



The Consumer Data and Information Program

Sowing the Seeds of Research

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¹ This administrative report was prepared by the following ERS staff: David Lindgren, Michael LeBlanc, Mark Denbaly, and Laurian Unnevehr, with assistance from Jay Variyam, Karen Hamrick, Laura Tiehen, and Ephraim Leibtag.

List of Acronyms Used in Report

ACS	American Community Survey
ATUS	American Time Use Survey
BLS	Bureau of Labor Statistics
BMI	Body Mass Index
CDC	Centers for Disease Control
CDIP	Consumer Data and Information Program
CDS	Child Development Supplement
CE	Consumer Expenditure Survey
CNSTAT	Committee on National Statistics
CPS	Current Population Survey
CSFII	Continuing Survey of Food Intakes by Individuals
DAA	Designated Agent Agreement
DHKS	Diet and Health Knowledge Survey
EH	ATUS Eating and Health Module
EIB	Economic Information Bulletin
ERR	Economic Research Report
ERS	Economic Research Service
FCBS	Flexible Consumer Behavior Survey
FCED	Food Commodity Economics Database
FED	Food Economics Division of the Economic Research Service
FY	United States Federal Government Fiscal Year (Oct. 1 - Sept 30)
HHS	Department of Health and Human Services
HUD	Department of Housing and Urban Development
IRI	Information Resources, Incorporated
MET	Metabolic Equivalents
NCHS	National Center for Health Statistics
NCI	National Cancer Institute
NHANES	National Health and Nutrition Examination Survey
NIA	National Institute on Aging
NICHHD	National Institute of Child Health and Human Development
NIH	National Institutes of Health
NSF	National Science Foundation
OMB	Office of Management and Budget
PSID	Panel Study of Income Dynamics
SNAP	Supplemental Nutrition Assistance Program
UMD	University of Maryland – College Park
UPC	Universal Product Code
USDA	United States Department of Agriculture
UT	University of Texas - Austin
WIC	Special Supplemental Nutrition Program for Women, Infants and Children

I. Introduction

Changes in the American public's food consumption and purchases in recent decades, together with advances in medical knowledge of dietary effects on health, have heightened awareness of the importance of understanding what people eat and where and why they eat it. Most U.S. consumers have diets that do not meet dietary guidelines' recommendations, and rates of obesity and overweight are rising for all consumers. American food markets are dynamic in offering new products and retail outlets to consumers, changing the food choices available. At the same time, food firms have been challenged by food safety recalls, adverse consumer reactions to new technologies, and increasing mandates for nutritional quality and information.

In the early 2000s, the United States' Federal data collection systems and infrastructure did not evolve quickly enough to meet the changing realities of today's food and nutrition issues. Gaps were increasingly evident in the data collection systems that historically facilitated information on the food sector, leaving researchers and policymakers grappling for the information they need to monitor conditions, detect new trends, design public policy, and react to issues in a timely manner.

In response to the growing need for improved data collection related to food consumption, the Economic Research Service began implementing the Consumer Data and Information Program (CDIP) in ERS Fiscal Year 2005. Over the past 5 years, the CDIP has strategically invested resources so that United States Department of Agriculture (USDA) policy officials, researchers, and the general public will have access to data about:

- Consumption and expenditure patterns - who is buying and eating what foods, when, where, why, and how much;
- Consumer responses to price changes, health concerns, new products, biotechnology, and events such as emerging foodborne diseases; and
- Relationships between food choices and diet, health and well-being outcomes—including food security and obesity—with emphasis on low-income populations.

The CDIP investments provide data to help understand price changes, market demand, and consumer reactions to unforeseen events and disruptions. In addition, the data indicate how market developments and consumer knowledge shape diet quality and health outcomes, thus helping policy officials assess performance of the U.S. food and agriculture system. Prior to this initiative, USDA lacked several key pieces of information about consumers on which to evaluate policy implications and tradeoffs.

This administrative report outlines the major investments in new data under the CDIP, highlighting the value of each investment's contribution to supporting the mission of ERS to inform decisionmakers. The report begins with a review of information needs for food economics research and policy analysis and the limitations of Federal survey data sources prior to the CDIP. Next, the report outlines how the CDIP arrived at a strategy for targeting new data investments to fill critical gaps. The report then reviews the four

major survey investments that have accounted for the majority of funds under the CDIP. In each case, information is provided regarding the content, timing, accessibility, and potential value of the surveys to future research. Other investments in data improvements are briefly outlined. We conclude with a look to the future for data investments under CDIP.

Information Needs for Food Policy

American food consumption and food markets have experienced dramatic and significant changes in recent decades. For example, over the past 30 years, Americans markedly increased the percentage of their total food dollar spent on food eaten away from home, from 32 percent in 1980 to 41.4 percent in 2007,² and over one-third of those expenditures are in fast food outlets. Consumers are eating less red meat, more poultry and seafood, and more imported fruits and vegetables. At the same time, average U.S. diets are deficient in fruits and vegetables, and contain more fats and added sugars than recommended by dietary guidance.³ Diet choices have received more scrutiny with rising rates of obesity, which doubled from 17 percent of U.S. adults in 1971-1974 to 34 percent in 2003-2006.⁴ And while food safety concerns have a long history, the frequency of recalls and other incidents has increased since 2004, with media attention on several large food safety recalls associated with different kinds of products and with growing international trade in food.

These food-related changes raise significant and intriguing policy and research questions. What caused Americans to become increasingly overweight and obese? Do people eat more, eat the wrong foods, exercise less, or some combination? Where do people purchase and consume food? How do changes in food markets, food prices, and availability affect what people consume? How are food consumption decisions affected by factors such as income, time resources, and consumers' preferences and knowledge, and how have these factors changed over time? How do new food preferences or trends (e.g., new weight-loss programs) affect the purchasing and consumption of different foods? How do factors outside of the household—such as access to food outlets, food and food preparation technologies, food marketing strategies, labeling policies, and the integration of advances in dietary knowledge into health care delivery—affect what people consume and the consequences for their health and safety? How do food preparation techniques affect diet and food safety? Does a food safety outbreak change the consumption patterns for specific foods? How have food assistance and educational programs affected the nutritional quality of diets in low-income households?

To answer these questions, it is necessary to have information about the many factors that go into making food consumption decisions. They include not only individual- and household-level factors (such as income, time resources, knowledge, skills, and

² Food CPI and Expenditures: Table 10.

http://www.ers.usda.gov/Briefing/CPIFoodAndExpenditures/Data/Expenditures_tables/table10.htm

³ <http://www.ers.usda.gov/Data/FoodConsumption/FoodAvailIndex.htm>

⁴ Health, United States, 2008: Health Risk Factors: Overweight and Obesity.

[http://www.cdc.gov/nchs/data/08.pdf#075](http://www.cdc.gov/nchs/data/hus/08.pdf#075)

preferences), but also factors outside of the household (prices, the availability of stores and restaurants, and new product introductions). When making decisions regarding food consumption, households and individuals consider their resource levels. These resources include monetary resources (income and asset levels), which are not always adequate for food consumption. Resources also include time—the amount of time available for food preparation, eating, and other activities. Household members may also have differing skills or informational resources available—for example, information on which foods are healthy and food preparation skills. Finally, individual household members have different food preferences (and allergies or aversions to some foods).

The amount and types of foods that can be consumed given a household's resources depend on the prices households face and the availability of different types of food (for example, the presence and types of grocery stores, restaurants, and food retailers and the variety of foods they carry). Packaging may also affect food consumption decisions, as might labeling that identifies the ingredients and nutrient elements that individuals may or may not prefer to eat or may perceive as harmful. Technology for food production and preparation also influences food choice, both in the home and away from home.

Households also make decisions within a policy environment. Government food policy affects the everyday choices that Americans make when deciding what foods to buy and consume. Policies directly related to food consumption include food and nutrition assistance and education programs, as well as food standards. The core food assistance programs, managed by the U.S. Department of Agriculture, include the Supplemental Nutrition Assistance Program (SNAP) (formerly the Food Stamp Program), which provides direct support for food purchases. Other programs, such as the school meals programs, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and commodity distribution programs provide meals or food directly to low-income households. Beyond food policy, other government policies regarding income, incentives, taxes, and other actions both directly and indirectly affect what, how, and why Americans purchase and eat the foods they do.

Policies also play a role in nutrition education and information. The USDA and the HHS issue the Dietary Guidelines, which are updated every 5 years. Nutrition education is provided to SNAP and WIC recipients. The FDA mandates nutrition labeling on packaged foods and regulates health claims on food. All of these actions shape the knowledge and market environment in which consumers make food choices.

The complexity of food markets, food policies, and food choices means that a great deal of information is needed to fully understand food consumption decisions. In addition to data on what foods people eat, what they prefer to eat, and where they eat it, information on household resources—income, assets, time, education, health and diet knowledge, and food preparation skills—is needed. Market-level information is also needed—that is, information on prices of food and related goods; availability of different foods; availability of grocery stores, food retailers, and restaurants; and marketing practices (such as amount of advertising exposure, target audiences, coupons or other incentives, and packaging/display). Finally, information on how policy interventions influence

markets and consumers—for example, through food assistance and other public assistance programs, government-assisted marketing efforts, labeling regulations, and public health initiatives related to diet—is also needed. The next section examines the extent to which existing data sources address these information needs.

