

What We Eat in America, NHANES Dietary Data: *What To Know and How to Use It*



2012 Workshop for National Conference on Health Statistics
Washington, DC
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Dietary Data: What To Know and How to Use It

- Dietary Data Collection and Products
Alanna Moshfegh
- Data Preparation Steps for Dietary Analysis
Randy LaComb
- Dietary Data Analysis Using SAS
Joe Goldman

Dietary Data Collection and Products



Alanna J. Moshfegh

Food Surveys Research Group
Beltsville Human Nutrition Research Center
Agricultural Research Service
US Department of Agriculture



Beltsville Human Nutrition
Research Center

Serving The Nation Since 1906. Improving Health Thru Research.

National dietary data collection . . .

Partnership between USDA and DHHS



National Health and Nutrition Examination Survey

- Objective: Assess health and nutritional status of children and adults in the U.S.
- Annual national sample 5,000 persons
- Data released publicly in 2-year cycles





Dietary Interview Component of NHANES

Partnership: Department of Health & Human Services
US Department of Agriculture

National Survey: What We Eat in America, NHANES

Method: USDA's Automated Multiple Pass Method
used since 2002

Dietary Collection: 2 days of dietary intake data

Sample: 5,000 individuals each year



Dietary Component

- USDA Automated Multiple Pass Method—24-hour dietary recall instrument
- Interview administration
 - Day 1: in-person
 - Day 2: telephone
 - Bilingual dietary interviewers
- Sample: all ages
 - Day 1: 100% sample
 - Day 2: 100% sample

