



United States Department of Agriculture

Linking options with retail food scanner data

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Evidence Based Policy Making for Applied Economics Workshop

October 1, 2021.

The findings and conclusions in this presentation are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy. This research was supported by the U.S. Department of Agriculture's Economic Research Service and Center for Nutrition, Policy and Promotion. Findings should not be attributed to IRI.



Purchase to Plate Team

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Thrifty Food Plan, 2021

Food and Nutrition Service

August 2021
FNS-916

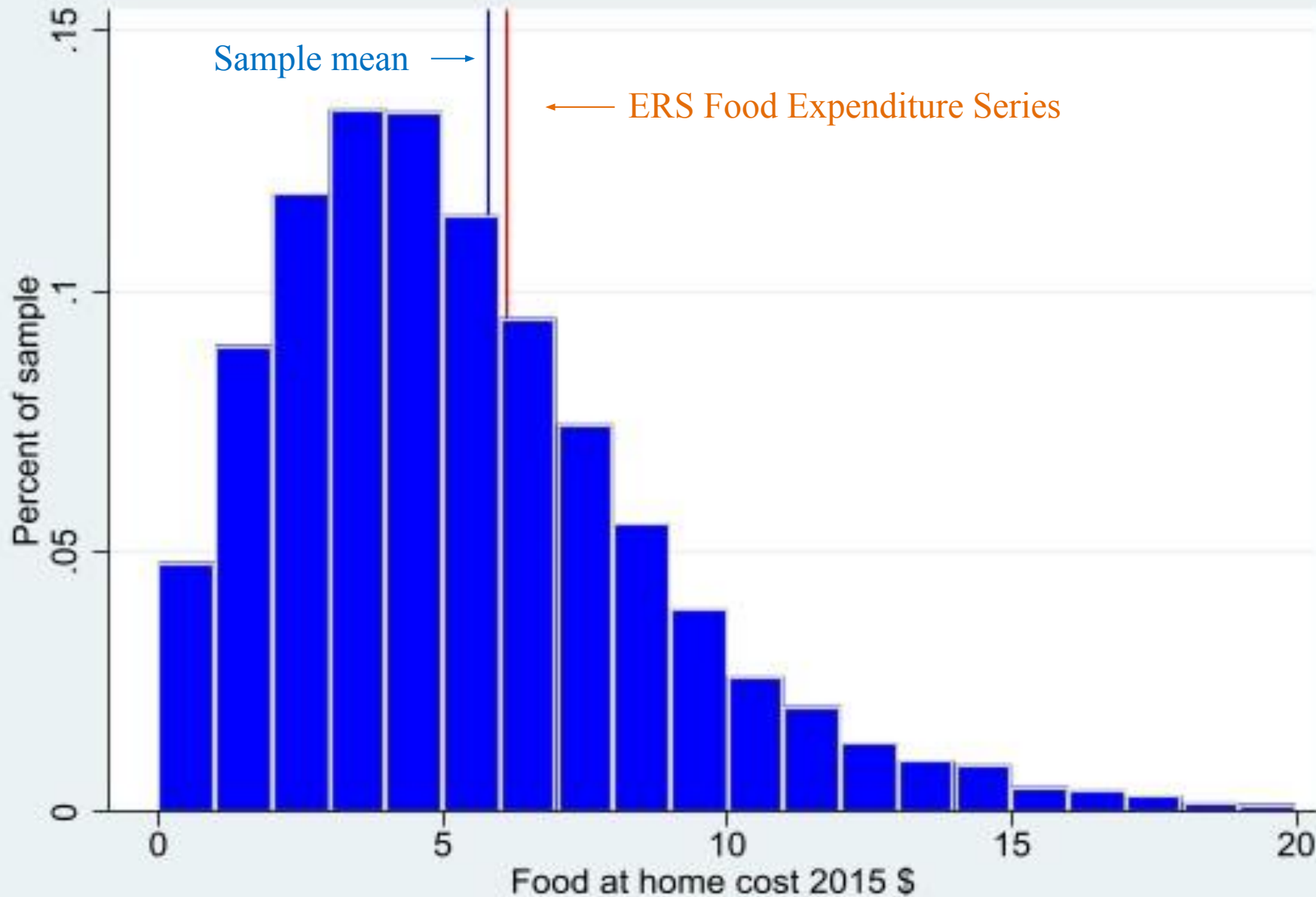


Required Evidence

- Current:
 - Food prices
 - Food composition
 - Consumption patterns
 - Dietary guidance
- Approved scientific methods



Distribution of the cost of food at home for adults.



Source: USDA
Economic Research
Service using data from
the National Health and
Nutrition Examination
Survey (NHANES)
2015-16 and IRI Info
Scan, 2015, 2016.