Limitations of Existing Data Sources

Although no existing data source currently provides all of the information needed to answer the wide-ranging research questions associated with diet, food safety, health, food assistance, and food markets, a number of data sources provide some of the needed information. Each source, though, has weaknesses for addressing policy-related questions. In this section, we review the limitations of the two primary Federal surveys that include information about food intake and expenditures.⁵

The National Health and Nutrition Examination Survey (NHANES) collects information on food intake (consumption) and health and nutritional status at the individual and household levels. NHANES is an ongoing survey conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. The survey assesses the health and nutritional status of the population and monitors changes over time. A major objective of the survey's nutrition component is to provide data for nutrition monitoring purposes, including tracking nutrition and estimating the prevalence of compromised nutritional status. A second major objective is to provide information for studying the relationships among diet, nutritional status, and health. The primary focus of NHANES is individual food intake. Information about household food purchases and other relevant economic data are limited, which makes it of limited value for economic analysis.

The Consumer Expenditure Survey (CE) is an annual survey of household expenditures conducted by the U.S. Bureau of Labor Statistics (BLS), U.S. Department of Labor. The survey has three major objectives: (1) to provide information on consumer expenditures to support revisions to the Consumer Price Index market basket; (2) to provide a flexible set of data serving a wide variety of social and economic analyses; and (3) to provide a continuous body of detailed expenditure and income data for research purposes. The CE has a number of limitations for ERS research needs:

- Food item detail is limited to about 100 food categories and subcategories. This is sufficient for some program and policy analyses but is limiting for analyses of food quality and/or nutrient content.
- The Diary Survey does not capture information on prices and quantities—data elements that are needed to estimate price elasticities.
- Purchases of food away from home do not assess quality, quantity, or prices.
- Food assistance program participation and benefits are severely under-reported. Myers et al. (2009) estimate that the 2006-07 CE captured only 38 percent of food

⁵ ERS maintains the Food Availability database that provides information at the aggregate market level regarding the use of commodities and food products. This database provides a picture of aggregate consumption trends, but it does not allow analysis of household level decisions.

stamp benefits, and the estimates have been getting progressively worse over time.⁶

Each of these surveys provides important information about food consumption, but neither survey provides the critical data needed for understanding the economics of food choices. Data on food product prices and quantities purchased are not collected in either survey. There is very limited detail in the data collected on the potential determinants of household or individual food purchase decisions, such as USDA program participation, consumer knowledge attitudes, retail outlet characteristics, or various sociodemographic variables.

Each of these surveys represents a major investment of public resources and respondent effort. Each has a primary focus other than food purchase behavior. The NHANES is primarily focused on health outcomes, with the detailed health information collected making it quite costly per individual. The CE is actually implemented in two different ways through both an annual and a quarterly sample. Its primary purpose is to provide a comprehensive view of household expenditures, rather than to provide detail for any particular expenditure category.

The CDIP Investment Strategy

ERS requested additional funding for consumer data investments and also turned to the National Academies for guidance. In May 2004, the National Academies' Committee on National Statistics (CNSTAT) convened a panel of experts to review data needs in support of research and decisionmaking for food and nutrition policies and programs in USDA, assessing the adequacy of the current data infrastructure and recommending enhancements to improve the infrastructure. Additionally, the panel was mandated with the task of reviewing and making recommendations to improve existing data collection systems rather than proposing major new systems. Participants represented Federal statistical agencies, Federal food and nutrition-related agencies, private-sector data collection firms, university scholars, and industry experts.

The panel crafted six broad recommendations that were meant to address the data collection gaps within the constraint of building on existing data collection systems.

Recommendation 1: Establish an interagency working group to take responsibility for the systematic development and use of diet and food consumption data to address policy and research questions of the Federal Government.

Recommendation 2: Assign clear responsibilities to ensure sustained programs of research and development on data in key areas to provide a sound base of scientific evidence for efforts to improve the available information on diet and food consumption.

Recommendation 3: Consider priorities and methods for obtaining additional food and nutrition-related information in the National Health and Nutrition Examination Survey. The development of a supplemental module to the NHANES—which should include

⁶ Myers, Bruce, W. Mok, and J. Sullivan. "The Under-Reporting of Transfers in Household Surveys: Its Nature and Consequences." National Bureau of Economic Research. Working paper 15181, July 2009.

questions on food expenditures, diet and health knowledge, and other food and nutrition-related topics—should proceed, and research should be conducted on ways to obtain price information for inclusion in NHANES.

Recommendation 4: Consider low-cost ways to enhance the analytic uses of NHANES and other surveys by linkages with food assistance program records and with sources of socioeconomic and food shopping characteristics for the areas in which survey respondents live.

Recommendation 5: Continue to explore the use of data on food purchases, prices, and consumption from proprietary retail scanner systems, household scanner panels, and household consumption surveys. This should include examination of data quality, consideration of ways to reduce the costs of access, and determination of priority applications for the information.

Recommendation 6: Consider ways to enhance the usefulness of other Federal datasets for food and nutrition-related policy analysis and research such as the Current Population Survey; the American Time Use Survey; panel surveys that follow families, children, and the elderly over time; and surveys that are designed to track emerging trends.⁷

ERS used these recommendations to implement the Consumer Data and Information Program. This program, funded at \$3.5 million per year and beginning in fiscal year 2005, set out to address gaps in USDA’s food consumption data. To be most cost-effective, the CDIP focused on enhancing existing public and private data collection systems and availability. The ERS devised a strategy that would use the CDIP’s limited resources to maximize data available to answer the most important policy questions. This strategy had four elements: (1) supplementing existing government surveys with separate modules when possible, (2) integrating and linking data from disparate surveys, (3) investing in proprietary data, and (4) enhancing existing surveys.

Table 1. Consumer Data and Information Program Investment Approach				
Area of Investment	Strategy			
	Supplement Existing Surveys	Create Linkages	Propriety Data Investments	Enhance Existing Surveys
National Health and Nutrition Examination Survey - NHANES	✓	✓		
Nielsen - HOMESCAN			✓	
American Time Use Survey (ATUS)– Food and Eating Module	✓			
Panel Study of Income Dynamics (PSID) 2007	✓			✓
Other investments	✓	✓	✓	✓

The Food Economics Division of ERS, through the Consumer Data and Information Program, has made significant investments, both in funds and people, in five new activities since 2005:

⁷ The CNSTAT report’s executive summary is available at: http://www.nap.edu/catalog.php?record_id=11428

- Additions and extensions to NHANES. The Flexible Consumer Behavior Survey complements data from the National Health and Nutrition Examination Survey (NHANES). The FCBS provides information needed to assess relationships between individuals' knowledge and attitudes about dietary guidance and food safety, their food-choice decisions, and their nutrient intakes and health outcomes. Complementary efforts to link NHANES to other information such as food prices and community characteristics will allow ERS researchers to investigate how these variables influence food intake and health outcomes.
- Proprietary data, primarily Nielsen's Homescan and consumer panel. The Homescan is a continuing panel survey of households. Participating panelists record UPC-coded transactions and random-weight (non-UPC coded) food purchases. Purchases of these data support analysis of food purchase behavior for individual food products, consumer response to market events such as food safety recalls, and consumer strategies for choosing retail outlets and sales opportunities. Complementary investments were made to assess the quality and reliability of these data.
- The third wave of the Panel Study of Income Dynamics (PSID) - Child Development Supplement (CDS-III). The PSID is a continuing intergenerational panel survey of a cohort of families that began in the late 1960s. As the longest running nationwide panel survey of its kind in the United States, the socioeconomic information generated provides useful insights into explaining food and nutrition policy trends. The PSID and CDS data allow us to better understand the determinants of the increase in child overweight and obesity rates, cognitive developments, and academic achievements, as well as how children's habits are formed over long periods of time and how they connect to the economic conditions in which they are raised.
- The Food & Eating Module of the Bureau of Labor Statistics American Time Use Survey (ATUS). The module consists of questions designed to examine relationships between time use and purchasing, preparing, and consuming food. Together with the complete data on time use, this module allows analysis of how eating behavior is influenced by time constraints, such as those involved in food access and preparation.
- Other specific targeted investments. In addition to the major investments, several ad hoc investments have been made that complement existing or ongoing data collections, including improvements to the Food Availability System; the Food Commodity Economics Database (FCED), which converts NHANES food intakes into commodity equivalents; and investments in behavioral economics to support survey question development.

II. Major Investments

Since the CDIP began in fiscal year 2005, the Economic Research Service has focused its efforts on four primary investment areas, all intended to eliminate existing gaps in or otherwise strengthen Federal food and nutrition data collection systems.

The following sections provide detailed insight into each of the four main investment areas, including historical information relevant to understanding the importance of the investments, the amount invested, the current status of the investments, and resulting data, publications, and research.

National Health and Nutrition Examination Survey (NHANES)

Background

The National Health and Nutrition Examination Survey (NHANES), administered by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) within the U.S. Department of Health and Human Service, tracks health and dietary practices and outcomes of Americans and serves as a tool to inform decision and policymakers. Established as a continuous survey in 1971 when the National Health Examination Survey and the National Nutrition Surveillance System were combined, the NHANES became an ongoing survey in 1999; reporting data on detailed health, nutrition, and medical information from about 5,000 participants per year. In addition to demographic and economic background information and self-reported health status for each individual in the sample, physiological information, including precise measurements of height and weight and blood chemistry, is obtained. Respondents complete a 24-hour dietary recall of food consumption for two non-successive days; the first conducted in person and the second by telephone.

