

Unique considerations in modifying food composition databases for image-based dietary assessment methods running on small mobile devices
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Recognition

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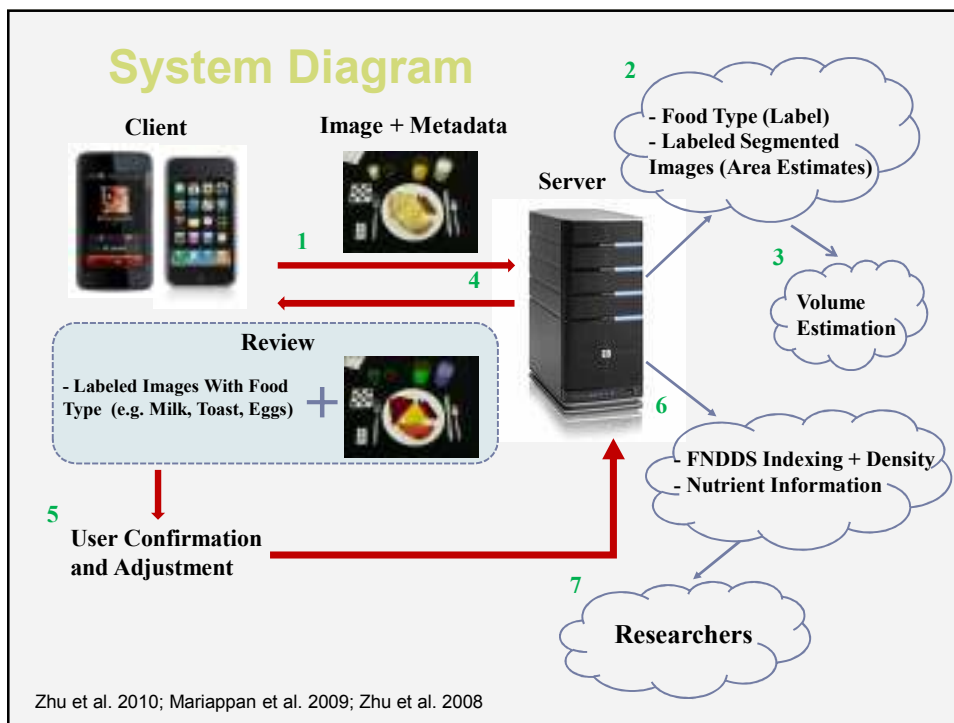
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- ▶ Objective: Modify FNDDS to accommodate the small screen size available on a mobile telephone.
- ▶ Shorten “Main Food Description” field
 - ▶ Create “Abbreviated Description” field
- ▶ Reduce number of foods displayed
- ▶ Enhance search mechanisms



Record section of the Application (App)

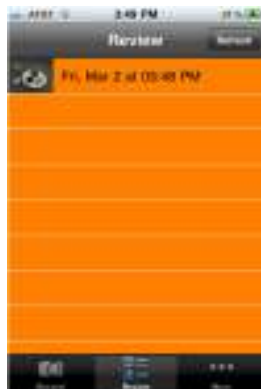


Opening screen: Record eating occasions



Image acquisition: Proper angle assistance

Review section of the app



TADA Review Application



Mini Labels

New Food Descriptions

- ▶ **Mini Label** = brief, 15-character or less description of a food item in FNDDS
- ▶ **Notes** = gives a more detailed description of the food item in FNDDS

TADA Review Application

Notes



Incremental search

Meat, Poultry, Fish, and
Mixtures

FNDDS (2)

(27) Meat, poultry, fish with nonmeat items

- ▶ Food Codes starting with 27....

I453-2020/7204

http://www.ars.usda.gov/SP2UserFiles/Place/12355000/pdf/fndds/fndds4_doc.pdf#title



Assigning a “Mini Label” to a Mixed Dish

Labeled with the meat item:

27116200 Beef with barbecue sauce (mixture)

Mini Label : beef

Notes: with barbeque sauce



Include style?