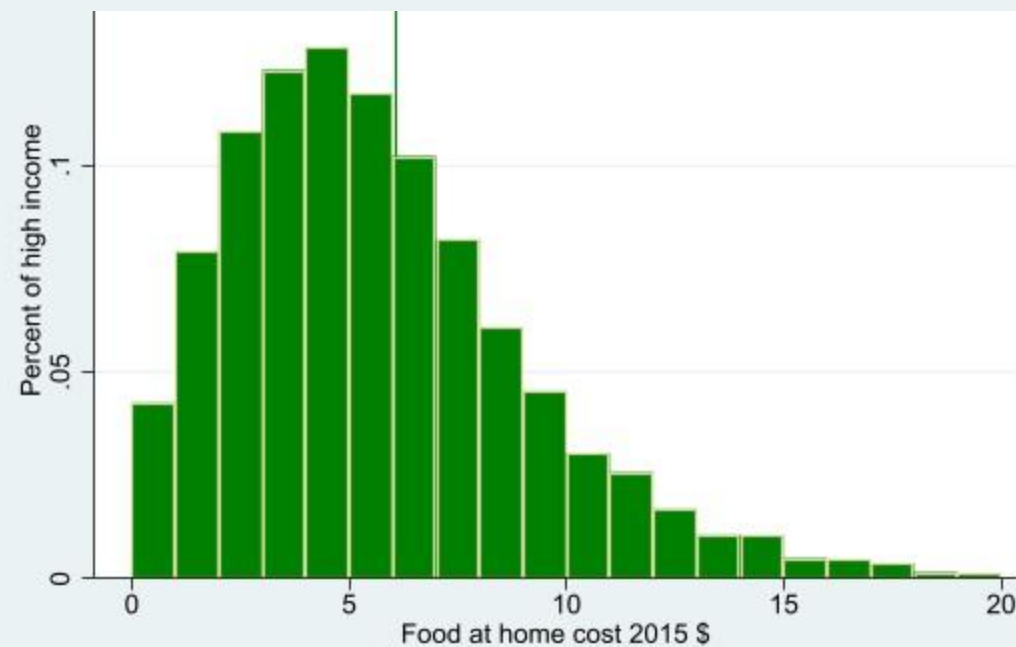
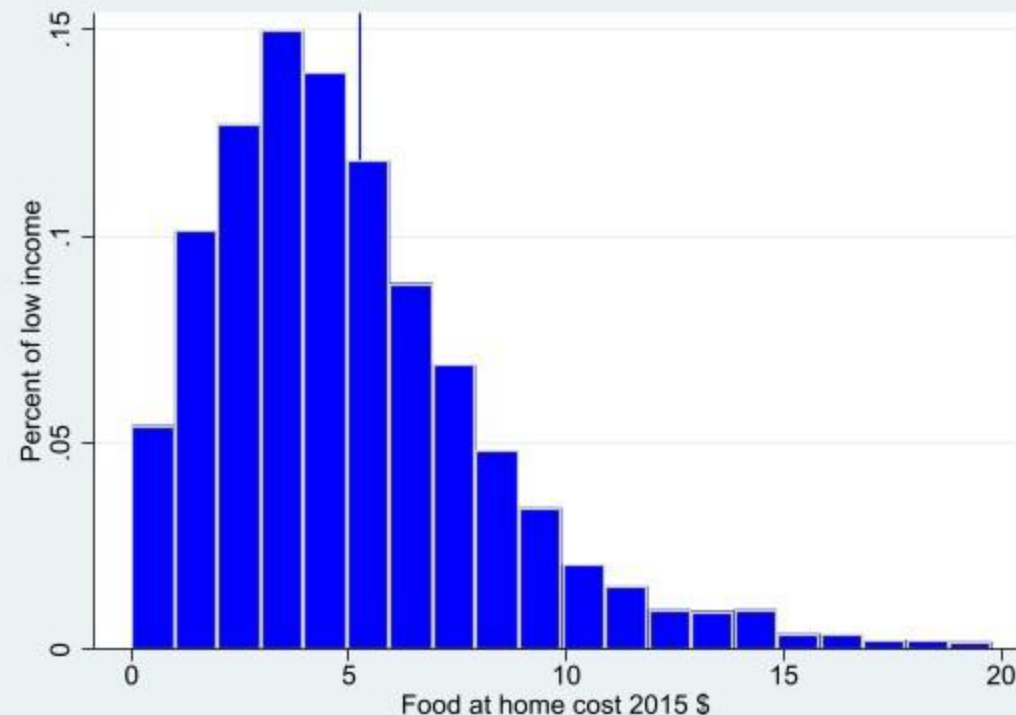
Distribution of the cost of food at home by income.

Blue = PIR < 1.31

Green = PIR > 3.0

PIR = Poverty Income Ratio

Source: USDA Economic Research Service
using data from the National Health and
Nutrition Examination Survey (NHANES)
2015-16 and Purchase to Plate National Average
Prices for NHANS (PP-NAP) IRI Info Scan,
2015 and 2016.



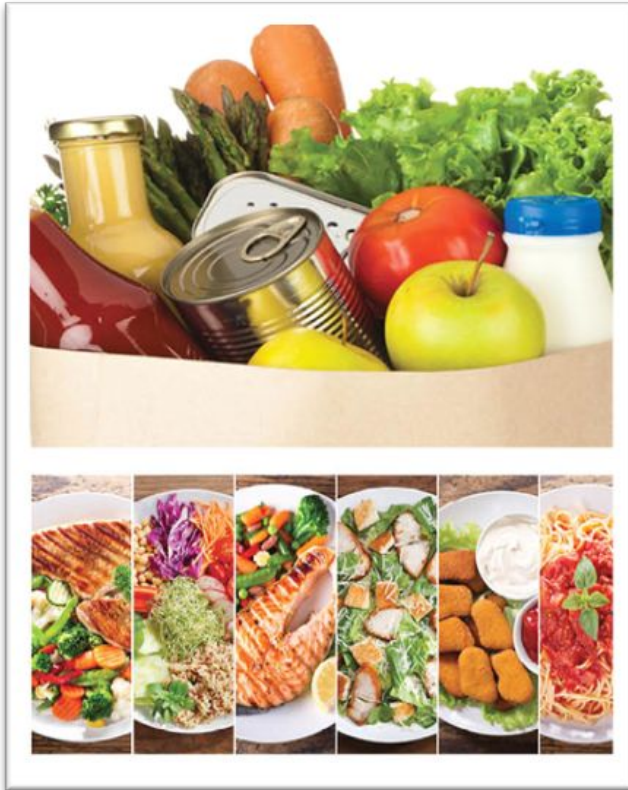
Policy-based research

Why are so many Americans' diets out of balance with dietary guidelines?

- data on what foods people choose
- a way to assess the healthfulness of these food choices
- data on the surrounding community– both the food environment and community beliefs, values, and prevalence of disease
- data on food prices, household income and other socio-economic factors that impact food choices



Purchase to Plate Suite



- Enhance research capacity related to the economics of food and nutrition
- Link data sets
- Support USDA projects such as
 - Agriculture Improvement Act of 2018 mandated update of the Thrifty Food Plan market baskets
 - Update other USDA Food Plan market baskets
 - Related research supporting USDA goals



Data Sets for the Purchase to Plate Suite

- Food Scanner data



- USDA Food and Nutrient Database for Dietary Studies





Food (at home) Scanner Data

- Retail point-of-sale (POS) data
 - Purchase transaction records collected from store POS systems
- Household scanner data
 - Household-scanned purchases
 - Linked with household demographics
- Product information
- Store information



Food and Nutrient Database for Dietary Studies (FNDDS)