Data from NHANES are a cornerstone for much of the diet and health research at ERS, ranging from the study of obesity to the effect of label use on consumption, yet there have always been limitations to the data, especially in the areas of food consumption and expenditures. Prior to 2002, the U.S. Department of Agriculture's primary methods of monitoring food consumption and expenditures as well as participation in food assistance programs were the Continuing Survey of Food Intakes by Individuals (CSFII) and Diet and Health Knowledge Survey (DHKS). These surveys provided information on food consumption, collected from 2 days of dietary recall, as well as food expenditures and shopping practices such as how much is spent on different types of food, how much is spent on food prepared at home versus food prepared outside the home, and where and with what frequency food shopping is done.

In 2002, a decision was made to integrate the CSFII and DHKS into the NHANES for improved data collection efficiencies and cost-saving purposes. Although this integration translated into more food-related questions and a second day of dietary recall in

NHANES, many CSFII and DHKS questions were dropped. Among the more notable losses, the updated NHANES no longer surveyed participants on household food expenditures, food shopping patterns, or diet and health knowledge. The Federal Government was thus left with no ongoing survey measuring many important food indicators in the United States.

Compounding concerns about NHANES's ability to collect food-related data are a few other possible or existing weaknesses. A recent study shows that many Federal surveys tend to underestimate the number of survey participants who also participate in government assistance programs.⁸ This means that it is important that NCHS, ERS, and other NHANES data users understand whether the NHANES underreports certain populations. Additionally, NHANES lacks general income data, meaning the data do not provide a clear understanding of household budget constraints. Likewise, the survey has shown a tendency to produce certain seasonal and locality biases due to a highly clustered design and, as the survey only includes 5,000 participants, some subpopulations and/or conditions are too limited or small for certain multivariate analyses.⁹ Essentially, the updated NHANES, while facilitating some enhanced food data, is still fundamentally a health survey, and therefore does not provide the Federal Government robust data on American food consumption and expenditures necessary for policy formation and decisionmaking.

What Was the Investment?

With the availability of Consumer Data and Information Program funds, ERS identified improving and broadening NHANES data and scope as critical to addressing survey limitations and enhancing access to food-related information. The ERS achieved these goals by applying a two-pronged investment strategy focused on developing and implementing a supplemental module and creating linkages between NHANES data and other existing data sets.

Even prior to CDIP, ERS and the National Center for Health Statistics had begun analyzing the possibilities for development of a supplemental module for NHANES. The intention of this new module was to re-introduce many of the questions lost by the elimination of the CSFII as well as field some new questions. With the availability of CDIP funding, ERS and NCHS were able to turn this module into reality.

Entitled the Flexible Consumer Behavior Survey (FCBS) Module, the module is designed to be implemented in conjunction with NHANES. It contains questions on food shopping, food expenditures, self-assessment of diet quality, frequency of eating food away from home, attitudes toward and knowledge about diet and food safety, use of food

⁸ Myers, Bruce, W. Mok, and J. Sullivan. "The Under-Reporting of Transfers in Household Surveys: Its Nature and Consequences." National Bureau of Economic Research. Working paper 15181, July 2009.

⁹ National Research Council (2005). *Improving Data to Analyze Food and Nutrition Policies*. Panel on Enhancing the Data Infrastructure in Support of Food and Nutrition Programs, Research, and Decision Making. Committee on National Statistics, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press. pp. 40-41.

labels, and safety-related preparation practices. Although ERS, via CDIP funding, covered all costs related to the development and implementation of the FCBS, NCHS, the agency responsible for managing the NHANES, coordinated and implemented the new module. As ERS was the funding agency, it was responsible for the development of all questions included in the module. Throughout the process, ERS solicited and received input and contributions from a variety of Federal agencies to develop questions that would maximize the module's utility.

To date, CDIP investments in the NHANES have supported development of the FCBS module in FY05, cognitive testing and a pilot implementation in FY06, fielding the survey in 2007 and 2008, and post-implementation processing during fiscal years 2008 and 2009. ERS continues to support the FCBS as it undergoes implementation with the 2009-10 NHANES cycle.

The FCBS was not fully implemented until 2007. A pilot survey developed in conjunction with NCHS was included as a section of the core NHANES 2005-06 survey. This pilot section, known as the Diet Behavior and Nutrition questionnaire, surveyed participants on a limited number of questions related to food consumption, food label use, and participation in food assistance programs. This survey not only re-introduced previously eliminated NHANES questions but allowed for ERS and NCHS to test some important questions being developed for the FCBS, ensuring greater effectiveness upon introduction of the FCBS in 2007.

Beyond the introduction of a supplemental survey, ERS also directed CDIP funding toward strengthening linkages between NHANES and other data sets to enable better and more extensive use for economic and policy analysis. The ability of researchers to link with existing data sets enables a broader, more robust data sample and is likely to be highly cost effective. More available data translates into a greater understanding of Americans' consumption habits and the factors that influence them. Efforts to link NHANES with other data focused on linkages in three areas: regional price data, neighborhood characteristics and food outlet databases, and food assistance program records.

By linking NHANES participant data with food assistance program records, ERS aims to address any questions about the accuracy of program participation information, allowing researchers to more accurately determine if correlations between food assistance participation and information on food consumption and nutrition exist. To strengthen food assistance participant accuracy, ERS directed CDIP resources toward linking NHANES to State-level food assistance program administrative data. This was done by identifying three research centers in California, Illinois, and Texas, each of which has significant experience linking Federal records and programs to State-run programs such as food stamps and WIC. These centers have been tasked with linking their respective States' food assistance administrative records with NHANES participant data. As each State manages federally funded food assistance programs separately, these studies were developed as pilot programs to evaluate the possibilities and challenges of linking NHANES data with State-level food assistance participation data. These initiatives are

expected to pave the way for an expanded effort to link State food assistance participant databases with NHANES data across the country.

Beyond linkages between NHANES and food assistance programs, ERS made other data linkage investments that are important to improved economic analysis. The first major success in establishing more linkages was to improve access to detailed NHANES data on the part of ERS researchers. Previously, ERS researchers were required to travel to NCHS offices every time they wished to conduct research involving detailed NHANES data. This meant that research was slowed, or, in some cases, did not take place at all. ERS signed a Designated Agent Agreement (DAA) with NCHS that allowed ERS to create a secure, in-house data lab with NCHS supplying detailed NHANES data. Having the in-house NHANES data lab means that NHANES-related research is much easier for ERS to conduct.

ERS in-house researchers have focused on creating linkages to NHANES in two areas: price data from other surveys and neighborhood characteristic/food outlet databases. Using Nielsen Homescan data, ERS developed a regional price database that includes prices for a variety of food items in 26 metropolitan markets as well as 9 non-metropolitan census divisions. These 35 markets can then be linked to the metropolitan areas where NHANES respondents reside. Price data linkages provide researchers greater insight into how food prices affect consumption and nutrition by region as well as strengthen analyses of food intake determinants. Building on this, researchers have more recently focused on linking NHANES data with neighborhood characteristics and food retail outlet databases. By first understanding food assistance participation and regional price effects, researchers can then apply neighborhood characteristics and availability of retail food outlets to better explain intraregional and inter-neighborhood differences. By making these linkage investments, ERS is able to provide more credible research on determinants of consumer food intake decisions on national, regional, and local bases.

Is the Investment Complete or Ongoing?

The majority of CDIP-related investments in NHANES are ongoing. The data generated by the FCBS in the 2007-2008 NHANES are still being processed and organized by NCHS; therefore, ERS continues to provide financial support to this effort. Likewise, NCHS, in coordination with ERS, has begun implementing the 2009-2010 NHANES, which includes the FCBS. The linkage activities are due to be completed by the end of FY11.

What Kind of Data Did It Generate? Over What Timeframe?

The FCBS surveyed participants on dietary habits, food expenditure, time use, income and assets, food assistance, frequency of food-away-from-home consumption, nutrition knowledge, food label use and understanding, and food safety. As with many long-term Federal surveys, NHANES data releases occur up to 2 years after the data have been collected. NHANES data are collected on an ongoing basis but, to create a nationally representative sample, the survey compiles and processes 2 years' worth of participant

data, releasing the data biannually. For the FCBS implemented with the 2007-2008 NHANES survey, the household survey data will be released in the fall of 2009 and the phone survey results in the summer of 2010.

As previously described, ERS also funded a smaller, pilot questionnaire in the 2005-06 NHANES, entitled the Diet Behavior and Nutrition Questionnaire. This section of NHANES involved surveying respondents on the use of food labels, milk consumption, understanding of dietary guidelines (food pyramid, etc.), participation in food assistance programs, frequency of food-away-from-home consumption, and a self-health assessment. These data were collected from 10,348 NHANES participants but, as is typical, response rates varied between questions. Although more limited in scope than the FCBS, this questionnaire generated extremely interesting and useful data for researchers.