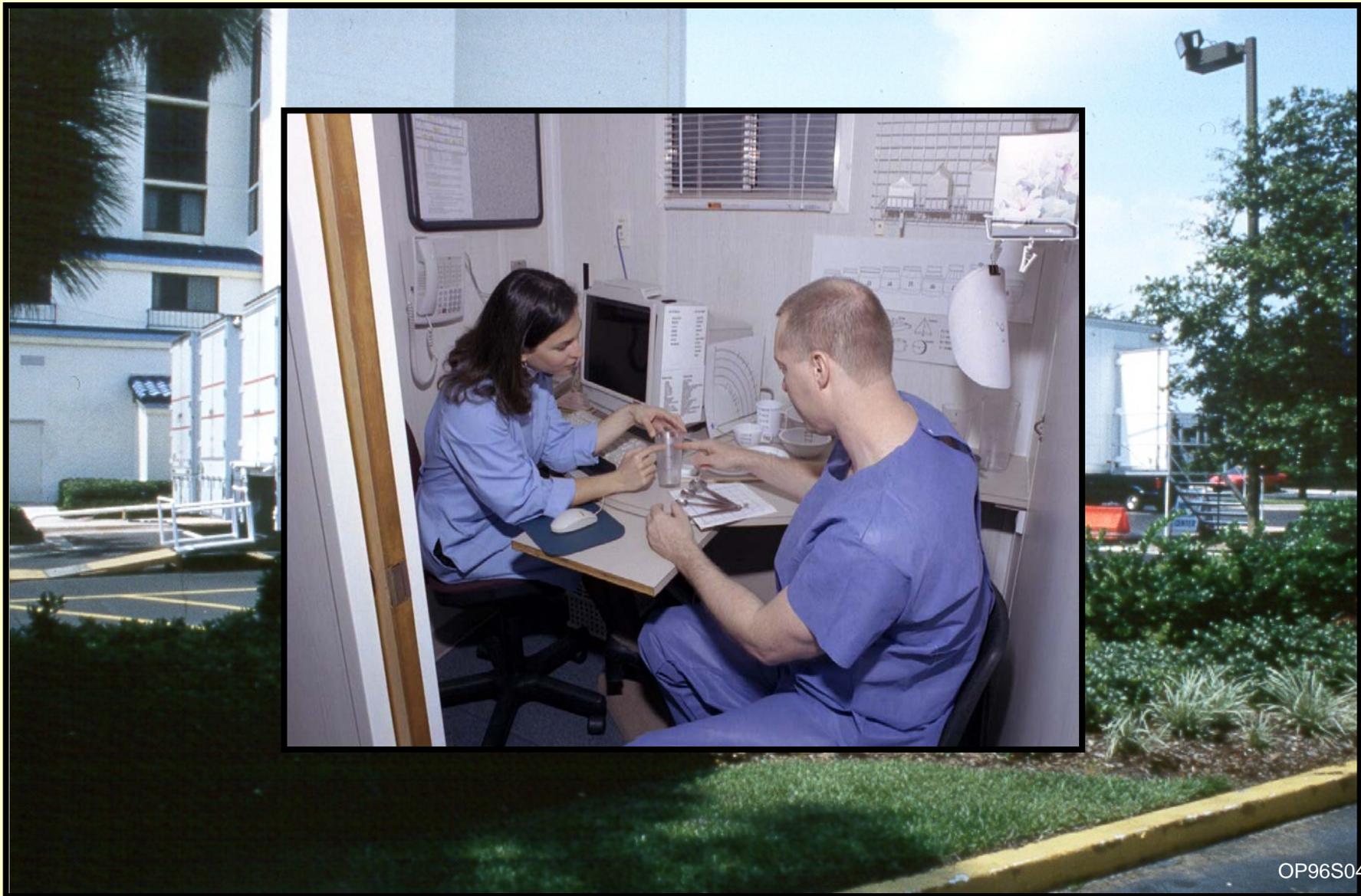


Dietary Interview Features

In-Person Interview—Day 1

- interview at MEC on exam day
- 2D and 3D food models
- appointment set for telephone interview
- food measurement aids provided for use during telephone interview

NHANES Mobile Exam Center





Dietary Interview Features

Telephone Interview—Day 2

- interview 3-10 days post-exam
- 2D and limited 3D food models
 - USDA Food Model Booklet
 - measuring cups and spoons
 - ruler
 - two household spoons

USDA Food Model Booklet



USDA Automated Multiple-Pass Method

Step 1

Quick List

... listing of all foods and beverages



Step 2

Forgotten Foods

... Probes for forgotten food items



Step 3

Time & Occasion

... Ask for each food



Step 4

Detail Cycle

... Standardized probes and questions for each food



Step 5

Final Probe

... A final probe for anything else



Step 1: Quick List

AMPM2.31\Intake\Instruments\Intake

Cassandra (10, F), N3.001.IN.02.001

First, we'll make a list of the foods you ate and drank yesterday, Tuesday. It may help you remember what you ate by thinking about where you were, who you were with, or what you were doing, like eating out, or watching television.

AMPM2.31\Intake\Instruments\Intake

Cassandra (10, F), N3.001.IN.02.001

Please tell me everything you had to eat and drink all day yesterday, Tuesday, from midnight to midnight. Include everything you had at home and away, even snacks and drinks . . . I'll ask you for specific details and amounts of the foods in a few minutes.
At this time, just tell me what you had.



Step 2: Forgotten Foods List

AMPM2.31 \Intake \Instruments \Intake

Cassandra (10, F), N3.001.IN.02.001

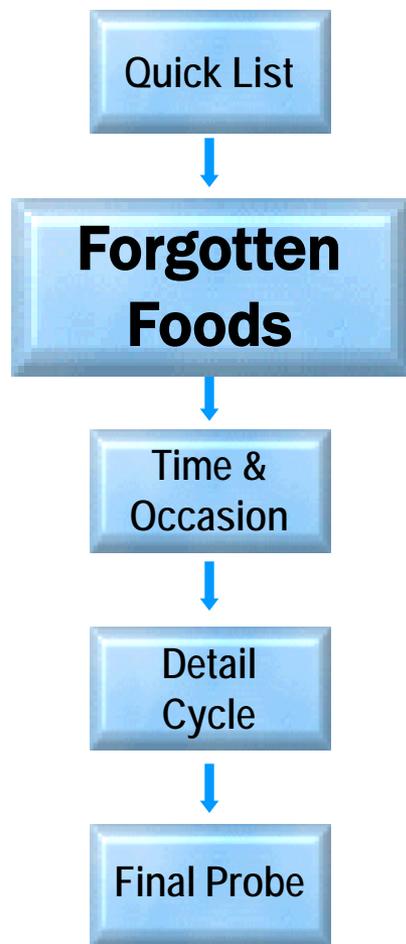
Your answers are important, so we'd like this list to be as **complete** as possible.

In addition to the foods you have already told me about, did you have any coffee, tea, soft drinks, milk or juice?