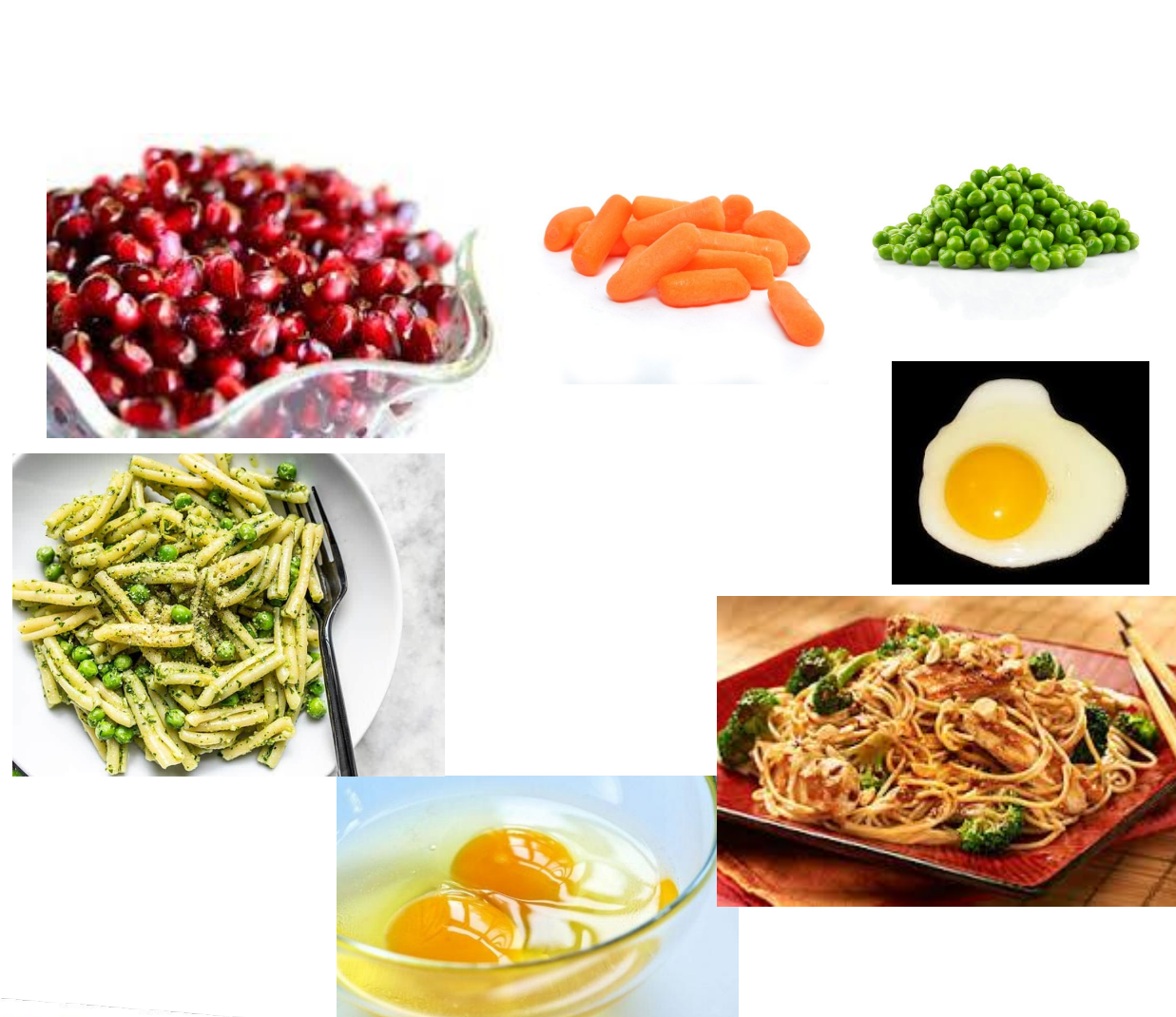
- Nutrient values for foods reported consumed by What We Eat in America (WWEIA) participants
- A set of “recipes” for nutrient calculation
- “ingredients” in recipes are not necessarily purchasable in stores
- Updates every two years:
 - New foods reported/developed
 - Changes in methodology



Scanner Data (n=350,000)



FNDDS (n=10,000)