All linkage investments are ongoing and have yet to yield data. The linkage projects, while promising to provide rich and expanded data sets for NHANES, are not short-term investments. Even upon establishment, many linkages will require testing and verification to confirm their utility and credibility. The investments to link food assistance administrative data are an excellent example. After much work, ERS researchers and the University of Texas – Austin (UT) have finally completed much of the preparatory work on the pilot program to link Texas NHAHES data with Texas SNAP data. The project has now begun to initiate work on developing the linkages, but the results are not expected to be available in the near term.

Are the Data Publicly Available?

The 2005-06 Diet Behavior and Nutrition Questionnaire data and questionnaire are available for download on the NHANES website.

The Food Economics Division of ERS has been able to review some of the data generated by the 2007-08 FCBS by using the secure, in-house NHANES data lab but, due to privacy demands as well as the need to further prepare the data, the data are not ready for release. Upon release, these data, as well as the 2009-10 FCBS data when complete, will be made available through the Center for Disease Control's National Center for Health Statistics' NHANES website.

National Health and Nutrition Examination Survey Websites

General Information

<http://www.cdc.gov/nchs/nhanes.htm>

NHANES 2005-06 Diet Behavior and Nutrition Data

http://www.cdc.gov/nchs/nhanes/nhanes2005-2006/quex05_06.htm

NHANES 2005-06 Diet Behavior and Nutrition Questionnaire

http://www.cdc.gov/nchs/data/nhanes/nhanes_05_06/sp_dbq_d.pdf

NHANES 2007-08 Flexible Consumer Behavior Survey Module

http://www.cdc.gov/nchs/data/nhanes/nhanes_07_08/fcbs_e.pdf

NHANES 2009-10 Flexible Consumer Behavior Survey Module

http://www.cdc.gov/nchs/data/nhanes/nhanes_09_10/FCBS_f.pdf

In the interim, the NCHS has made the 2007-08 and 2009-10 FCBS questionnaires available for download via its website. These documents, along with the 2005-06 Diet Behavior and Nutrition Questionnaire, include every question in the surveys, providing a

much more detailed understanding of what data gaps ERS seeks to address. The text box in this section presents a list of links to the NHANES website where these data and questionnaires may be located and downloaded at no cost.

What Published or Ongoing Research Has Resulted From the Data?

Considering the long time horizon of investments under NHANES, few research initiatives and even fewer publications have yet to emerge. As more data become available, more research and publications on a variety of issues addressed by these investments should emerge.

One research initiative, undertaken by researchers in ERS's Food Economics Division¹⁰, utilized the data generated by the NHANES 2005-06 Diet Behavior and Nutrition questionnaire to analyze Americans' use of food nutrition labels on food packages. The research compared results of questions pertaining to food nutrition label use from the 1994-96 Diet and Health Knowledge Survey (the supplemental module to the CSFII) to the results generated from the Diet Behavior and Nutrition questionnaire in the 2005-06 NHANES. The researchers found that, while the majority of consumers look at food nutrition labels when making purchases, consumers' reliance on label components to influence purchase decisions has decreased over time. With the exception of increased attention given to fiber content, Americans are less likely to make their food purchase decisions based on specific food contents such as calories, fats, cholesterol, and sodium. This decline is especially true for American adults under the age of 30.

Since 1994, when the Nutrition Labeling and Education Act took effect, the Federal Government has worked to support increased use of food nutrition labels as a means of improving consumers' ability to make healthy food choices, including programs to educate Americans about how food nutrition labels are used. CDIP-funded research provides Federal policymakers with important insight into the use of food nutrition labels, and indicates what adjustments are necessary to improve the effectiveness of nutrition education and other programs that promote healthy eating. The publication is available at <http://www.ers.usda.gov/Publications/ERR63/>.

Much of the linkage research currently being carried out is being conducted by ERS staff. The following titles and brief descriptions give greater insight into the linkage research currently underway.

- **Price Effects on Diet and Health Outcomes.** This study is currently working to use data from Nielsen's Homescan, American Community Survey (ACS), and NHANES to evaluate the effects of food prices and neighborhood characteristics on the health and dietary intake of Americans.
- **Supplemental Nutrition Assistance Program Participation, Food Consumption and Health Outcomes.** Researchers first worked to establish a

¹⁰Todd, Jessica E., and Jayachandran N. Variyam. *The Decline in Consumer Use of Food Nutrition Labels, 1995-2006*, Economic Research Report No. 63, Economic Research Service, U.S. Dept. of Agriculture, August 2008.

means of predicting SNAP participation by comparing NHANES participant response data with participation rules and regulations on a State-by-State basis. Upon obtaining a means of predicting participation, the researchers will then compare SNAP participation to the food and health outcomes reported by NHANES to see how participation influences the latter.

- **Texas SNAP State Linkage Pilot Project.** This project, working with UT, attempts to evaluate the value and accuracy of NHANES self-reported food assistance participation as compared to SNAP administrative records. Using SNAP administrative records from the State of Texas, researchers are working to link State food assistance participant information with results from Texas NHANES participant data in an attempt to better understand whether or not participation in food assistance programs has effects on food consumption, health, and nutrition. ERS researchers are also beginning to coordinate with the Universities of Chicago and California-Berkeley to develop similar linkage programs in Illinois and California.

Upon completion of this research, ERS researchers will make public certain results of these studies. Due to the sensitive nature of the data being analyzed, in many cases ERS will not be able to make detailed data sets publicly available but will provide a synthesis of the results.

Proprietary Consumer Panel Data

Background

CDIP also provided ERS an opportunity to analyze possible investments in proprietary data collection systems. A number of private data collection systems, focused on tracking consumer goods markets, exist and have long been of interest to ERS and other researchers. These data sets contain substantial amounts of data on food purchases and consumption, including detailed information on the purchase of specific foods, brands, quantities, and prices paid. These data sets are also available much sooner than the results of most Federal data sets, ready in a year instead of 2-3 years. This kind of detail and the timeliness with which the data are produced is unmatched in existing, federally sponsored surveys.

Because some policy and decisionmaking questions require unusually detailed information, the proprietary data sets represent an attractive opportunity for USDA and the Federal Government. In particular, retail and household scanner data can reveal short- and long-term trends in aggregate market purchasing of foods, demonstrating how consumer behavior changes (both short- and long-term) with respect to specific product attributes and price, when new products are introduced, or when labeling regulations change. Additionally, proprietary data can help to identify trends in eating patterns and dieting practices.

Scanner data have been used in published economic studies for two decades to answer a variety of questions about food consumption, food pricing, and the operation of retail food markets. These data are generated via two types of collection systems: *point-of-sale* (retail) collections, which link the Universal Product Code (UPC) of products sold at retail checkout counters to quantities sold and their prices; and *household scanner panels*, in which household members are asked to scan the UPC of the items they have purchased. One of the key attributes of these data is the detailed product information, including brand name, exact description of the product (e.g., regular versus calcium-enriched orange juice), quantity of the product, and purchase price, including whether it was on sale or part of a promotion. This linkage of price and detailed quantity and product data for individual household purchases is unique among all the data sets reviewed in this report.

Currently, there are two major research firms that develop these data sets: Nielsen and Information Resources, Inc. (IRI). For point-of-sale data, Nielsen and IRI purchase price and item data from the scanner systems of participating retailers. The retail scanner data do not cover restaurants or other food outlets, fruits and vegetables, some prepared foods, and a number of other products without UPC codes.

Alternatively, household scanner panel data (Nielsen's Homescan and IRI's Combined Outlet Consumer Panel) are generated by select households, in which they scan in all purchases, including food, on a weekly basis. Information collected on products with a UPC includes price, quantity, and promotional information; for items without a UPC, such as fruits and vegetables, participants identify the type of item and its weight. Along with purchase data, the firms also collect a limited amount of demographic data on the participating households.

While highly detailed, a number of limitations have been identified with the retail scanner data. A major challenge to researchers is that the retail scanner data from point-of-sale are not generated through a randomly selected sample and are not necessarily representative. A glaring weakness in the data is that retailer Wal-Mart and small food outlets do not participate, yet they represent a significant portion of U.S. sales. This means that we may be seeing highly biased or restricted results that are not nationally representative. Additionally, the lack of data on fruit, vegetable, and prepared food purchases further restricts the ability of retail scanner data to predict or reveal trends. As a result of these limitations, ERS researchers prefer using household scanner panel data instead of retail scanner data as a means of ensuring a more representative and informative sample of food purchases. Household scanner panel data include purchases from all retailers and, in some cases, provide information on random-weight food items.

In 1998, ERS began making strategic investments in Nielsen's household scanner data (Homescan). ERS selected Nielsen's Homescan over IRI because Homescan tracked the weight, unit measure and prices of non-UPC purchases (e.g., fruit and vegetable purchases) whereas IRI did not offer that information. Starting in 2007, Nielsen's Homescan moved away from collecting information on the weight and unit prices of non-UPC items as it was deemed too onerous for panel participants; instead, it asked

respondents to record only total expenditures of each non-UPC item. Although this panel became less desirable for many policy-related questions surrounding diet quality and health outcomes, Homescan continues to provide attractive and timely information that IRI does not make available, rendering it more useful to ERS research.