- ▶ 27351010 Codfish with starchy vegetables, Puerto Rican style (Serenata de bacalao) (mixture)
 - ▶ Mini Label: codfish
 - ▶ Notes: with starchy vegetables, Puerto Rican style
-

Noodles, Rice, potatoes included in mini label


- ▶ 27220020 Ham and noodles with cream or white sauce (mixture)
 - ▶ Mini Label: ham & noodles
 - ▶ Notes: with cream or white sauce
 - ◎ 27213200 Beef and rice with gravy (mixture)
 - ◎ Mini Label: beef & rice
 - ◎ Notes: with gravy
-

Vegetables

- ▶ 27311630 Beef, potatoes, and vegetables (excluding carrots, broccoli, and dark-green leafy), tomato-based sauce (mixture)
 - ▶ Mini Label: beef & potatoes
 - ▶ Notes: with vegetables (no carrots, broccoli, and dark-green leafy), tomato sauce
-
- ▶

Vegetables

- ▶ 27311635 Beef, potatoes, and vegetables (including carrots, broccoli, and/or dark-green leafy), cheese sauce (mixture)
 - ▶ Mini Label : beef & potatoes
 - ▶ Notes: with carrots, broccoli, and/or dark-green leafy vegetables, cheese sauce
-
- ▶



Grain products

Breads

- ▶ Mini label: bread, roll, muffin, croissant, bagel, coffee cake, English muffin, pita bread, tortilla, biscuit, bread stick, or stuffing
- ▶ Notes: specific type
- ▶ Example
 - ▶ **51602010** Bread, multigrain, reduced calorie and/or high fiber
 - ▶ Mini Label: bread
 - ▶ Notes: multigrain, reduced calorie, and high fiber



Cakes

- ▶ Mini Label: cake
 - ▶ Notes: specific type/brand

 - ▶ Example
 - ▶ **53108200** Cake, cupcake, chocolate, with icing or filling
 - ▶ Mini Label: cake
 - ▶ Notes: chocolate cupcake, with icing
-
- ▶

Ready-to-Eat Cereals

- ▶ Mini Label- cereal
 - ▶ Notes-Specific cereal or brand name
-
- ▶

- For many bakery products, the toasted item has more energy than the same amount of the untoasted item, e.g.:

FNDDS code: 51201010
Bread, whole wheat, 100%
100 g has 247 kcal
1 regular slice (28g) has 69 kcal



FNDDS code: 51201020
Bread, whole wheat, 100 % toasted
100g has 306 kcal
1 regular slice (25g) has 76 kcal

FNDDS code: 51180010
Bagel
100 g has 257 kcal
1 regular bagel (105g) has 270 kcal

FNDDS code: 51180020
Bagel, toasted
100 g has 288 kcal
1 regular bagel (99 g) has 285 kcal

FNDDS code: 51186010
Muffin, English
100 g has 227 kcal
1 muffin (58g) has 132 kcal

FNDDS code: 51186020
Muffin, English, toasted
100g has 270 kcal
1 muffin (50 g) has 135 kcal

Sample of food descriptions given by adults and adolescents at time of eating			
	Food	Description	
<p>24</p> <p>Recorded descriptions of foods by adults and adolescents differ.</p>	Adults		
		Milk	•Skimmed milk •2% milk
		Pork chop	•Breaded pork chop •Fried boneless pork chop
		BBQ chicken	•Baked chicken with barbecue sauce •Chicken with BBQ sauce •BBQ chicken
	Adolescents		
		Milk	•White milk •Cereal milk •Milk 4 cereal
	Sliced Apple	•Red apple slices •Sliced apples •Red apple	
	Strawberry Yogurt	•Pink yogurt	
Schap et al Public Health Nutr 2011; Schap et al ISBNPA, Melbourne, Australia 2011			

Frequently Reported Foods and Beverages by Age Among Participants of NHANES 1999-2008

- ▶ Determine the most frequently reported foods or beverages for individuals ages 11-14 y, 15-21 y, and 22-65 y using data drawn from NHANES 1999-2008.

Participants	n
Total	11 – 65 y 22,935
Age	11 – 14 y 3,655
	15 – 21 y 5,524
	22 – 65 y 13,756

▶ Eicher-Miller H & Boushey CJ. FASEB 2012

Table 1

Most Frequently Consumed Foods or Beverages among US Children ages 11 to 14 y from 1999 to 2008, calculated from NHANES data (n=3,655)