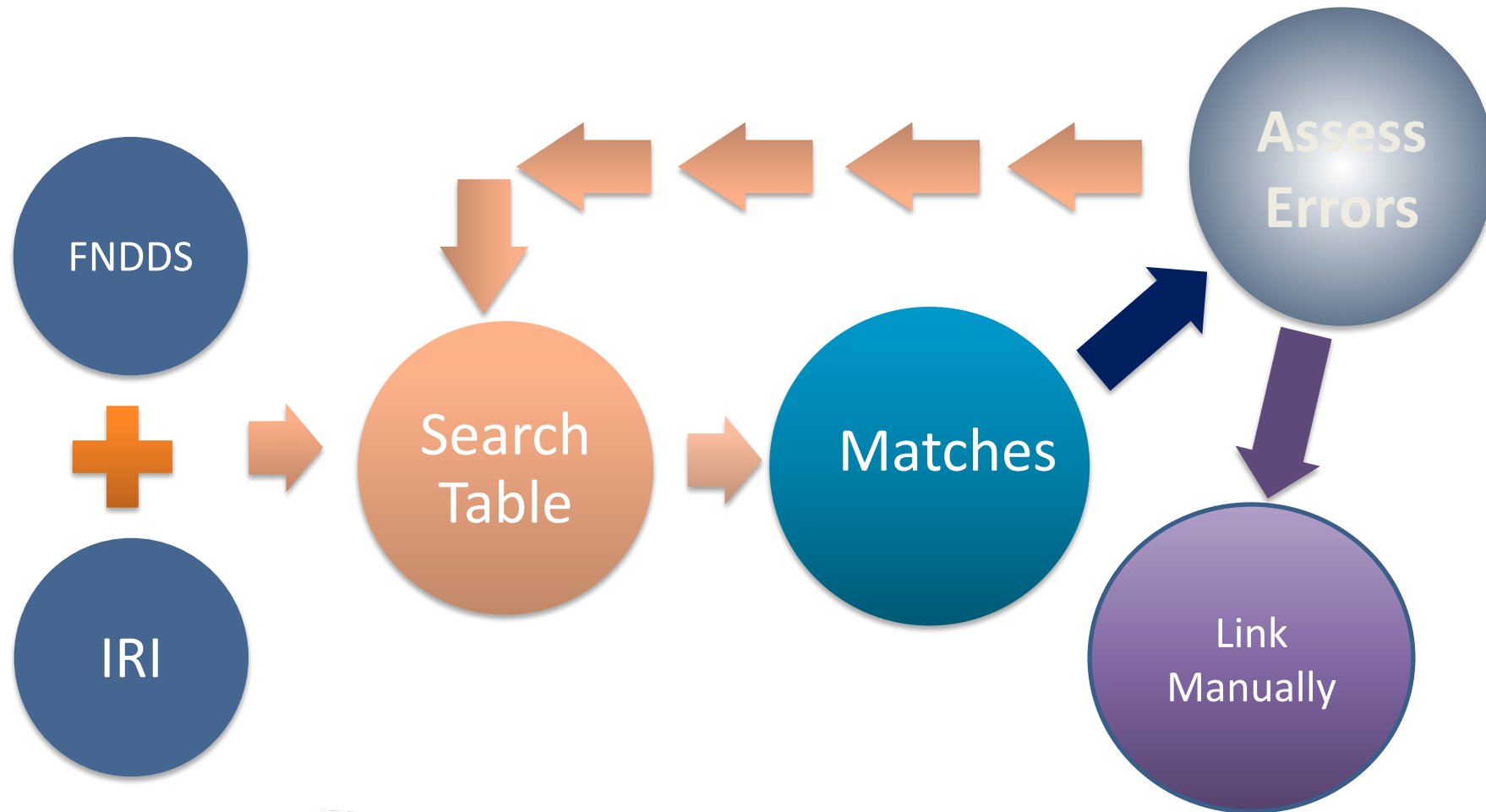


Scanner and USDA data are different

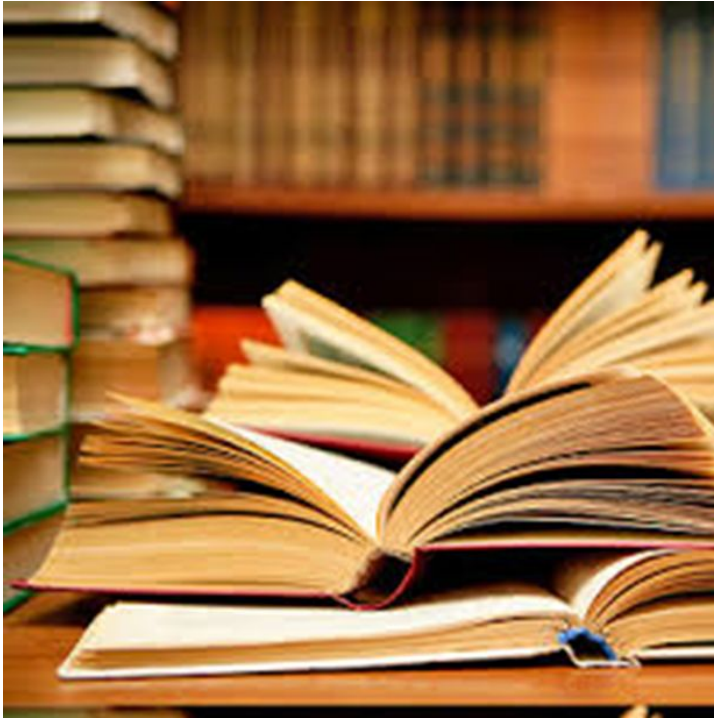
Difference	IRI Scanner Data 2015-16	FNDDS 2015-16
Primary use	Market research	Support WWEIA nutrition monitoring and research in NHANES.
Number of items	500,000	12,000
Database structure	Wide- many blank columns	Long – not consistent information
Form of item (product weight)	Purchase form (weight can include both edible and non-edible parts)	Raw or cooked (weight does not include inedible parts)



Methods



Yield Factors are UPC-based



350,000 yield factors from:

- FNDDS
- Other government sources
- Agriculture Handbook 102
- Market Checks



Data Sets for the Purchase to Plate Suite

- Food Scanner data



- USDA Food and Nutrient Database for Dietary Studies



- National Health and Nutrition Examination Survey (NHANES) and What We Eat in America (WWEIA)

- Food Pattern Equivalent Database



NHANES and WWEIA

- NHANES – National Health and Nutrition Examination Survey
 - 5,000 individuals each year
 - Released in 2-year cycles
 - detailed medical exam
- What We Eat in America (WWEIA)
 - two 24-hour dietary recalls
 - Nutrition data for foods as ingested



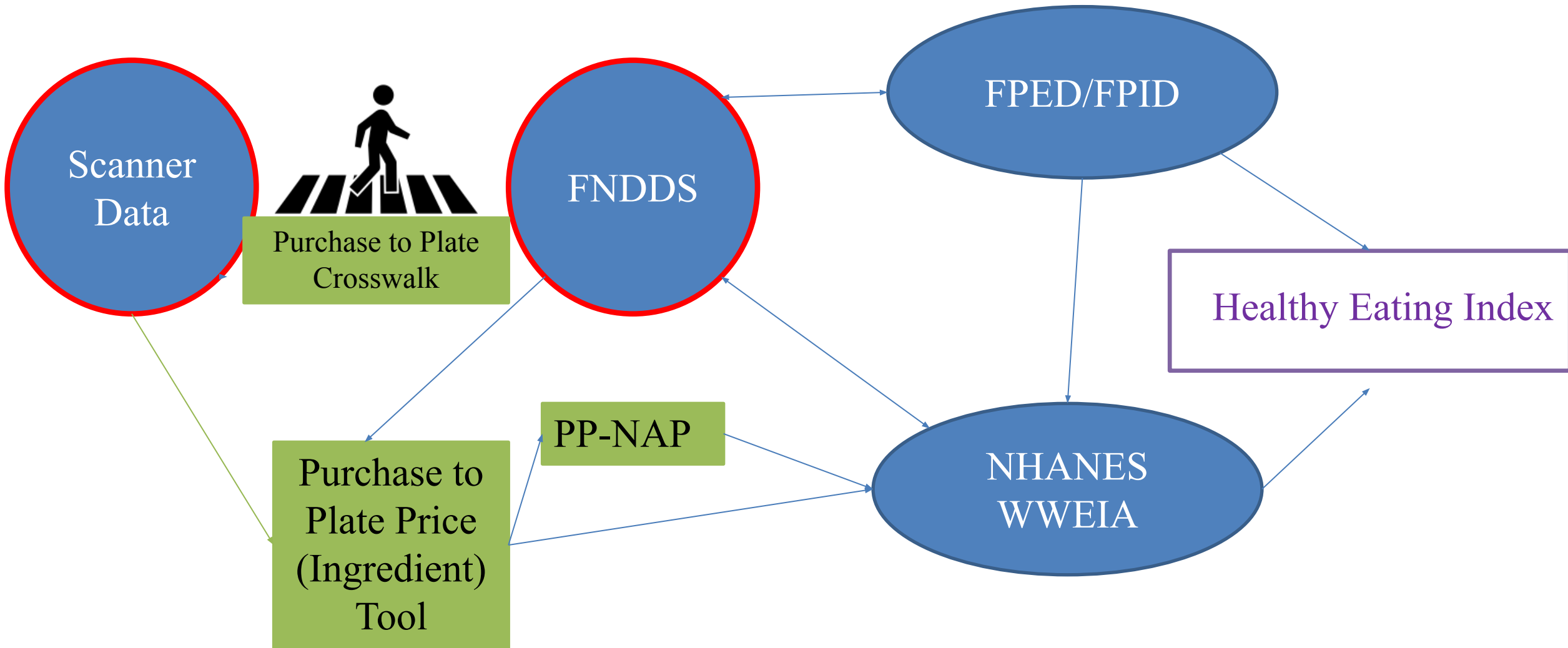
Food Pattern Equivalent Database (FPED/FPID)



- Converts FNDDS foods to the food pattern equivalents used in MyPlate
- Needed to measure how well a set of foods conforms to the recommendations in the *Dietary Guidelines for Americans*



Purchase to Plate Suite



Current Applications

USDA Food Plans

- Agriculture Improvement Act of 2018:
 - Thrifty Food Plan
- Other food plans:
 - Low-Cost,
 - Moderate-Cost
 - Liberal Food Plans

Research

- Cost of low-, mid- and high- quality diets
- Shifts in U.S. food preferences
- Climate change induced food cost changes
- Relationship between store type and diet quality
- NIFA funded grant
 - *From Scarcity to Prosperity: Nutrition and Food Spending Goals and Constraints for Low-Income Americans*



What can be further linked

- Using FIPS or county codes, link scanner data to:
 - ERS Food Environment Atlas
 - CDC data on community health
 - What ever else you can think of...
- Using bar-codes, link scanner data to:
 - USDA Branded Foods Product Database



ERS Food Environment Atlas

- **Food Choices**

- Access and proximity to a grocery store
- Number and type of food stores and restaurants
- Expenditures on fast foods
- Food and nutrition assistance program participation
- Food prices
- Food taxes
- Availability of local foods



ERS Food Environment Atlas (cond.)

