

## Using UPC scanning methods to characterize household food supplies of multi-ethnic low income minorities

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## Abstract

Most characterizations of food stored in the home for everyday use have been based on average household food inventories derived from food frequency questionnaires of middle to high-income households, and thus are unlikely to reflect food stores of low-income households. Therefore, this study sought to accurately characterize household food supplies of low-income minority families by inventorying 30 African-American and 30 Oaxacan-American low-income households with children, in an urban center of New Jersey.

For both groups, grains accounted for the greatest percentage of kilocalories (>40%). The greatest percentage of total fat was found in meat/protein foods in African-American households and in fats and oils in Oaxacan households. The Oaxacan households had a greater percentage of calcium from the dairy group than the African-American households (32.7% vs. 18.5%) while also having a greater proportion of dairy foods from non-dessert dairy than dessert dairy (96.1% vs. 64%). Both groups had similar amounts of fruit and vegetables, with thermally processed fruits and vegetables (i.e., canned and jarred) being more common in African-American households than Oaxacan households (80% vs. 32%). Fresh fruits and vegetables were more common in Oaxacan than African-American households (51.6% vs. 5.5%).

An understanding of the types and nutrient content of foods on hand in diverse low-income households can lead to more ecologically valid nutritional interventions.

## Methods

- ❖ Participants were recruited using snowball sampling.
- ❖ A survey recorded demographic information and emergency preparedness behaviors.
- ❖ Home food inventories were conducted using Universal Product Code (UPC) scanning technology linked to a nutrient database.
- ❖ Inventoried food items were categorized into:
  - ❖ Dairy
  - ❖ Meat/Proteins
  - ❖ Fruits & Vegetables
  - ❖ Grains
  - ❖ Sweets
  - ❖ Salty/Fatty Snacks
  - ❖ Fats & Oils
  - ❖ Miscellaneous



## Results

### Grains

- ❖ Grains contained the most kilocalories and sodium in both samples' households.
- ❖ Dried grains (e.g. rice, pasta, and breads) comprised 75% of African-American and 91% of Oaxacan household grain calories.



### Meat/protein

- ❖ Meat/protein contained the most total fat in African-American households.
- ❖ Meat/protein contained the largest amount of saturated fat and cholesterol in both samples' households.



### Fats and oils

- ❖ Supplied the most total fat in Oaxacan households.

### Dairy

- ❖ Comprised <5% of total calories in both samples' households.
- ❖ Non-dessert dairy items (e.g. milk, sour cream, yogurt) were more common in Oaxacan households (96%) versus 64% in the African-American households.
- ❖ Dairy provided significantly more calcium in Oaxacan than African-American households (33% vs. 19%).



### Fruits & Vegetables

- ❖ Fruit and vegetables comprised ~10% of calories, 70% vitamin C, and 60% vitamin A in both samples.
- ❖ Thermally processed fruits and vegetables (i.e., canned and jarred) were significantly more common in African-American than Oaxacan households (80% vs. 32%)
- ❖ Fresh fruits and vegetables were significantly more common in Oaxacan than African-American households (52% vs. 6%).



### Sweets

- ❖ Provided the largest percentage of total sugar.
- ❖ Sweetened Beverages comprised 11% of the total sugar in African-American and 20 % in the Oaxacan home food supply.



### Food groups<sup>a</sup> providing ≥ 10% nutrients in household food supplies<sup>b</sup>

Nutrients	African-American (% of HFS)	Oaxacan (% of HFS)
<b>Kilocalories (Kcal)</b>		
Meat/Protein	23.42	12.16
Fruits/Veg	11.76	9.29
Grains	41.73	42.79
Sweets	9.73	9.03
Fats & oils	8.39	21.39
<b>Total Fat (g)</b>		
Meat/Protein	42.30	16.25
Grains	18.45	10.24
Fats & oils	26.49	63.12
<b>Cholesterol (mg)</b>		
Dairy	6.96	9.21
Meat/Protein	77.94	85.64
Grains	11.10	1.99
<b>Sodium (mg)</b>		
Meat/Protein	19.21	21.71
Fruits/Veg	26.79	16.24
Grains	37.95	23.48
Misc	7.74	24.92
<b>Carbohydrate (g)</b>		
Fruits/Veg	16.76	13.33
Grains	55.47	63.02
Sweets	16.69	14.68
<b>Total Sugars (g)</b>		
Fruits/Veg	24.31	27.81
Grains	22.43	10.19
Sweets	44.89	52.94
<b>Protein (g)</b>		
Meat/Protein	50.60	41.86
Grains	34.60	39.81
<b>Vitamin A (IU)</b>		
Fruits/Veg	63.81	60.57
Grains	15.14	6.97
Misc	5.71	17.87
Fats & oils	6.65	2.51
<b>Vitamin C (mg)</b>		
Fruits/Veg	72.23	76.57
Grains	14.74	3.79
Sweets	13.26	15.01
<b>Calcium (mg)</b>		
Dairy	18.53	32.68
Meat/Protein	15.06	10.94
Fruits/Veg	12.23	11.91
Grains	48.66	35.52
<b>Iron (mg)</b>		
Meat/Protein	23.59	21.72
Fruits/Veg	9.45	12.15
Grains	62.92	61.22

<sup>a</sup> Food groups are as follows: grains (includes dry grains [e.g., rice, pasta], ready-to-eat cereals, baked goods, and grain snacks [e.g., pretzels, crackers]); fruits and vegetables; dairy; meat [e.g., high protein [non-dairy] foods including meat, fish, poultry, nuts, seeds, legumes]; high added sugar foods (e.g., candy, sugar-sweetened soft drinks, drink mixes); energy-free beverages; packaged entrees containing a mixture of food groups (e.g., pizza, potpies); and salty/fatty snacks (e.g., chips, cheese curls).

<sup>b</sup> Total sample size = 60; African-American, n = 30; Oaxacan, n = 30.

<sup>c</sup> Includes all foods available in households except alcoholic beverages, commercially prepared baby food, infant formula, pet foods, bottled water, refrigerated leftovers, foods of minimal nutrient content (e.g., vinegar, baking powder, baking soda, salt, pepper, herbs, spices, extracts, cooking spray, non-caloric sweeteners, gum, coffee and tea [except packaged beverages containing caloric sweeteners]), and condiments typically used in small quantities e.g., ketchup, mustard, mayonnaise, horseradish, soy sauce, hot sauce).

<sup>d</sup> Total for each nutrient do not total 100% because only food groups contributing at least 10% of a nutrient are included.

## Conclusions

- ❖ UPC scanning to conduct household kitchen audits in low income ethnic groups can be used as a tool in developing nutrition education.



- ❖ Interventions to reduce the fat content of meats, increase calcium, and decrease sodium in home food supplies could improve the food supply in African-American households.

- ❖ Interventions to reduce the amount of sugar in the household food supply, especially from sweetened beverages, and to increase the amount of low-fat dairy products (calcium) could improve the food supply in the Oaxacan Households.



### Strengths

- ❖ Time efficient method reduces participant burden.
- ❖ Increased accuracy over previous home food inventory methods.
- ❖ No households were inventoried during major holiday periods.

### Weaknesses

- ❖ Does not make assumptions about method of preparation, rate of use, or food purchased/eaten outside the household.
- ❖ Does not distinguish between regularly eaten foods and foods stored for special occasion such as birthdays or holidays.

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