Updating USDA's Key Foods List Using NHANES 2003-04 Data

D.B.Haytowitz, P.R.Pehrsson, and J.M.Holden

Nutrient Data Laboratory, Beltsville Human Nutrition Research Center, Beltsville, MD 20705

USDA ARS Beltsville Human Nutrition Research Center

Serving The Nation Since 1906. Improving Health Thru Research.

Abstract 533.13

The Nutrient Data Laboratory has used a Key Foods approach to set priorities for the analysis of foods/nutrients for the National Food and Nutrient Analysis Program. Key Foods are those foods designated as primary contributors for 16 nutrients of public health significance, and was last determined, using NHANES 2001-02 consumption data. NHANES 2003-04 food consumption data were combined with food composition data from the USDA National Nutrient Database for Standard Reference 18 to determine the nutrient-weighted contribution of each food. As a result, the new Key Foods list contains 454 food items, divided into 4 quartiles, based upon the percent amount consumed for each of the 16 nutrients. Quartile 1 contains common foods such as milk, eggs, processed cheese, margarine, and salt. Quartile 2 contains other popular foods such as French fries, tomatoes, sugar, and ground beef. Margarine (80% fat, stick) was the top contributor to fat intake (4.3%), followed by mayonnaise at 3.4%. Whole milk provided 9.9% of the saturated fat intake while sugar-sweetened carbonated beverages provided 5.8% of the energy intake and 22.6% of sugar intake. Changes in the Key Foods list items between 2002 and 2004 were minimal, validating previous choices of foods/nutrients for analysis and providing a cost-effective method to set priorities for monitoring key contributors of nutrients and for new analyses. Funded by: USDA & NIH Y1CN5010.

Introduction

NDL, in collaboration with NCI, ODS/NIH and other institutes and agencies initiated the National Food and Nutrient Analysis Program (NFNAP), a dynamic, nationally representative food analysis program, with the goal of improving the quality and quantity of data in USDA's food composition databases. The first goal of the program is to identify and prioritize foods and nutrients for sampling and analysis, thereby maximizing the cost-effectiveness of the program.

Methods

To accomplish this goal the Key Foods approach (Haytowitz et al, 2000; 2002) was used. The Key Foods approach uses USDA's food composition and food consumption data to identify and prioritize foods and nutrients for analysis.

For the current Key Foods list, the following sources were used:

- Food composition data from the USDA National Nutrient Database for Standard Reference, Release 18 (USDA, 2005)
- The link file from Release 2 of the Food and Nutrient Database for Dietary Surveys (FNDDS; USDA, 2006)
- Weighted two-day food consumption data from the National Health and Nutrition Examination Survey (NHANES) 2003-2004 Data Files (U.S. DHHS, NCHS, 2006)

These data files were processed as follows:

- Convert ingredient amounts per food item to percents
- Multiply weighted grams consumed from NHANES by the percentage contribution of each ingredient in all foods
- Sum the amount consumed for each ingredient in all foods to give the total amount consumed of that ingredient or food
- Select targeted nutrients from the 2005 Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans (Table 1).
- Multiply the amount of each ingredient by the content of the targeted nutrient in the food to give its percent nutrient contribution to the total intake
- Sort and rank values for total nutrient intake for each nutrient
- Divide nutrient lists into quartiles based on percent contribution
- Repeat for all targeted nutrients

Results

Fat:

- Major sources of fat include margarine and spreads, shortening, milk, and fast food French fries (Table 2).
- Household shortening moved from 15th rank in 1998 to 5th rank in 2003-04 providing 2.5% of fat intake

Potassium:

- Due to high consumption, milk, coffee, and orange juice were the highest ranked sources of potassium in the diet (Table 3).
- Whole milk was ranked 1st in 1998, while in 2003-04, 2% milk was ranked 1st providing 5.24% of the potassium intake.
- Brewed coffee showed a dramatic change in rank moving from 720 in 1998 to 3rd in 2003-04, providing 3.40% of the potassium intake.

Folate:

- Grains and baked products, showing the impact of recent fortification were the highest sources of folate to the diet (Table 4).
- All purpose flour ranked 1st providing 5.70% of the folate intake

Over the years the rankings of the various foods in the 1st quartile have remained relatively constant (Table 5). The presence of hamburger rolls and American cheese are influenced by the popularity of fast food hamburgers. Due to the prevalence of many different forms, ground beef and chicken do not show up in Table 5. If the various forms were combined, their rank would be much higher and the combined item would appear in the 1st quartile.

Non-diet, carbonated colas moved from 40th in CSFII 94-96 to 11th in NHANES 2003-04. Salt appears on the list, due to its use as an ingredient in many foods; carrots appear primarily due to their high carotenoid and pro-vitamin A content.