- **Health and Well-Being**
 - Food insecurity
 - Diabetes and obesity rates
 - Physical activity levels
- **Community Characteristics**
 - Demographic composition
 - Income and poverty
 - Population loss
 - Metro-nonmetro status
 - Natural amenities
 - Recreation and fitness centers



Data from CDC

- Heart Disease and Stroke with social and economic indicators
- CDC Places -- census tract level estimates of 27 chronic disease measures, including risk factors
- CDC Vulnerability Index
- County Health Rankings
- Child Opportunity Index



USDA Global Branded Foods Product Database

- Public-Private partnership
- Food industry uploads their data:
 - Nutrition Facts Panel
 - Health related claims
- Uses GTIN – Global Trade Identifier Numbers
- Contains history of previous uploads
- Issues linking to IRI data
 - Not always direct link between GTIN and EAN/UPC
 - IRI UPCs masked for private label



Access

Scanner data:

- Proprietary Data
- Projects of interest to USDA including funded by USDA

<https://www.ers.usda.gov/topics/food-markets-prices/food-prices-expenditures-costs/using-scanner-data/>

Public Data:

- FNDDS
- FPED/FPID
- NHANES/WWEIA
- Food Environment Atlas
- CDC data
- BFPD

Coming soon:

- PP-NAP public
- PPC public



Upcoming Opportunity

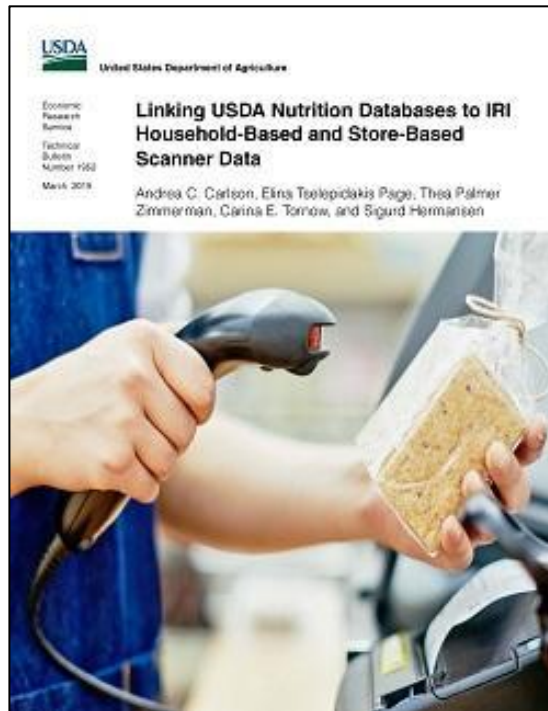
- <https://coleridgeinitiative.org/food-for-thought/>
- Challenge run by the Coleridge Initiative (cash prizes)
- Use Natural Language Processing and machine learning to improve the PPC
- Dates:
 - Oct. 12 – Information webinar
 - Nov. 7 – Team application deadline



For More Information

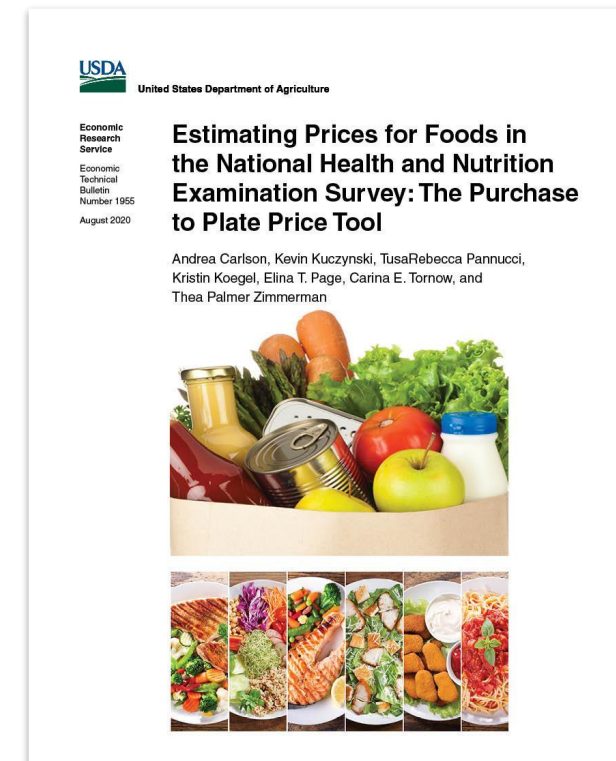
<https://www.ers.usda.gov/publications/pub-details/?pubid=92570>