Although Homescan provides significant insight into American expenditure patterns and habits, the data set poses a major challenge to researchers. Rather than using established scientific random sampling methods like those utilized in government-sponsored surveys, Nielsen collects household scanner panel data based on demographic and geographical population data. This means that questions exist about the statistical qualities of the data, especially their ability to conform to Office of Management and Budget (OMB) requirements. With the availability of Consumer Data and Information Program funds, ERS decided that it was an opportune moment to investigate the statistical validity of Homescan data, as well as to make additional investments in Homescan-related research and outreach.

What Was the Investment?

The purchase of Homescan data sets provided ERS with a significant amount of data for agencywide research. Nielsen offers a wide variety of data sets for purchase and, after careful consideration, ERS elected to purchase year-old, full “static” Homescan data sets of UPC and non-UPC food purchases. A “static” sample, as defined by Nielsen, consists of those respondents who participate in the panel for a minimum of 10 of the 12 months during the year; currently, there are approximately 60,000 households included in the static sample. Between FY05 and FY09, ERS acquired the full static Homescan food data sets for calendar years 2004-2008.

Upon acquisition of the Homescan data, ERS began investments in assessing the overall data quality and usefulness for specific research programs. The first investigation, assessing overall data quality, was designed to look at the statistical properties of Homescan data as well as compare the data to existing data sets to analyze Homescan data credibility. Since FY05, ERS has awarded four cooperative agreements for research aimed at addressing these data quality and credibility questions. The second area focused on awarding research grants for specific research desired by ERS. The grants and cooperative agreements awarded for this research analyzed food demand, demographics of food expenditures and consumption, and the effects of package size on the consumption of unhealthy foods.

What Kind of Data Did It Generate? Over What Timeframe?

CDIP investments in Nielsen’s Homescan data resulted in the acquisition of a significant amount of food data. With approximately 60,000 respondent households, the consumer panel represents 61 geographic areas and provides both demographic information and purchase data. Of the 60,000 households participating in the Homescan, 22,000 of them also participate in the Fresh Foods panel, which reports on non-UPC fresh foods in 12 geographic locations (prior to 2007, there were only 8,000 participating households).

Demographic information includes family size, income, gender, race, education, employment status, head of household, and location by region, State, and county. Purchase data contain information on purchase date, brand, size, flavor, and store. The two sections are linked by an identification number assigned by Nielsen to each household. Thus, ERS can investigate both overall food consumption trends and specific trends by region, income group, store, etc.

Beyond the acquired data sets, CDIP investments in research yielded a host of qualitative and quantitative information surrounding Nielsen's proprietary data sets. The majority of this research was conducted between fiscal years 2006-08, although a few research programs are ongoing.

ERS has complete and comparable Homescan data for the years 1998-2006. Even though Nielsen changed the collection format beginning in 2007, ERS intends to continue purchasing Homescan panel data on an annual basis as they have proven highly valuable to the agency. Additionally, ERS will continue research activities related to and based on Homescan data sets.

Are the Data Publicly Available?

Due to the proprietary nature of the Homescan data, these data are not made publicly available by ERS. ERS does use these data for a wide variety of research initiatives that lend support and guidance to policy- and decisionmaking, and some data have been shared with academic cooperators for specific projects of interest to ERS.

What Published or Ongoing Research Has Resulted From the Data?

As previously noted, some CDIP-funded research initiatives were related to Homescan data sets. ERS looked to analyze the statistical qualities of the Homescan data, through benchmarking Homescan's data against that of other Federal and proprietary data sets. This was important as ERS and other Federal agencies increasingly rely on Homescan data even though the statistical properties had never been well understood and some researchers and government agencies considered the data unreliable. By funding the studies, ERS was able to determine where weaknesses exist in Homescan data and what would be necessary to strengthen the data's reliability.

A benchmark analysis comparing Homescan price data to expenditure data from the government-sponsored Consumer Expenditure Survey was carried out through a contract with the Research Triangle Institute. The benchmark analysis discovered that many differences in reported expenditures across the two data sets can be explained by household demographics such as gender of head of household, income, and household size. The largest discrepancies across data sets occur for food categories containing more non-UPC foods.¹¹

¹¹ The results are reported in Zhen, C., J.L. Taylor, M.K. Muth, and E. Leibtag, "Understanding Differences in Self-Reported Expenditures between Household Scanner Data and Diary Survey Data: A Comparison of

Beyond benchmarking against Federal surveys, CDIP funded a cooperative agreement between Northwestern University and ERS to assess the accuracy of the Homescan data by benchmarking Homescan data to Nielsen's retail scanner data (Scantrak). While most surveys (Federal and proprietary) do not have a means of comparison, the Nielsen data offer the unique possibility of analyzing price and quantity discrepancies by comparing data from stores and households. The program identified a few select retailers included in Scantrak and purchased Scantrak data on food purchases reported by those retailers. Then, using Homescan data, researchers compared the retailer food purchase records to the same food items reported by Homescan households.

Ideally, comparing these data should provide significantly similar results, but this is not the case. Nielsen, in an attempt to reduce the time burden, does not require Homescan households to report prices on items purchased at retailers that participate in Scantrak. Instead, Nielsen determines unitary prices through a formula that considers regular prices, sales, loyalty card benefits, and other special offers for each retailer. Although this reduces the burden to the Homescan participants, it translates to less accurate reporting of prices paid on food items. The research report *On the Accuracy of Nielsen Homescan Data* (<http://www.ers.usda.gov/Publications/ERR69/>) reveals that while purchase quantities reported in Homescan are very accurate, discrepancies exist in price records. Overall, even with price reporting errors, the report concludes that Homescan reporting errors are in line with other existing research data sets.

The other focus of CDIP-funded research activities related to Homescan data was a number of research projects that supported the analysis of both Homescan food data and food consumption trends, as follows:

- **Measuring Consumption Response to Prices in a Dynamic Model of Consumer Food Purchase Behavior** – Michael Wohlgenant and Mary Muth, RTI International
- **Comparisons of Estimates of Food Expenditures by Income and Family Size** – Austin Nichols, The Urban Institute
- **Expenditures on High-Sodium Foods by Race and Income: Implications for Food Stamp Program** – Maria McDaniel and Tracy Vericker, The Urban Institute
- **The Impact of Retail Firm Pricing Strategies on Food Purchase Behavior, Consumption and Nutrition** – Aviv Nevo, Northwestern University
- **Modeling and Measuring Food Price Changes Through the Food Distribution System** – Ariel Pakes, Harvard University
- **U.S. Household Food Demand at Home** – Steven Yen, University of Tennessee
- **Organic Produce Demand Analysis Using Homescan Data** – Chung Huang, the University of Georgia

Homescan and Consumer Expenditure Survey,” *Review of Agricultural Economics*, 31(3), 2009, pp. 470-492.

- **Consumer Response to Changes in Food Package Size: Econometric Evidence from Nielsen Homescan Data** – J. Balagtas and S. Chen, Purdue University.

Most of the research initiatives are ongoing and not yet published. A more recent research program, entitled *Measuring Consumption Response to Prices in a Dynamic Model of Consumer Food Purchase Behavior* and undertaken by RTI International, is looking at the high rates of obesity in low-income populations and how it may relate to the overconsumption of foods that are energy dense but low in cost. Specifically, the project uses Homescan data related to caloric soft drinks and salty snacks to analyze the economic determinants of food purchasing and consumption behavior of low-income households. The study is also examining several key issues regarding the implication of package sizes on overconsumption, including short- and longrun effects of package size on habit formation and household perceptions. This research has the potential to shape food policy in an effort to combat increasing rates of obesity nationwide.

American Time Use Survey - Eating and Health Module

Background

The American Time Use Survey (ATUS), established in January 2003, is currently the only nationally representative survey recording how Americans spend their time, as well as the only Federal survey providing data on the full range of non-market activities. Sponsored by the BLS and conducted by the U.S. Census Bureau, the ATUS is a continuous survey that draws participating households from the outgoing population of the Current Population Survey and releases results annually.

The ATUS surveys one individual from each sampled household about his or her time use, tracking, among other activities, paid work, household chores, childcare, time spent commuting, recreation, and out-of-town travel in the previous 30 days. Survey respondents identify their primary activity for the entire 24-hour timeframe (4 am to the following 4 am), logging the activity in a time diary, along with when and for how long the respondent engaged in each activity, where the respondent was, whom the respondent was with, and whether or not the activity was for education or paid work. The respondents also provide basic demographic and labor force participation information.

The ATUS data have been very informative but from its inception, the Economic Research Service (ERS) had identified a major weakness in the survey. Specifically, when respondents report their primary activity, any simultaneous, secondary activities went undocumented. One of the major secondary activities that ERS and other researchers have identified as missing is food consumption. Increasingly, as Americans tend to consume food while engaging in other activities considered primary (e.g., working, watching TV, etc.), many instances of meals or snacking have not appeared in the ATUS data.

In response to this weakness, ERS began working with the BLS in 2003 to develop an add-on module to monitor secondary activities as they relate to food consumption and general health. The result was the Eating and Health (EH) Module, a 4-minute supplement to the American Time Use Survey (ATUS) that collects information on Americans' eating patterns, general health, participation in food assistance programs, grocery shopping, and meal preparation, making this previously unknown information publicly available.

What Was the Investment?