Other categories include:

- ▶ Alcoholic beverages
- ▶ Sweets
- ▶ Savory snacks
- ▶ Fruits and vegetables and cheese
- ▶ Breads and rolls
- ▶ Anything else

Importance of “Forgotten Foods”



50% remembered foods

Type of foods	%
beverages	40
sweets	20
fruits, vegetables, cheese	15
savory snacks	13
bread and rolls	9
anything else	2



Step 3: Time and Occasion

Blaise Data Entry - S:\AMPM2.1\Testing\Instruments\Intake

Forms Answer Navigate Options Help

Intake Sorted_RFL

Cassandra (10, F), N1.001.IN.01.001

About what time did you **begin** to eat/drink the Coke?

	Food Name	Comment	Time	Occasion	Occasion, OS
Food[1]	Pancakes		8:00AM	1	
Food[2]	Milk		8:00AM	1	
Food[3]	Pizza		12:00PM	2	
Food[4]	Coke				
Food[5]	Apple				
Food[6]	XXX				
Food[7]					

time entered here



Step 3: Time and Occasion

AMPM2.31 \Intake \Instruments \Intake

Cassandra (10, F), N3.001.IN.02.001

What would you call this eating occasion?

<input type="radio"/> 1. Breakfast	<input type="radio"/> 8. Feeding-infant only	<input type="radio"/> 14. Cena
<input type="radio"/> 2. Lunch	<input type="radio"/> 9. Extended consumption	<input type="radio"/> 15. Entre comidas
<input type="radio"/> 3. Dinner	<input type="radio"/> 10. Desayuno	<input type="radio"/> 16. Botana
<input type="radio"/> 4. Supper	<input type="radio"/> 11. Almuerzo	<input type="radio"/> 17. Bocado
<input type="radio"/> 5. Brunch	<input type="radio"/> 12. Comida	<input type="radio"/> 18. Tentempie
<input type="radio"/> 6. Snack	<input type="radio"/> 13. Merienda	<input type="radio"/> 19. Bebida
<input type="radio"/> 7. Drink		<input type="radio"/> 91. Other, Specify



Step 3: Time and Occasion

Blaise Data Entry - S:\AMPM2.1\Testing\Instruments\Intake

Forms Answer Navigate Options Help

Intake | Sorted_RFL

Cassandra (10, F), N1.001.IN.01.001

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Food[6]	XXX				
Food[7]					

occasion entered here



Step 4: Detail Cycle

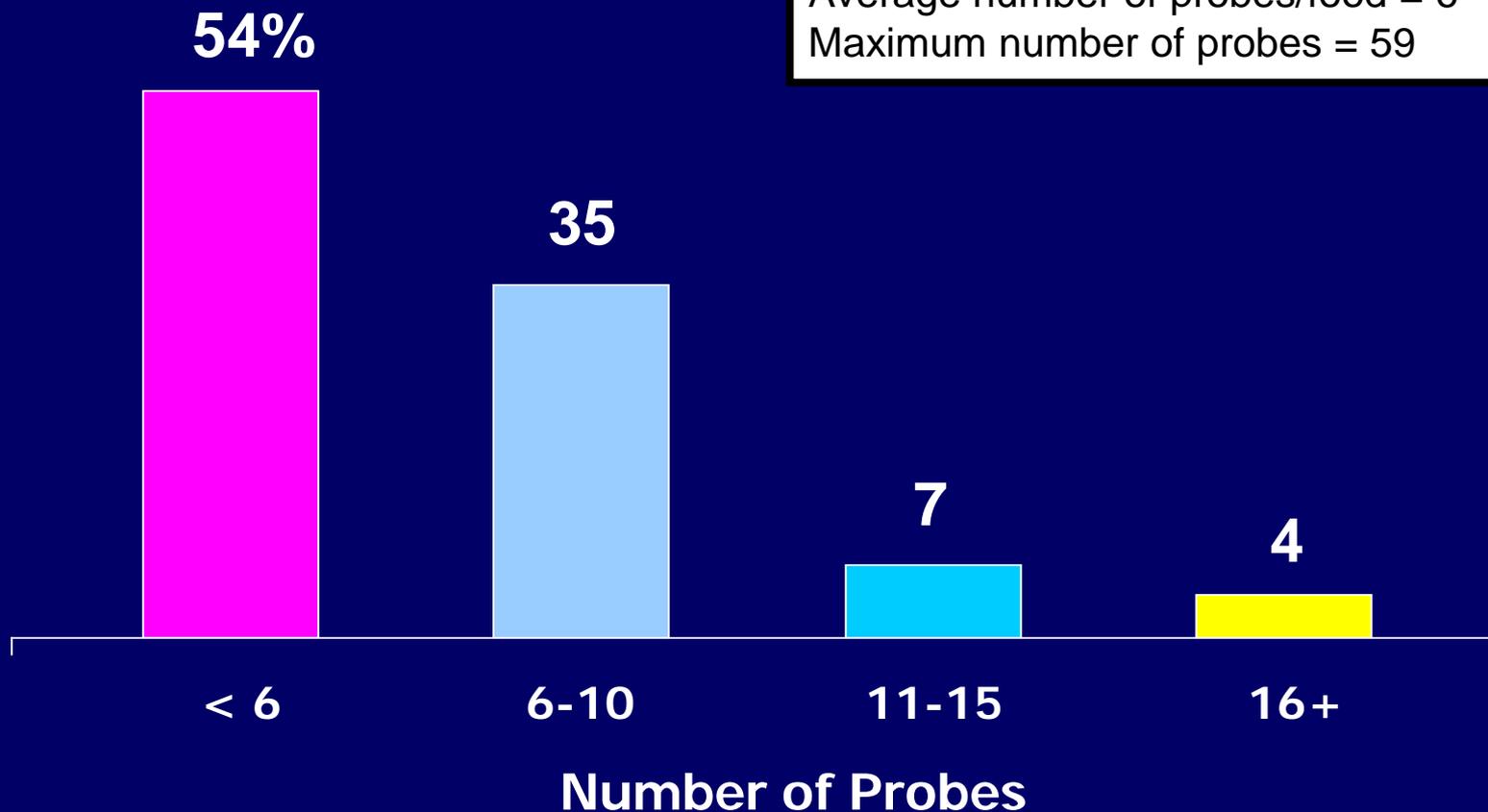
Four Tasks to be completed:

- collect **description** of each food
- **amount** consumed
- **addition(s)** for each food
- **review** 24-hr day



Percent of Foods Reported by Probes

Foods reported/year = ~125,000
Average number of probes/food = 6
Maximum number of probes = 59





Step 5: Final Probe

AMPM2.31\Intake\Instruments\Intake

Cassandra (10, F), N3.001.IN.02.001

Do you remember anything else you ate or drank yesterday - even small amounts, anything you ate in the car, at meetings, or while shopping, cooking or cleaning up?

AMPM

Validation Study

Objective

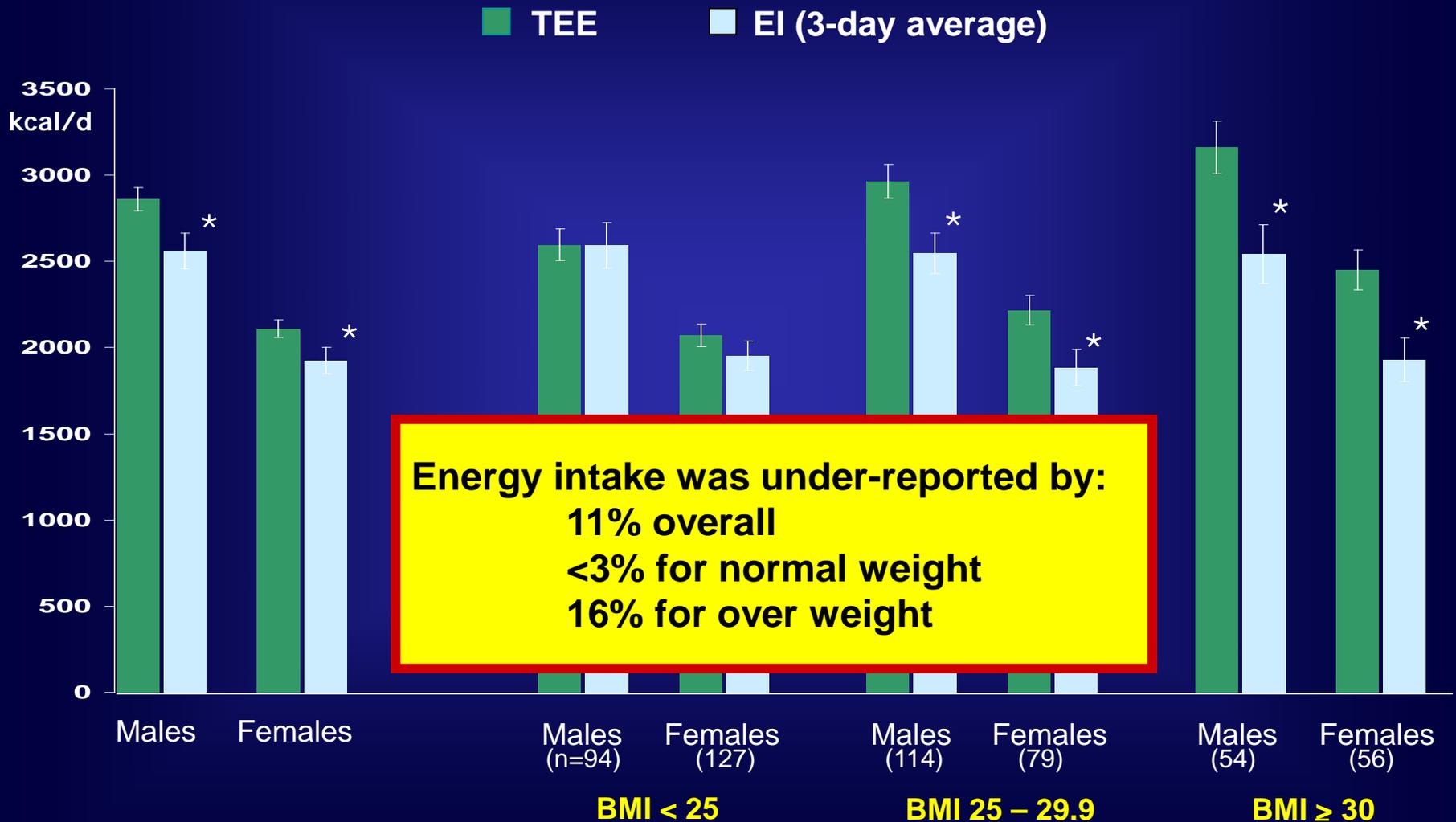
- Validate AMPM comparing energy intake with total energy expenditure measured by the doubly-labeled water technique

Study Design

- 524 adults from Washington DC - Baltimore area
- 5 cohorts, July 2002 – September 2003
- 14-day study period for each subject
- 3 24-hr recalls - - first in person, others by telephone
- Numerous other health and physical activity measures



Results of AMPM Validation Study



* Significant at <5%

Source: Moshfegh et al, *AJCN* 2008;88:324-32



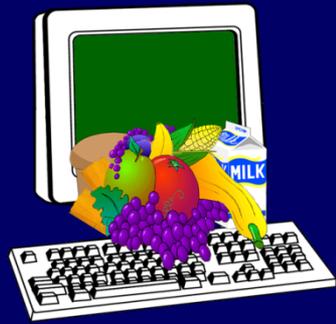
How do we interview children?

- < 6 years -- proxy respondent
- 6 - 8 years -- proxy respondent and child
- 9 - 11 years -- child and proxy-assisted
- 12 and over -- child



Data Retrieval

- children <12 years
- eating occasion reported ... but
 - with no foods
 - or