<https://www.ers.usda.gov/publications/pub-details/?pubid=294>



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Extra Slides



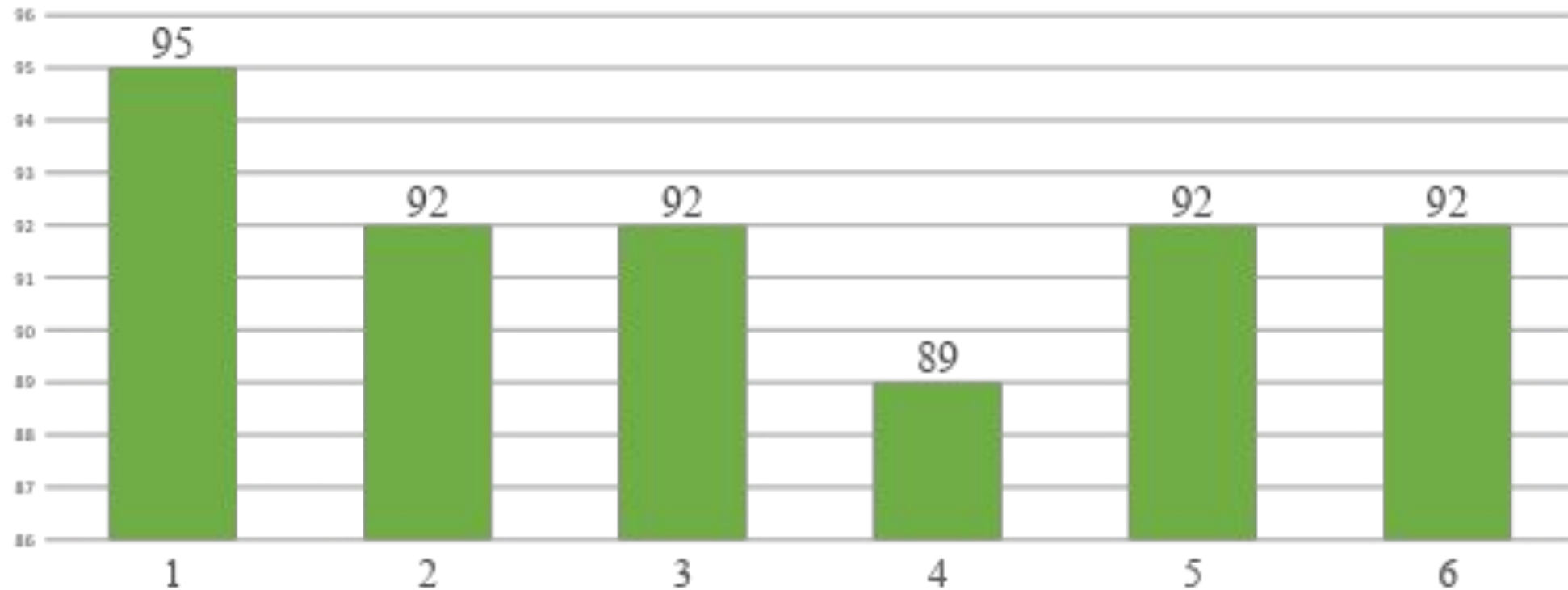
Purchase to Plate Crosswalk

Allows scanner data users to import the nutrition data from the
FNDDS and FPED/FPID



Coverage of Crosswalk

Percent



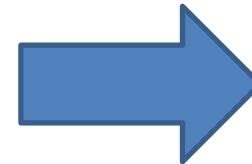
Source: ERS using IRI Infoscan and The Consumer Network 2013, 2015, 2016





United States Department of Agriculture

Purchase to Plate Price Tool

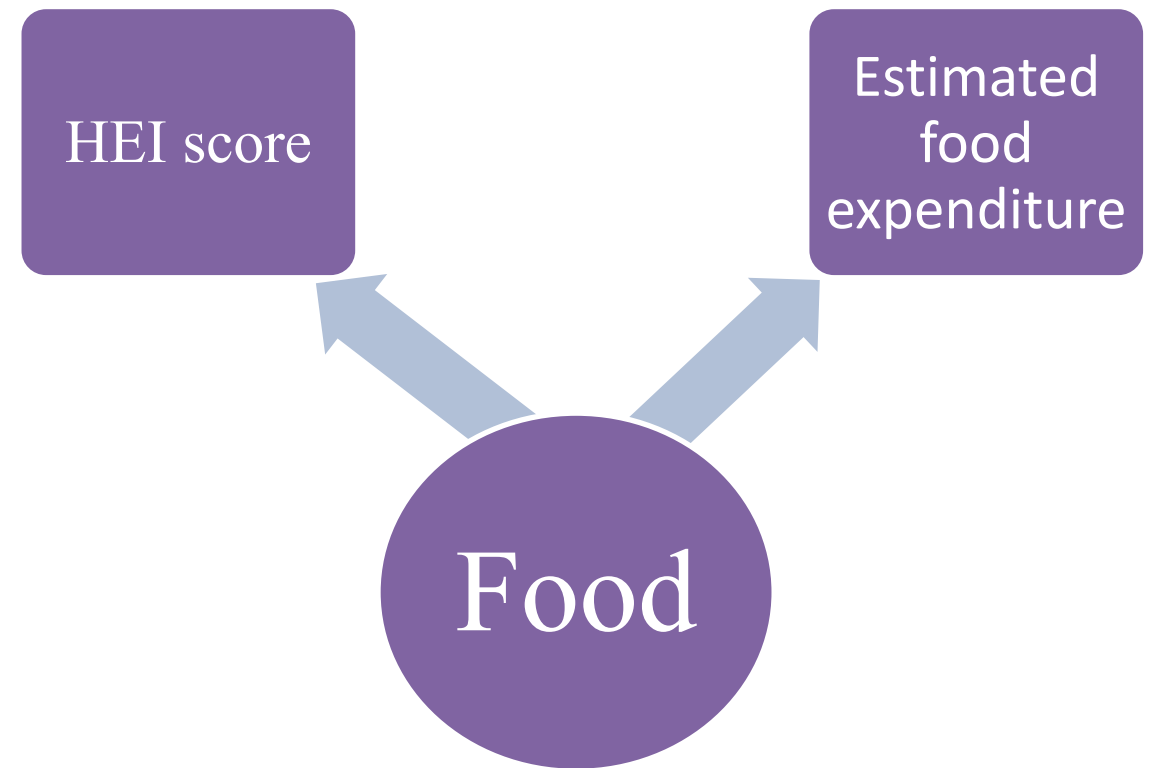


Expenditure and HEI Endogenous Relationship

Prices are national average—
everyone faces the same prices.

$$\text{HEI} = g(\text{food})$$

$$\text{Est expenditure} = h(\text{food}, \text{prices})$$

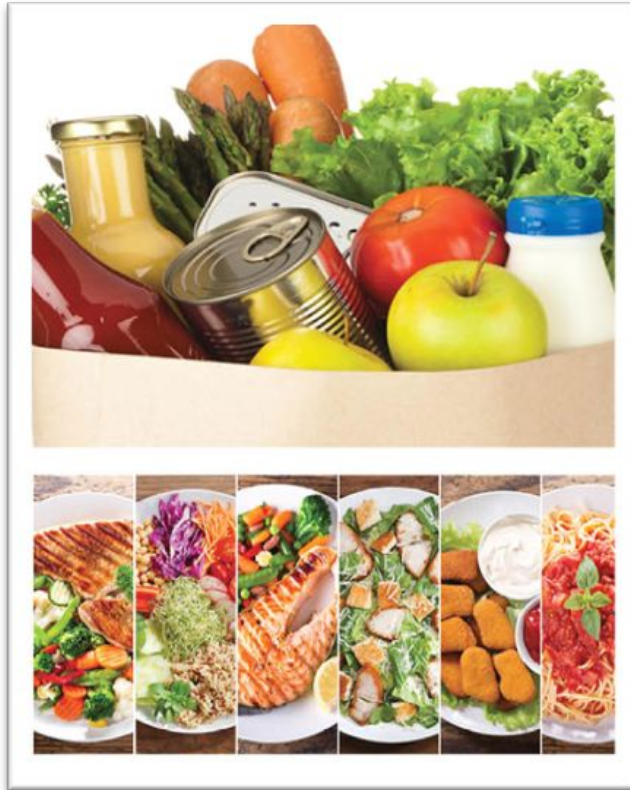


Limitations of PPC, PP-PT and PP-NAP

- Match rate varies by supermarket category.
- Price differences might be based on price calculation method.
- Retail data:
 - 20% of stores; half of all retail food sales
 - Not all stores provide data to IRI or allow USDA access to it
- Household data:
 - Under reporting by participants
 - Does not use random weight data



Purchase to Plate Suite



- Purchase to Plate Crosswalk (PPC):
 - Allows scanner data users to measure the healthfulness of store purchases
- Purchase to Plate National Average Prices for NHANES (PP-NAP):
 - Tool allows users to estimate custom prices
- Purchase to Plate Ingredient Tool:
 - How do U.S. consumers prepare food