The EH Module was developed by ERS and is co-sponsored by the National Institutes of Health's National Cancer Institute (NIH-NCI). Initially relying on a variety of funding mechanisms to formulate questions, begin cognitive pre-testing and develop data management software, ERS was able to use Consumer Data and Information Program (CDIP) funding to complete the module's implementation. The CDIP, tasked with strengthening the Federal Government's food data collection infrastructure, is an ideal funding source for the EH Module as the module encompassed every aspect of the programmatic objectives. The funding focused on four areas: direct development and implementation of the survey, development of data management software, research, and outreach to disseminate results.

The EH Module was added to the ATUS fieldings in 2006, 2007 and 2008, collecting 3 years' worth of data on outgoing Current Population Survey participants. Although originally intended to be fielded for just 2 consecutive years, ERS, NCI, and BLS determined that it was in the interest of all parties involved to test the module over 3 consecutive years. This not only ensured that any problems and challenges were eliminated from the survey at the outset but also ensured adequate sample data on low-income and food stamp populations.

Understanding that there would be interest from a wide variety of users, the CDIP funded a cooperative agreement with the University of Maryland – College Park (UMD) to develop an enhanced data management system (ATUS-X) to make ATUS data more accessible . This agreement operated between fiscal years 2006 and 2008, with the goals of collecting and preserving ATUS data and documentation, harmonizing the data from different years, and enabling the creation of data files containing the ATUS variables a user needs. This project resulted in the successful development of a system whereby the ATUS and EH Module data are significantly more user-friendly, thus providing less experienced users greater access to the data.

Beyond simply investing in the development and implementation of the EH Module and improving data accessibility, the CDIP played an integral part in the initial analysis, dissemination, and promotion of the data obtained in the module. CDIP signed two cooperative agreements with UMD, co-sponsoring the 2007 International Association for Time Use Research Conference and the 2009 American Time Use Research Conference. Both forums brought together prominent academics, researchers, and policymakers to share early analysis of the data emerging from ATUS and EH Module data. ERS, in

conjunction with UMD, also used these conferences to better understand what type of ATUS-based research is being done outside the Federal Government and how ERS can continue improving the EH Module for future fieldings.

ERS, via CDIP, has also supported research to utilize the ATUS data investment. A cooperative agreement with University of Texas-Austin supports research focused on primary and secondary eating/drinking episodes and their relation to health, body mass index (BMI), and income, including how the production and timing of meals affects obesity rates.¹² Another cooperative research agreement with Ohio University focuses on establishing time poverty thresholds (that point where individuals have so little discretionary time remaining after completing necessary activities that they are unable to engage in activities, like leisure and education, that improve their overall well-being).

Is the Investment Complete or Ongoing?

After a small trial run in 2005, the Eating and Health Module was fielded in January 2006 and ran for 3 years, concluding in December 2008. Except for some final costs related to processing survey data and research activities, the CDIP investments in the EH Module and core ATUS are complete.

ERS is considering further investments to run the EH Module (or an updated version) every 5 years for 2 consecutive years, with the next module slated for 2013-14. Considering that time use behavior does not generally register significant changes year to year, fielding the EH Module every year is neither necessary nor feasible. Even if ERS wished to field the EH Module permanently, BLS would not allow this as there would be no slots for other modules.

What Kind of Data Did It Generate? Over What Timeframe?

The EH Module complements the core ATUS by collecting data on secondary eating and drinking; height, weight, and general health; food stamp (SNAP) benefit participation; meals obtained at school; household income; and grocery shopping and meal preparation. This—combined with core ATUS information on primary time use activities, demographics, and labor force status—has resulted in a much clearer picture of the eating habits and health of Americans. Collecting these characteristics of the respondent and of the respondent's household allows the U.S. Department of Agriculture to examine, for example, time use patterns of food stamp recipients versus income-eligible nonrecipients. Additionally, because the ATUS draws its sample from households that respond to a prior Current Population Survey interview, ATUS respondents can be linked back to their CPS data, and to CPS supplements such as the Food Security Supplement, for an even richer picture of the sample population.

As previously detailed, 3 years of continuous data were collected between 2006 and 2008, surveying approximately 12,600 people per year. The 2006 EH Module data were

¹² Results reported in Hamermesh, D.S., “Grazing, Goods, and Girth: Determinants and Effects,” NBER Working Paper 15277, August 2009, <http://www.nber.org/papers/w15277>.

released in May 2008, the 2007 data in February 2009, and the 2008 data are scheduled to be released in February 2010.

Are the Data Publicly Available?

The data generated from the CDIP-funded Eating and Health Modules conducted in 2006 and 2007 are available on the ERS and BLS websites. The data on the two websites are interlinked for easier access. The ERS website includes estimates of basic statistics, including a host of data tables presenting summarized results, while the BLS website includes summary charts and the EH Module microdata files. Upon release, the 2008 data set and resulting summary data will also be made available on both websites.

Eating and Health Module Links
Estimates of Basic Statistics
Economic Research Service
<http://ers.usda.gov/Data/ATUS/>

Microdata Files
Bureau of Labor Statistics
<http://www.bls.gov/tus/ehdatafiles.htm>

What Published or Ongoing Research Has Resulted From the Data?

Data from the EH Module have only been available just over 1 year, and only one published research paper has emerged. Still, CDIP investments in research and workshops have led to a number of conference presentations and working papers. In addition, significant research is underway, both by ERS researchers as well as outside researchers and academics.

The cooperative agreement with Ohio University (CA 58-4000-6-0120) was the first research to yield a working paper based on data collected under the EH Module. The research, entitled *Time Poverty Thresholds*¹³ and conducted with support from ERS researchers, analyzed data from the 2003-2006 American Time Use Surveys in an attempt to objectively identify time poverty thresholds. Defined as that point where individuals have so little discretionary time remaining after completing necessary activities that they are unable to engage in activities that improve their overall well-being (e.g., leisure, education), time poverty thresholds have rarely been analyzed, especially in comparison to income poverty thresholds. The researchers analyzed a variety of scenarios in order to test their assumptions that time poverty varies based on income and household composition. Ultimately, they were able to develop a set of reasonable time poverty thresholds that, regardless of the application of a variety of scenarios, resulted in very similar time poverty rates. Although many of the assumptions made in the analysis proved reasonable, future research is needed to analyze distributions of time allocation across activities in order to better determine time poverty thresholds. Additionally, the researchers suggest that further analysis should be done to help shape policy and determine whether time poverty affects BMI and food assistance program.

The research under the other CDIP-funded cooperative agreement, entitled “Goods, Grazing, and Girth: How the Timing of Eating Relates to Health and Food Consumption”

¹³ http://oak.cats.ohiou.edu/~kalenkos/Kalenkoski_Hamrick_Andrews.finalreport100708.pdf

is with the University of Texas. Using the 2006-07 American Time Use Survey and Eating and Health Module data, the research focuses on measuring adult Americans' grazing habits (secondary eating/drinking) on a typical day and how that grazing time compares to primary eating/drinking time. An economic model has been developed to evaluate whether higher wage rates (price of time) will lead to substitution of grazing for primary eating/drinking, especially by raising the number of grazing incidents relative to meals. Additionally, analysis is being performed to determine if the frequency of meals and grazing relates to BMI levels and self-reported health, as well as whether food purchases relate to time spent eating.

The American Time Use Conference and Workshop—held June 25-26, 2009, and co-sponsored by CDIP—included the presentation of a number of research papers using EH Module data. Among those presentations are the following five ongoing research projects:

- **How Does Time Use Affect the Probability of Becoming Obese?** Josh Pinkston and Jay Stewart, Bureau of Labor Statistics
- **Food Expenditure and Time-Use Patterns in Single Normal and Overweight Female-Headed Households**, Jane Kolodinsky and A. Goldstein, University of Vermont
- **Is Dinner Ready Yet? The Time Implications of Participating in the Food Stamp Program**, Cathleen Zick and R. Stevens, University of Utah
- **Food Stamp Effects on Home Food Preparation**, Geetha Waehrer (Pacific Institute for Research and Evaluation) and Partha Deb (CUNY)
- **Time Spent on Outpatient Visits by Race and Ethnicity; Evidence from the American Time Use Survey**, Deborah Carr, et al., Rutgers University.

Although none of the papers reflect final, published research, they provide rich insight into the types of ongoing research emerging from the EH Module data. All of the above are available on UMD's Maryland Population Research Center website, under the Sponsored Events – American Time Use Conference and Workshop 2009 links (<http://www.popcenter.umd.edu/research/sponsored-events/atus-conf-workshop-2009>). Additional research papers are also available through this same website, although not all build on the data directly generated by the EH Module.

The NIH-NCI funded a grant that produced a bridge between metabolic equivalents (MET) based on the Compendium of Physical Activities and the ATUS lexicon of activities. By using this bridge, MET values can be assigned to all the activities in a respondent's time diary, including secondary activities. That information, along with the BMI from the EH Module, has facilitated research on activity level and BMI across a nationally representative sample. The resulting paper, entitled *Linking the American Time Use Survey (ATUS) and the Compendium of Physical Activities: Methods and Rationale*, as well as a searchable interface, are available on the NIH-NCI's website (<http://riskfactor.cancer.gov/tools/atus-met/>).