 - with some foods



Food and Nutrient Database for Dietary Studies (FNDDS)

- Used to code foods and amounts to determine nutrient content of foods
- Food descriptions, mainly generic
~ 7,000 food codes
- Food portions and weights
30,000+ portions in grams
- Food energy & 64 nutrients based on USDA National Nutrient Database for Standard Reference, 24

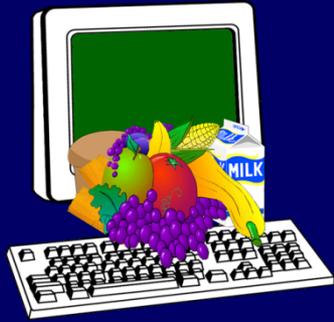


Food and Nutrient Database for Dietary Studies

- Updated for each 2-year WWEIA data release

<u>FNDDS version</u>	<u>WWEIA cycle</u>
1.0	2001-2002
2.0	2003-2004
3.0	2005-2006
4.1	2007-2008
5.0	2009-2010

- www.ars.usda.gov/ba/bhnrc/fsrg
- On CD in packet



Main Food Descriptions

- **Food Code:** 56205430 (8 digits)
- **Complete description:** (200 Characters)
Rice, white, cooked, instant, fat added in cooking
- **Food Code:** 58421080
Sopa de tortilla, Mexican style tortilla soup



USDA Food Code - - in IFF DR1IFDCD and DR2IFDCD

- 8 digit code number is in each food record.
- Description is not in food record.
- Can link to food descriptions in two ways:
 - FNDDS
 - Food Code Description File
 - DRXFCD_F



Modification Codes

- Recipe and nutrients adjusted to represent food eaten
- Often reflect type of fat used in cooking
- 2.5% of foods reported
- 6 digit code, variable DR1MC, DR2MC
- Modification Code Description File
DRXMCD_F in IFF





Combinations are used for...