Purchase to Plate Ingredient Tool

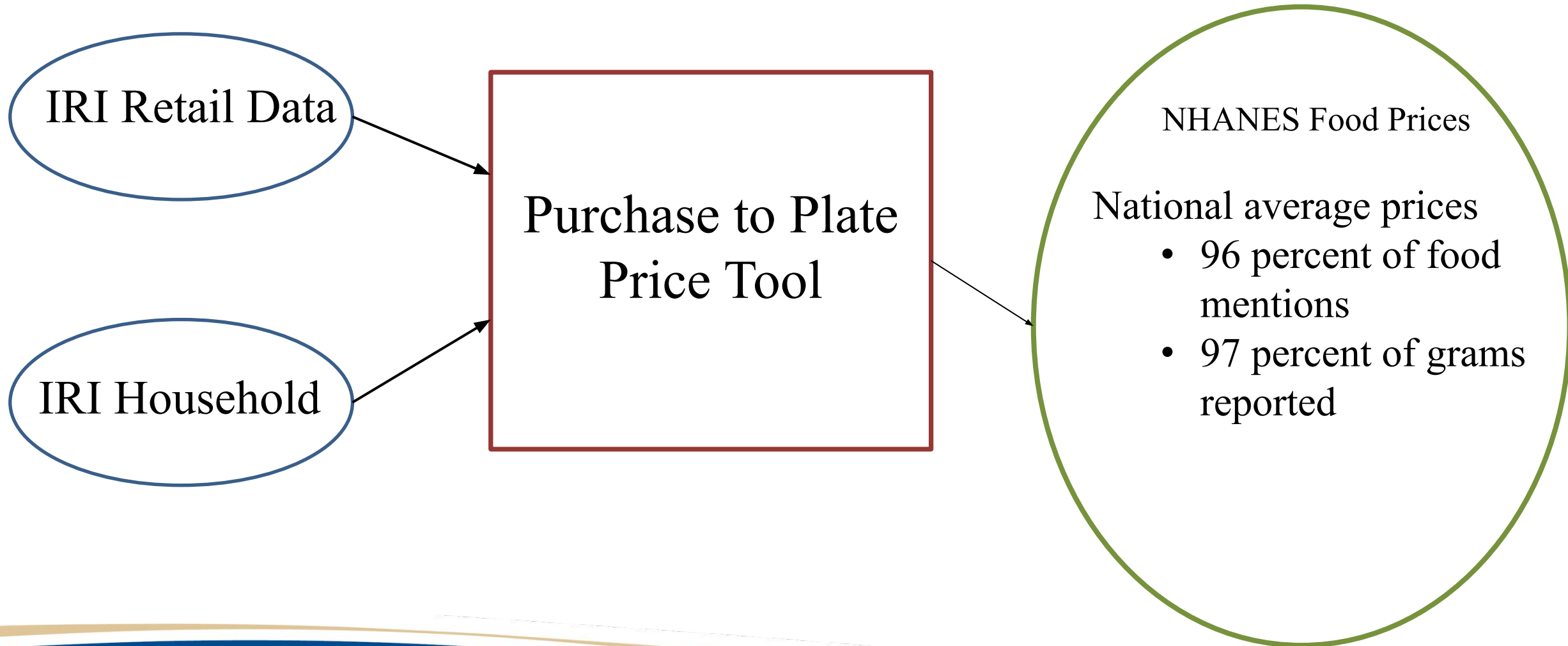


Product --- USDA Food = cooked rice	Subcode_IRIForm	Amount to Purchase (g)
Rice, brown, long-grain, raw	RFG-NRTS	0.00
Rice, brown, long-grain, raw	SS-NRTS	2.35
Rice, white, long-grain, regular, raw, enriched	RFG-NRTS	0.01
Rice, white, long-grain, regular, raw, enriched	SS-NRTS	28.29
Rice, white, long-grain, regular, enriched, cooked	SS-RTS	1.76
Rice, white, glutinous, unenriched, cooked	RFG-RTS	0.05
Rice, cooked, NFS	RFG-RTS	0.00
Rice, white, cooked, NS as to fat added in cooking	FZ-NRTS	0.27
Rice, white, cooked, fat added in cooking, made with oil	FZ-NRTS	0.38
Rice, brown, cooked, fat added in cooking, made with oil	FZ-NRTS	0.56
Rice, brown, cooked, fat not added in cooking	SS-NRTS	0.02
Rice, brown, cooked, fat not added in cooking	SS-RTS	1.42
Yellow rice, cooked, fat not added in cooking	SS-RTS	0.03
Rice, white, cooked, glutinous	SS-NRTS	0.38