ERS research includes an analysis of time use patterns of food stamp participants versus income-eligible nonparticipants, further refinement and application of the time poverty thresholds, and study of time use patterns of parents whose children obtain meals at school versus others. For a recent report to Congress, ERS coordinated with BLS and the Census Bureau to match ATUS and EH Module respondents to census tracts, therefore identifying which respondents reside in areas with low supermarket access. The entire food deserts report, entitled, “Access to Affordable and Nutritious Food—Measuring and Understanding Food Deserts and Their Consequences: Report to Congress” is available at <http://www.ers.usda.gov/Publications/AP/AP036/>. ERS is also in the early stages of developing publications that will include more comprehensive analyses and technical discussions covering the 2006-2007 ATUS/EH data.

Panel Study of Income Dynamics (PSID) and the Child Development Supplement (CDS)-III

Background

For many kinds of analysis, particularly to inform policy planning, it is desirable to have measures on the same individuals over time. Longitudinal information from a panel survey that repeatedly interviews the same respondents would facilitate research on changes in food consumption behavior, diet, and health at the household or individual level and how they might relate to such factors as changes in income and program participation, initiatives for food education and safety, or changes in other contextual factors.

The PSID, established in 1968, is the nation’s longest running, nationally representative panel study with information currently collected on 8,000 families, some for up to 40 years. Managed by the University of Michigan’s Institute of Social Research, the study measures a broad range of social, economic, demographic, and psychological indicators. The extended time series of data allows the study of human, social, and economic behavior through changing conditions, such as transitions in and out of food assistance programs for different populations during the course of business cycles and policy changes. In addition, the longitudinal data facilitate the conduct of cohort analysis, as persons from one time period to another may be compared. Importantly, these data also facilitate developmental analysis, as early experiences may be used to predict longer term outcomes, such as the prediction of adult health and earnings from early socioeconomic circumstances, including participation in government programs such as SNAP, WIC, the Child and Adult Care Food Program, and the National School Lunch and Breakfast Program; government-subsidized housing, home heat assistance, State aid programs, and Medicaid. Many of these areas have been included in the instrument for the entirety of the study.

The PSID collects data on a wide array of economic, social, demographic, geospatial, and psychological topics, supporting unique multidisciplinary research. ERS is a financial co-sponsor with several other government agencies, including the National Science Foundation, the National Institutes of Health, the Housing and Urban Development

Department, and the Department of Health and Human Services. Between 1968 and 1997, data collection occurred annually; since 1999, data collection occurs biennially. The length of the panel, the extensive range of measures, the unique sample following rules, and the fact that both individuals and families are followed make the PSID a valuable data source. Re-interview response rates have been a consistent and unprecedented 96-98 percent.

Questions about food expenditures and food assistance have been a core topic of the PSID since its inception. Data on food expenditures is the most frequently used of all the expenditure data collected by PSID (which, since 2005, assesses aggregates of all the categories asked about in the Consumer Expenditure Survey, allowing the construction of total annual spending), and information from families about how much is spent on food has been collected in most waves since 1968. Annual amounts spent on food “at home” and food “eaten out” have been collected in most every wave. Amounts spent on having food delivered were collected in 1968, in every wave from 1994 to 2007, and are planned for 2009-2011.

Of particular interest to ERS, the PSID contains high-quality economic and health data. In 2007, the 80-minute interview collected data on: employment, earnings, income from all sources, food expenditures, housing, geospatial data, health insurance, educational expenditures, child care, marriage and fertility, vehicle ownership, wealth and pensions, and philanthropy. Recent and ongoing health data collected include health status, health conditions, childhood health history, limitations in daily activities, smoking history, alcohol use, exercise, body mass index, and psychological distress. Questions on food assistance have been expanded in more recent waves to encompass new government food assistance programs. Information on food stamp participation has been collected in most every wave from 1968 to 2007 and is planned for 2009-2011. Additional questions on number and identity of family members receiving food stamp benefits, and benefit amounts, were added in 1999. In 2003, a special series of questions was asked about reasons for leaving the food stamp program, even for 1 month. Questions about other government-sponsored food programs in child and adult daycare centers started in 1999, and will be continued at least through 2011.

In 1997, the Child Development Supplement (CDS) was added to the PSID as a means of tracking and collecting generational information on the children of PSID participants. The CDS has more extensive information on the monetary and time investments (child consumption of family resources) that parents make in their children, as well as time investments the children themselves make in acquiring various forms of human and social capital (e.g., the time spent on productive vs. developmentally insignificant activities), which can be used to study connections with health outcomes over the life course.

This subsample of the PSID is nationally representative of children, including an over-sampling of African-American children, and is also representative of immigrant children. The first wave of the supplement (CDS-I), conducted in 1997, surveyed 3,563 children ages 0 to 12. The data from CDS-I meant that the inherently genealogical design of the

PSID rendered data about the habits of three generations and, in some families, four generations. Such data enable intergenerational studies, and provide much richer information to model selection effects and causal hypotheses using instrumental variables. A second wave of the CDS was conducted in 2002, following up with the same children surveyed in 1997 to track their development, including food and nutritional habits.

What Was the Investment?

Beginning in 2006, ERS invested CDIP funds in strengthening and disseminating core PSID food-related data and in developing and implementing the third wave of the Child Development Supplement (CDS-III). In FY06, ERS supported the pre-production tasks related to the implementation of the CDS-III, including questionnaire development, instrument programming and testing, pre-test, interviewer training, and incentive payments. In FY07, CDIP funding was split between continued support for development and implementation of the CDS-III and ongoing collection of data in the PSID 2007. Contributions to CDS-III supported the data collection activities of CDS-III and post-data collection processing and dissemination. These funds were of critical importance for carrying out the CDS-III, given a substantial funding cut by the National Institute of Child Health and Human Development (NICHD) due to budget shortfalls.

Funds directed toward the PSID 2007 were used to continue collection of food-related data from adults and to facilitate the use of the food-specific data by the wider scientific community through the promotion of the data at professional meetings, conferences, and user workshops. As one example, ERS worked with PSID to produce a brochure, “Studying Food and Nutrition with the PSID,” which was distributed at professional meetings in 2007 and 2008, including the American Economic Association, the Population Association of America, the American Society of Health Economics, the American Sociological Association, and the Gerontological Society of America. Prominent ads in the programs of these professional meetings helped to promote the PSID and CDS data, including the food and nutrition data.

In FY08, CDIP funds were used for ongoing support of the processing and dissemination of the 2007 PSID and CDS-III data. In addition, some FY08 funds were used to support a graduate student fellowship through the National Poverty Center at the University of Michigan for a study on the intergenerational correlation of food stamp receipt. In addition to completing research of interest to ERS, this fellowship supports a new generation of scholars who will continue to use the PSID food-related data.

The previous two waves of the Child Development Supplement contained content on food, nutrition, and health. Domains included the child’s food consumption (e.g., typical breakfast, frequency of different food groups), family dynamics related to food consumption (e.g., frequency eating as a family, family rules about snacking and watching TV while eating), child’s body weight, strategies to maintain or lose weight, exercise habits, sleep, and health conditions. Five questions in CDS-III were updated from CDS-II with the assistance of ERS. These questions assessed food program

participation in the School Breakfast Program and the National School Lunch Program (at full-, reduced, or free-meal rates), as well as frequency of eating a hot lunch. Information was also collected about the receipt of a meal or snack during any child care received before or after school.

Two new modules were developed in consultation with ERS staff, focusing on eating habits and food expenditures. Included in these new modules were the following:

- Eleven (11) new questions about food consumption included whether the child can buy snack foods at school, and if so where; as well as the frequency of eating various types of food in the prior 7 days, including milk (as well as specific type), fruit juices, soda/pop, fresh fruit, vegetables, fast food, candy, and salty snack foods.
- Nine (9) questions about expenditures of the child's own money on food included the categories of food and drinks at school, fast food, and all other food and drinks in the past week, past 3 months, and past year.

Is the Investment Complete or Ongoing?

CDIP investments in CDS-III have concluded. Depending on future availability of funds and data priorities, it is possible that the CDIP would support future data collection under the PSID.

What Kind of Data Did It Generate? Over What Timeframe?

Support from the CDIP initiative has sponsored the collection and processing of data obtained from nearly 9,000 U.S. families in two major national studies during 2007 in the area of food and nutrition. Data collection for the main PSID took place between March and December 2007, and will be available for analysis in late 2009.

The CDS-III was fielded between September and May, 2008; the data are expected to be available on the University of Michigan Institute of Social Research website sometime in the summer of 2009. The CDS-III interviewed 1,550 children who were participants in CDS-II in 2002, 18 years old and younger and had not yet left high school. As was intended with CDS-II, the resulting data from CDS-III are expected to provide researchers with a comprehensive, nationally representative and longitudinal data base of these children and their families. These data will allow us to understand the determinants of increased levels of obese and overweight children, cognitive developments, academic achievements, how the children's habits are formed over long periods of time and how they connect to the economic conditions in which they are raised.

Are the Data Publicly Available?

All waves of the Panel Study of Income Dynamics (PSID) and the Child Development Supplement (CDS) data are available on PSID's data center:

<http://psidonline.isr.umich.edu/data/>. The PSID has been distributing data through an

online data center since 1996; it now includes 35 waves of data comprised of over 65,000 variables based on nearly 70,000 individuals.

With so much data available, the vastness and complexity of the data threatened to compromise its use. To ensure that complexity did not become a major barrier for data users, the PSID strives to develop tools maximizing users' ease of use. The PSID data center allows users to generate customized longitudinal data sets from all waves of the PSID by choosing various options, create customized codebooks specific to the data that have been downloaded, search and browse for variables, and archive data downloads for shared and future use.