Table 1. Nutrients of Concern for Americans (USDA, 2004)

Fat, total	Vitamin A
Food energy	Beta-carotene
Sugar, total	Alpha-tocopherol
Calcium	Vitamin C
Iron	Vitamin B_{12}
Potassium	Folate
Sodium	Cholesterol
Zinc	Saturated fatty acids

Table 2. Fat content of 1st Quartile Foods in Rank Order

SR code	Description	Value (g/100g)	% of total fat intake	Rank in CSFII 94-96, 98
04610	Margarine, regular, stick, composite, 80% fat, with salt	78.77	4.29	2
04025	Salad dressing, mayonnaise, soybean oil, with salt	78.2	3.40	17
01077	Milk, whole, 3.25% milk fat	3.25	3.04	1
04615	Shortening, household, composite	100	2.51	15
21138	Fast foods, potato, french fried in vegetable oil	17.05	2.26	8
01079	Milk, reduced fat, fluid, 2% milk fat	1.97	2.25	4
01009	Cheese, cheddar	33.14	2.15	9
04044	Oil, soybean, salad or cooking	100	2.08	16
01123	Egg, whole, raw, fresh	9.94	2.08	13

Table 3. Potassium content of 1st Quartile Foods in Rank Order

SR code	Description	Value (mg/100 g)	% of total potassium intake	Rank in CSFII 94-96, 98
01079	Milk, reduced fat, fluid, 2% milk fat	150	5.24	2
01077	Milk, whole, 3.25% milk fat	143	4.10	1
14209	Coffee, brewed from grounds	49	3.40	720
09207	Orange juice, canned, unsweetened	175	3.19	6
19411	Snacks, potato chips, plain, salted	1642	2.51	7
09040	Bananas, raw	358	2.41	3
21138	Fast foods, potato, french fried in vegetable oil	550	2.23	4

Table 4. Folate (DFE) content of 1st Quartile Foods in Rank Order

SR Code	Description	Value (µg/100 g)	% of total folate intake	Rank in CSFII 94-96,98
20081	Wheat flour, white, all-purpose, enriched, bleached	291	6.69	5
18350	Rolls, hamburger or hotdog, plain	170	5.10	2
18069	Bread, white, commercially prepared	171	3.42	1
20045	Rice, white, long-grain, regular, cooked	97	3.05	15
20121	Spaghetti, cooked, enriched	119	2.67	13
20100	Macaroni, cooked, enriched	119	2.43	4

Table 5. Top 15 Key Foods: Nationwide Food Consumption Surveys, 1994-2004

NDB No.	NHANES 2003-04 Rank	NHANES 2001-02 Rank	NHANES 1999-2000 Rank	CSFII 94-96 Rank	Food Description	NHANES 2003-04 Quartile
01079	1	1	2	2	Milk, fluid, 2% milk fat	1
01123	2	2	3	3	Eggs, whole, raw, fresh	1
01077	3	3	1	1	Milk, whole, 3.25% milk fat	1
09207	4	4	8	8	Orange juice, canned, unsweetened	1
02047	5	6	9	6	Salt, table	1
11124	6	5	11	10	Carrots, raw	1
18350	7	10	4	5	Rolls, hamburger or hotdog	1
01046	8	9	7	9	Cheese food, American	1
04610	9	8	5	7	Margarine, stick, 80% fat, salted	1
19095	10	11	17	17	Ice cream, vanilla	2
14400	11	13	27	40	Carbonated beverages, cola	2
01085	12	7	13	13	Milk, nonfat, fluid	2
01009	13	12	12	15	Cheese, cheddar	2
20081	14	17	15	20	Wheat flour, white, all-purpose, enriched	2
18069	15	20	18	14	Bread, white, commercially prepared	2

Conclusion

The relative ranking of foods in the Key Foods list shifts due to changes in composition and consumption. Changes to specific recipes in the SR Link file as well as changes in the survey instruments, such as the adoption of the USDA Automated Multiple-Pass Method (Raper *et al*, 2005) in 2002, may impact the relative ranking of the food items.

The Key Foods approach has allowed NDL to concentrate analytical resources on those foods that contribute significant amounts of nutrients of public health interest to the U.S. diet.

To date under NFNAP, NDL has analyzed over 1,200 food samples. Of these, over 700 (representing over 48,000 nutrient values) have been incorporated into the USDA National Nutrient Database for Standard Reference.

References

Haytowitz, D.B., Pehrsson, P.R. and Holden, J.M. 2000. Setting Priorities for Nutrient Analysis in Diverse Populations. *J. Food Comp. Anal.* 13:425-433.

Haytowitz, D.B., Pehrsson, P.R., and Holden, J.M. 2002. The Identification of Key Foods for Food Composition Research. *J. Food Comp. Anal.* 15(2):183-194.

Raper N, Perloff B, Ingwersen L, Steinfeldt L, and Anand J. (2004). An overview of USDA's Dietary Intake Data System. *J Food Comp. Anal. 17*(3-4):545-55.

U.S. Department of Agriculture (USDA), Agricultural Research Service. Dietary Guidelines Advisory Committee. 2004. Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2005. http://www.health.gov/dietaryguidelines/dga2005/report

U.S. Department of Agriculture (USDA), Agricultural Research Service. 2005. USDA National Nutrient Database for Standard Reference, Release 18. Nutrient Data Laboratory Home Page, http://www.ars.usda.gov/nutrientdata

U.S. Department of Agriculture (USDA), Agricultural Research Service. 2006. USDA Food and Nutrient Database for Dietary Studies, 2.0. Food Surveys Research Group Web site: http://www.barc.usda.gov/bhnrc/foodsurvey/fndds_intro.html

U.S. Department of Health and Human Services, National Center for Health Statistics. 2006. National Health and Nutrition Examination Survey 2003-2004 Data Files. http://www.cdc.gov/nchs/about/major/nhanes/nhanes03-04.htm