Method Change, Not a Change in HEI



Food Prices Your Way

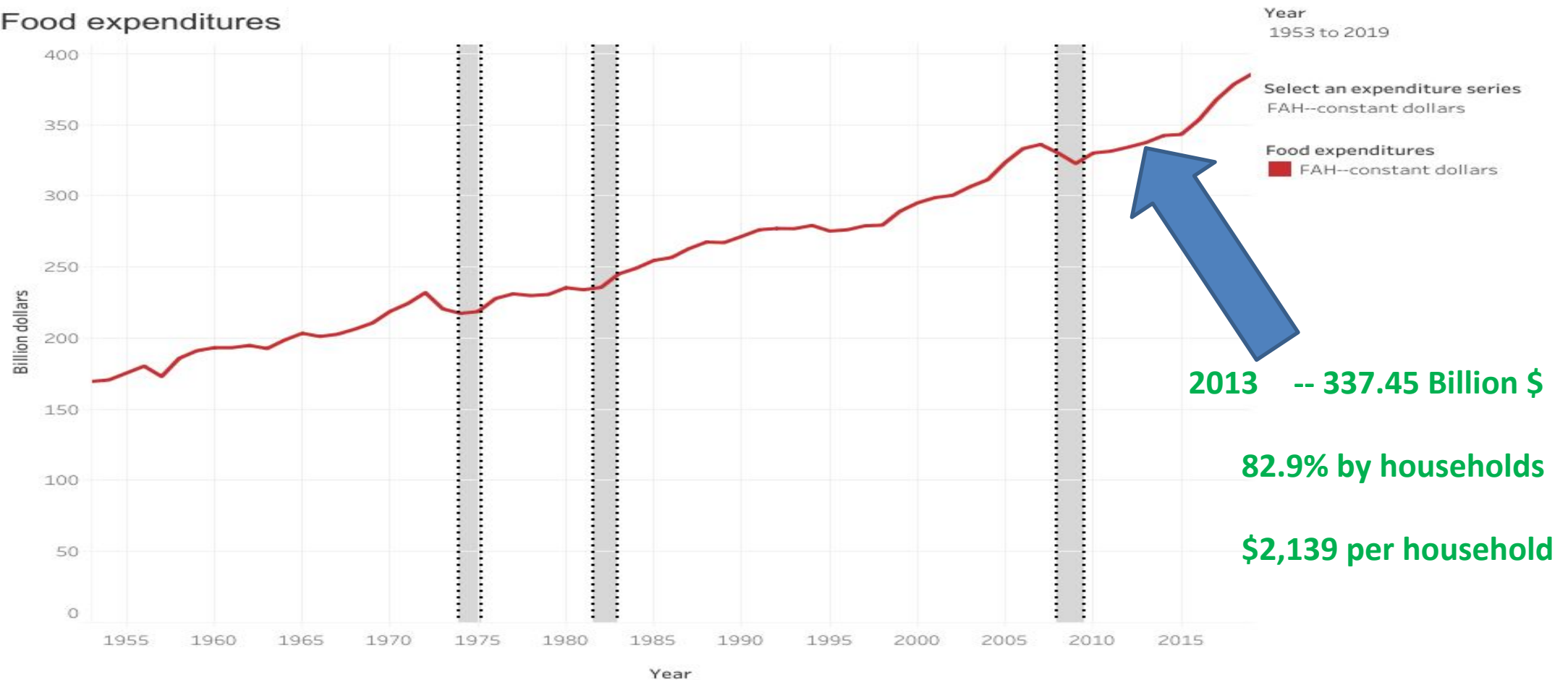


Food expenditures by aggregate series

Food expenditures in
nominal and constant..

Food sales by month

Food expenditures



Notes: Estimates are in nominal and constant dollars, as noted.

FAH is food at home. FAFH is food away from home.

The base year for the constant dollar series is 1988=100.

Recessions lasting more than 1 year are denoted as gray bands in the chart. Recessions are defined by the National Bureau of Economic Research.

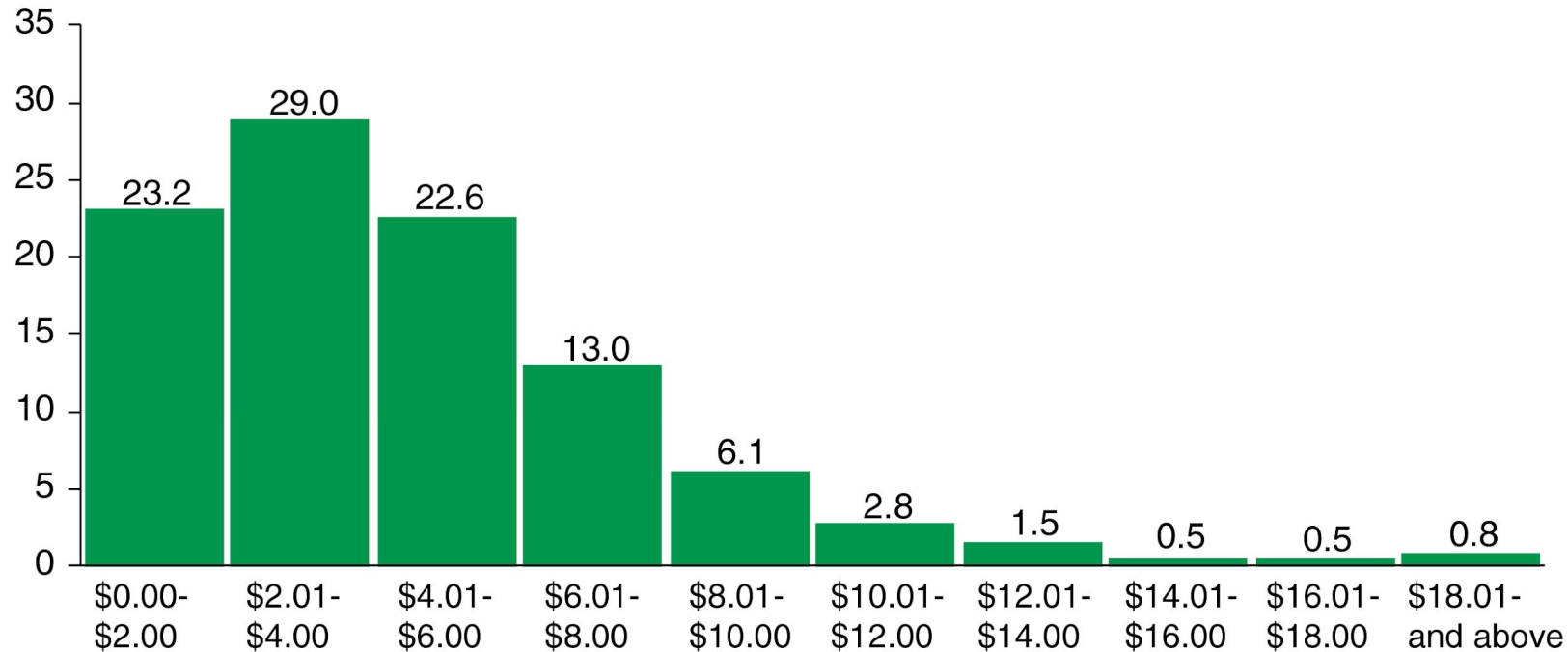
These estimates are for all purchasers.

The Food Expenditure Series has been comprehensively revised, resulting in a break in the series beginning in 1997. Data from 1950 to 1996 are extrapolated using the percentage change in the previously established estimates to pull 1997 levels back to 1950.

Sources: USDA, Economic Research Service, Food Expenditure Series and the National Bureau of Economic Research.

For 75 percent of NHANES participants, at-home food costs totaled \$6 or less per day in 2013

Share of participants, percent



Average daily per person food-at-home costs, 2013

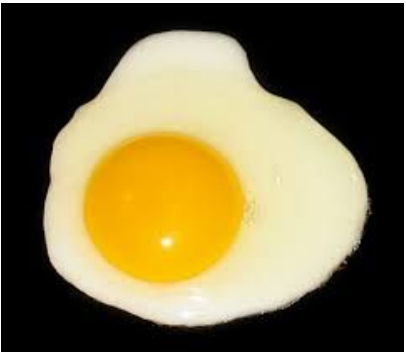
Notes: NHANES = National Health and Nutrition Examination Survey. Categories may not sum to 100 percent due to rounding. Estimates control for the NHANES complex sample design.
Source: USDA, Economic Research Service using data from NHANES 2011-12 and IRI InfoScan 2013.



Sample recipe from FNDDS

WWEIA Food		Ingredient	Amount
Vegetables, NS as to type, cooked, fat not added in cooking		Vegetables, mixed, frozen, cooked, 1 boiled, drained, without salt	100
	2	Salt, table	0.6
Carrots, cooked, NS as to form, fat not added in cooking		Carrots, cooked, boiled, drained, 1 without salt	155.2
	2	Salt, table	0.96





Recipes to price “as eaten” food



- Ingredients used are purchased from stores
- Convenience foods used
- Almost all foods prepared in 30 minutes or less