Rank	Short Food Description	Frequency	Weighted Frequency	Percent
1	Water, tap	1,186	6,091,921	3.38
2	Milk, Cow's, Fluid, 2% Fat	1,078	5,091,809	2.82
3	Soft Drink, Cola Type	1,064	5,741,680	2.08
4	Water, Bottled, Unsweetened	815	3,282,917	1.82
5	Tomato Catsup	986	3,272,191	1.82
6	Bread, White	774	3,006,591	1.67
7	Bread, Whole, Soft	778	3,000,078	1.66
8	Soft Drink, Fruit-Flavored, Caffeine Free	1,045	2,926,964	1.62
9	Milk, Cow's, Fluid, Whole	900	2,739,802	1.52
10	Lettuce, Raw	629	2,165,362	1.20
11	White Potato, Chips	606	1,986,082	1.10
12	Apple, Raw	467	1,726,510	0.96
13	Milk, Cow's, Fluid, 1% Fat	305	1,399,649	0.77
14	Milk, Cow's, Fluid, Skim or Nonfat	216	1,362,664	0.76
15	White Potato, French Fries, From Frozen, Deep-Fried	482	1,361,680	0.76
16	Salty Snacks, Corn or Cornmeal, Tortilla Chips	430	1,353,352	0.75

Table 2

Most Frequently Consumed Foods or Beverages among US Children ages 8 to 21 y from 1999 to 2008, calculated from NHANES data (n=5,524).

Rank	Short Food Code Description	Frequency	Weighted Frequency	Percent
1	Soft Drink, Cola-Type	2,134	9,006,376	2.85
2	Water, Tap	1,521	8,946,671	2.83
3	Water, Bottled, Unsweetened	1,537	6,770,094	2.14
4	Tomato Catsup	1,418	5,617,970	1.78
5	Milk, Cow's Fluid, 2% Fat	1,097	5,586,868	1.77
6	Letttuce, Raw	1,242	5,434,837	1.72
7	Soft Drink, Fruit-Flavored, Caffeine Free	1,397	4,561,872	1.44
8	Brd, White, Soft	1,007	4,516,121	1.43
9	Bread, White	976	4,300,536	1.36
10	Milk, Cow's, Fluid, Whole	1,119	4,178,451	1.32
11	White Potato, French Fries, From Frozen, Deep-Fried	1,014	3,699,667	1.17
12	Tomatoes, Raw	911	3,646,606	1.15
13	Soft Drink, Fruit-Flavored, W/Caffeine	513	3,171,828	1.00
14	Mayonnaise, Regular	699	3,096,066	0.98
15	White Potato, Chips	718	3,035,408	0.96
16	Soft Drink, Beverage-Type (Dr. Pepper, Ab, BM)	552	2,754,786	0.87

Table 3

Most Frequently Consumed Foods or Beverages among US Children ages 22 to 65 y from 1999 to 2008, calculated from NHANES data (n=15,756).

Rank	Short Food Code Description	Frequency	Weighted Frequency	Percent
1	Water, Tap	6,068	64,980,652	3.01
2	Coffee, Made from Ground, Regular	5,436	60,001,510	2.78
3	Soft Drink, Cola-Type	4,724	43,855,789	2.05
4	Water, Bottled, Unsweetened	4,733	40,528,840	1.88
5	Sugar, White, Granulated/Low Lump	4,331	36,742,872	1.70
6	Letttuce, Raw	3,601	36,514,975	1.69
7	Tomatoes, Raw	3,457	34,782,579	1.61
8	Soft Drink, Cola-Type, Sugar-Free	2,130	28,243,264	1.31
9	Milk, Cow's, Fluid, 2% Fat	2,786	27,593,950	1.28
10	Brd, White, Soft	2,181	22,446,672	1.04
11	Tomato Catsup	2,126	20,678,291	0.96
12	Milk, Cow's, Fluid, Whole	2,475	19,276,637	0.89
13	Bread, White	2,055	19,065,315	0.88
14	Bananas, Raw	1,917	17,879,065	0.83
15	Milk, Cow's, Fluid, Skim or NonFat	1,332	17,119,955	0.79
16	Mustard (Dressings/Mustard, Chinese Mustard)	1,497	16,364,199	0.76

Review: Typing-in a Not Listed Food



New Fields

- ▶ **“Mini label”**
 - ▶ 15 characters or less
 - ▶ May represent many food codes
- ▶ **“Notes”**
 - ▶ Short description
 - ▶ Designates food code
- ▶ **“Includes”**
 - ▶ Brand names
 - ▶ Flavors, etc

Uses

- Automated labels
- Searchable term

- Second line description
- Searchable terms

- Searchable terms
- Barcode (UPC) links



Enhanced Searching

- ▶ Incremental searching using full identification structure, i.e., mini labels, notes, and includes.
 - ▶ Reduce the number of foods
 - ▶ Tailor foods lists by age, other characteristics, history, favorites
-
- ▶

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