Two or more foods eaten as a unit

- Items added to main food, eaten together
- Components / ingredients of foods - -
home-prepared & non-fast food sandwiches and salads
- Unusual mixtures not in FNDDS

Welcome to the **FOOD SURVEYS RESEARCH GROUP!**

Our mission is to monitor and assess food consumption and related behavior of the U.S. population by conducting surveys and providing the resulting information for food and nutrition-related programs and public policy decisions.



**What We Eat
in America**

WHAT WE EAT IN AMERICA

... source of data on food and nutrient intakes of Americans

[Data Tables](#) [Usual Intakes DRI's](#) [Data Briefs](#) [Research Articles](#) [Overview FAQs](#) [Documentation Data Sets](#) [Links](#)

DIETARY METHODS RESEARCH

... topics in collection of dietary recalls

[Salt Adjustment](#) [Water Intake](#) [Research Articles](#)



WHAT'S IN THE FOODS YOU EAT *SEARCH TOOL*

... search nutrient content of 13,000 commonly eaten foods

FOOD AND NUTRIENT DATABASE FOR DIETARY STUDIES

... foods, portions/weights, nutrients for analyzing dietary data

AMPM

AUTOMATED MULTIPLE-PASS METHOD

... computerized method to collect 24-hour dietary recalls

[Overview](#) [Validation Study](#) [Research Articles](#)



MYPYRAMID EQUIVALENTS DATABASE

... MyPyramid equivalents data for analyzing dietary intakes



FOOD INTAKES CONVERTED TO RETAIL COMMODITIES

... convert foods consumed in national dietary surveys to retail-level commodities

[Data Tables](#) [Overview](#) [Methodology & User Guide](#) [Databases](#)



FSRG LISTSERV

... receive announcements about FSRG releases



USDA FOOD SURVEYS, 1935 -1998

... documentation, questionnaires, reports, data sets

WHAT WE EAT IN AMERICA

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Dietary Data for Download

Documentation and Data Sets

2009-2010

[2007-2008](#)

[2005-2006](#)

[2003-2004](#)

[2001-2002](#)

WWEIA-NHANES 2009-2010	Individual Foods File	Total Nutrients File	All
Documentation (Source: NHANES website)	Day 1 and Day 2		Demographic
Codebook, and Frequencies (Source: NHANES website)	Day 1 Day 2	Day 1 Day 2	
What's New	-	-	VIEW
Intake Days	-	-	VIEW
Data File Descriptions	-	-	VIEW
Sample Weights	-	-	VIEW
Variables	VIEW	VIEW	Demographic
Nutrients/Food Components	-	-	VIEW
FNDDS - Version 5	-	-	VIEW
Download Data (help) (Source: NHANES website, SAS format)	Day 1 Day 2 Food Code Descriptions Modification Code Descriptions	Day 1 Day 2	Demographic
Suggested Citation/ Key Words	-	-	VIEW

What are combination foods?





Combination: number & type

All line items in a combination have same values for 2 variables:

- Combination food number - DR1CCMNM:
links a group of foods eaten together as a unit
- Combination food type - DR1CCMTZ:
identifies the general type of combination

	Number	Type
Bagel	1	3
Cream Cheese	1	3
Coffee	2	1
Sugar	2	1



Combination Food Types by Percent use

0: Not in combination food	56%	8: Ice crm/frz yogurt w/ adds	<1
1: Beverage w/ additions	8	9: Dried beans/veg w/ adds	3
2: Cereal w/ additions	5	10: Fruit w/ additions	<1
3: Bread/baked prod w/ adds	4	11: Tortilla products	3
4: Salad	4	12: Meat, poultry, fish	2
5: Sandwiches	11	13: Lunchables	<1
6: Soup	<1	14: Chips w/ additions	<1
7: Frozen meals	<1	90: Other mixtures	3