The data from PSID 2007 and CDS-III, reorganized and prepared, are available to the general public through the PSID data center. These new data will surely inspire the development of additional variables and reports to provide the latest estimates in key statistics or analytic results, such as lifetime likelihood of program participation over time and/or the intergenerational dynamics of food stamp participation.

What Published or Ongoing Research Has Resulted From the Data?

As the data from PSID 2007 and CDS-III are not yet publicly available, there have been no publications or research that specifically relate to the CDIP investment. It is expected that the data generated from PSID 2007 and CDS-III will result in many new publications and research activities.

The PSID/CDS data are highly anticipated, and it is expected that a wide host of organizations, institutions, and government agencies will make extensive use of them. Building on this eagerness, the PSID coordinators are planning an early-results workshop for sometime in mid- to late 2010. This conference will convene the top scholars in the area of food and nutritional issues related to child well-being to present findings using the longitudinal data collected in the CDS-III and PSID.

The fellowship awarded to David Ratner through the University of Michigan National Poverty Center resulted in research focused on two areas: assessing the quality of the PSID food stamp data by comparing it to the Current Population Survey (CPS) and analyzing whether growing up in food stamp recipient households as a child exhibits any correlation to food stamp participation in adulthood. The initial results, presented to ERS in December 2008, showed that PSID's food stamp data are very similar to those of the CPS. Additionally, Ratner found not only that those people who grew up in households receiving food stamps were more likely to receive food stamps as adults, but also that this correlation increased the longer the households received assistance while the current-day adults were children. This is an example of the unique research that can be carried out with a longitudinal panel such as the PSID.

III. Other Investments

Although CDIP focused primarily on strategic investments in four major areas, ERS also made a number of investments that both support the major investments and address specific needs of the agency and USDA. These investments, accounting for 27 percent of total CDIP expenditures for the first 4 fiscal years, totaled \$3,884,256. Although the following does not include the entire list of other investments, these examples describe the larger and more significant investments made outside of the four key focus areas.

Behavioral Economics

While major investments and existing data collection systems attempt to obtain data that increase the Federal Government's understanding of consumer actions, little is understood about the motivations and psychology that drive these actions. Interest in this new approach to explaining behavior led to investments in research that could inform future survey questions. Using CDIP funds, ERS developed a small, pilot module to NHANES designed to understand the connection between consumer behavior and food consumption and nutrition. This module sampled 400 people in a small trial implementation, with preliminary results provided to ERS in March 2009. Upon receipt of the final results, ERS intends to evaluate the data to determine whether the module is worth further exploration and investment.

ERS also funded two behavioral economics workshops, where a number of applications with which to survey dietary choice and obesity were discussed. These workshops included academics, researchers, and representatives from Federal agencies such as the Food and Nutrition Service, the Cooperative State Research Education and Extension Service, and the National Institutes of Health. In FY08, ERS awarded nine small research grants to examine possible policy solutions to reduce poor diets and obesity. Some of the ongoing research includes:

- Assessing the efficacy of monetary incentives on motivating weight loss in the workplace – John Cawley, Cornell University;
- Examining how subtle changes in the school lunch environment can help students make more healthful choices, both in terms of nutrient profile and consumption volume – David Just, Cornell University;
- Testing a variety of strategies to increase fruit and vegetable consumption in school-age children – Joseph Price, Brigham Young University;
- Exploring the effect of relatively subtle modifications (smaller plates, changing the menu layout) in the eating environment on weight gain – Paul Rozin, University of Pennsylvania;
- Using tools from neuroeconomics to better understand why so many people make dietary and lifestyle decisions that lead to obesity – Antonio Rangel, California Institute of Technology, Pasadena.

ERS has tentatively scheduled a third workshop in 2010 where researchers will provide results from these and other funded studies. Based on these outcomes, ERS will determine whether further investments in behavioral economics are justified.

Food Availability

The Food Availability Data System, running since 1909, is a longstanding database focused on monitoring the availability of several hundred commodities and food items. As this is the only time series data system on food availability, it is frequently used as a proxy for actual consumption. The database tracks how much food is made available to consumers by collecting and tracking data on production, imports, exports, nonfood uses, and beginning and ending stocks of the designated items. The database and its systems must be periodically updated to reflect new breakthroughs and changes in data collection. Using CDIP funding, ERS made a variety of investments focused on enhancing, updating, and improving the database. For example, a survey of retailers allowed updated loss estimates for fruits and vegetables at retail. Having precise estimates of how much food is lost at the retailer level translates into an improved understanding of how much food is available for consumer purchase.

Food Commodity Economics Database

ERS provides CDIP funds to USDA's Agricultural Research Service to develop the Food Commodity Economics Database (FCED), which converts food intake data from NHANES into commodity equivalents (200 principal commodities), allowing analysis of how food demand is related to commodity demand. As an example of the expected results of this database, USDA will be able to estimate how much beef is consumed away from home versus at home. This new database will improve understanding of food away from home and other market changes related to commodity demand.

Retail Scanner Data

ERS used CDIP resources to make limited investments in acquiring retail point-of-sale data from companies such as Nielsen and IRI. Despite certain weaknesses in these data, they still provide significant insight into consumer purchase habits and trends. Therefore, these data were useful for specific, targeted research initiatives supported by ERS. For example, an ERS study on the effects of the 2006 spinach recall and *E. coli* outbreak on leafy green purchases used these retail scanner data, with results presented at the 2008 American Agricultural Economics Association meeting (<http://ageconsearch.umn.edu/handle/6448>).

Food Away From Home

As a growing share of American household budgets is used for food consumed away from home, researchers at ERS used CDIP funds to improve their understanding of this area of food consumption. While there are existing studies on this topic, ERS researchers looked at additional factors influencing U.S. consumer tendencies to eat away from home by purchasing specific sections of Consumer Reports on Eating Share Trends (CREST) data. CREST is an online sampling of consumers' purchases of prepared meals and snacks at restaurants and other food outlets; respondents provide daily reports on the food

they eat, where the food was purchased, where it was eaten, who they were with while eating, and how much they spent on the food.

In one study, entitled *Determinants of Food Away from Home Expenditures: A Transactional Analysis by Type of Facility and Meal Occasion*, ERS researchers analyzed data from the 2004 CREST to assess socioeconomic and demographic factors as well as other transactional and facility characteristics that influence food-away-from-home expenditures. Initial findings confirm what other studies have generally found: as income goes up, people tend to eat out more often, and as family size increases, eating out occurs less frequently. The study also found that transactional and facility characteristics influence where people eat and how much they spend. This new insight into why consumers eat where they do and how much they spend when eating away from home provides a greater understanding of recent trends and may also help Federal agencies design policy to combat obesity and the consumption of nutrient-poor food and beverages. An ERS report on the research findings will be published in 2010.

New Product Introduction

ERS invested CDIP funds to examine policy effects on the introduction of new products. By acquiring proprietary data from Datamonitor's Product Launch Analytics that detail new product introductions, the Food Economics Division of ERS was able to support several reports and new research, including *The U.S. Food Marketing System: Recent Developments, 1997-2006* (<http://www.ers.usda.gov/publications/err42/err42.pdf>). Datamonitor's data facilitated an analysis of the types of new products being introduced, which found that a large portion of new products were generally variations of existing products rather than innovative products. These new variations were developed and marketed toward a specific purchaser demographic with *upscale* and *organic* the lead claims for new products in 2006. Additionally, there has been a strong movement toward co-branded products that incorporate other well known products, people, and symbols to stoke buyer interest.

IV. Looking to the Future

The CDIP has made significant contributions to the data available for food economics research. New information is becoming available to the research community that will provide answers to many of the most important policy-related questions about food choices. However, gaps in data coverage still remain, and lessons are emerging from the investments of the past 5 years. In FY09, ERS reviewed investment strategies for the CDIP, and identified core continuing needs and new opportunities.

As a result of this strategic review, ERS funded a new stand-alone survey, the National Household Food Purchase and Acquisition Survey (NHFPAS). This new investment is designed to address critical gaps in data on household food purchases—both at and away from home—and focuses on low-income households. Funding for this ambitious new survey was made possible by redirecting funds from both the CDIP and the Food

Assistance and Nutrition Research Program (FANRP). A contract was awarded to Mathematica Policy Research in FY09 to carry out the survey.

The main features of the NHFPAS are:

- Data will be collected from all members of households on foods acquired and purchased from all sources, including food away from home.
- Data will include prices and quantities of foods purchased and key nutrition attributes of the foods purchased.
- Data will include household descriptors, including households' eligibility for and participation in USDA's food assistance programs.
- Key demographic information about the household, including diet and health knowledge, will be captured.
- Information about household location will allow linkage with other data sets that contain information about the food retail environment and other key community characteristics.

Due to the planning and feasibility testing required for this unique effort, survey collection will take place in 2012, with data available for ERS research and analysis in 2013.

ERS investments made through the CDIP over the past 5 years have provided ample evidence of the current and future value of generating new information about consumers and their food choices. This information has already supported a significant expansion of policy-related research in food economics. The challenge for the future will be to continue to support investments to acquire the most relevant information in the most cost-effective manner.