Table in "Key Points" handout and Survey Documentation



Information Collected

- Detailed description and amount of each food and beverage including water consumed during previous 24-hour period
- Additions to the food
- What foods were eaten in combination
- Time each food consumed and name of eating occasion
- Was food eaten at home?
- Source of tap water
- Day of the week
- Daily intake usual, more than or less than usual
- Frequency of fish & shellfish consumption for 1 yr of age and older
- Use and type of salt at table and in preparation
- Intakes of energy and 64 nutrients – vitamin D added in 2007-2008

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Summary Data Tables

Nutrient Intakes from Food

- 1 by Gender and Age
 - 2 by Race/Ethnicity
 - 3 by Income (In Dollars)
 - 4 by Income (as % of Federal Poverty Threshold)
-

Percent of Energy from Protein, Carbohydrate, Fat and Alcohol

- 5 by Gender and Age
 - 6 by Race/Ethnicity
 - 7 by Income (In Dollars)
 - 8 by Income (as % of Federal Poverty Threshold)
-

Away from Home: Percent of Nutrients

- 9 by Gender and Age
 - 10 by Race/Ethnicity
 - 11 by Income (In Dollars)
 - 12 by Income (as % of Federal Poverty Threshold)
-

Breakfast: Percent of Nutrients

- 13 by Gender and Age
 - 14 by Race/Ethnicity
 - 15 by Income (In Dollars)
 - 16 by Income (as % of Federal Poverty Threshold)
-

Lunch: Percent of Nutrients

- 17 by Gender and Age
 - 18 by Race/Ethnicity
 - 19 by Income (In Dollars)
 - 20 by Income (as % of Federal Poverty Threshold)
-

Dinner: Percent of Nutrients

- 21 by Gender and Age
 - 22 by Race/Ethnicity
 - 23 by Income (In Dollars)
 - 24 by Income (as % of Federal Poverty Threshold)
-

Snacks: Percent of Nutrients

- 25 by Gender and Age
 - 26 by Race/Ethnicity
 - 27 by Income (In Dollars)
 - 28 by Income (as % of Federal Poverty Threshold)
-

Snacks: Distribution of Snack Occasions

- 29 by Gender and Age
 - 30 by Race/Ethnicity
 - 31 by Income (In Dollars)
 - 32 by Income (as % of Federal Poverty Threshold)
-

Meals and Snacks: Distribution of Meal Patterns and Snack Occasions

- 33 by Gender and Age
- 34 by Race/Ethnicity
- 35 by Income (In Dollars)
- 36 by Income (as % of Federal Poverty Threshold)

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Reports on Usual Intakes Compared to Dietary Reference Intakes

- 5 Usual Nutrient Intakes from Food 2005-2006 Compared to 1997 Dietary Reference Intakes for **Vitamin D, Calcium, Phosphorus, and Magnesium** (24-page report)
- 4 **Cholesterol:** Usual Intakes from Food and Water, 2003-2006, Compared to the Recommendation of Below 300 mg
- 3 **Dietary Fiber:** Usual Intakes from Food and Water, 2003-2006, Compared to Adequate Intakes
- 2 **Sodium:** Usual Intakes from Food and Water, 2003-2006, Compared to Adequate Intakes and Tolerable Upper Intake Levels
- 1 Usual Nutrient Intakes from Food 2001-2002 Compared to 1997 Dietary Reference Intakes (56-page report).

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Breakfast in America, 2001-2002

Dietary Data Briefs



Snacking Patterns of U.S. Adolescents



Fluid Milk Consumption



Snacking Patterns of U.S. Adults



MyPyramid Intakes and Snacking Patterns of U.S. Adults

Food Surveys Research Group
Dietary Data Brief
June 2008



Beverage Choices of U.S. Adults

Food Surveys Research Group
Dietary Data Brief
August 2008



Drinking Water Intake



Sodium Intake of the U.S. Population

What We Eat in America, NHANES 2007-2008

Food Surveys Research Group
Dietary Data Brief
September 2008



Dietary Intakes of Choline

What We Eat in America, NHANES 2007-2008

Food Surveys Research Group
Dietary Data Brief No. 9
October 2011

Thank you

To keep informed about dietary data products,
join the FSRG listserv at . . .

www.ars.usda.gov/ba/bhnrc/fsrg



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