## THE CONTRIBUTION OF SOUL AND CARIBBEAN FOODS TO NUTRIENT INTAKE IN A SAMPLE OF BLACKS OF US AND CARIBBEAN DESCENT IN THE ADVENTIST HEALTH STUDY-2: A PILOT STUDY

**Objective:** To evaluate the dietary contribution of culturally preferred foods in a population of Black Seventh-Day Adventists from the eastern and southern United States in order to improve the standard food frequency questionnaire.

**Design:** Intake of such foods was assessed using a specially designed self-administered food frequency questionnaire consisting of a list of 60 items. A demographic questionnaire was administered by later telephone interview.

**Setting:** Southern and northeastern United States

**Subjects:** One hundred and sixty-one Black Seventh-Day Adventists were selected from 60 congregations. Approximately half had Caribbean roots.

Results: Among the special foods included, red beans stood out and were among the top five contributors to eight of nine selected nutrients. Various legumes, cruciferous vegetables, and okra-corn-tomatoes were the most frequently consumed special foods. Macaroni and cheese was an important contributor to total energy, fat, saturated fat, and protein. At least weekly consumption of red beans, rice and beans, pinto beans, black-eyed peas, plantains and poke salad was reported by 47%, 40%, 31%, 28%, 26% and 25% of subjects, respectively. These foods (largely the legumes) contributed 77% and 104% of the dietary reference intakes for folate and total fiber, respectively. On average, all these foods contributed an estimated 726 calories per day.

**Conclusions:** These findings show that, in total, these foods make a major contribution to the diets of these subjects and that the most commonly eaten at least should be included in dietary questionnaires designed for this minority population. (*Ethn Dis.* 2007;17:244–249)

**Key Words:** African American, Diet, Ethnic Foods, Food Frequency Questionnaire

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## INTRODUCTION

A healthy diet, including a variety of plant-based foods, is a key to good health. Evidence suggests that adopting a vegetarian diet can lower the risk of obesity and many chronic diseases<sup>1,2</sup> that are disproportionately seen among Black subjects.<sup>3</sup> Seventh-Day Adventists value adherence to a healthy lifestyle, and many, but not all, avoid meat consumption and use of alcohol or tobacco. Thus, Adventists are a useful population in which to study the effects of diet because of their wide range of dietary habits.

Lifestyle-related studies of Seventh-Day Adventists have contributed substantively to the scientific understanding of the relationship between nutrition and health,<sup>1</sup> but less data on Black Seventh-Day Adventists are available from these studies.<sup>4</sup> Food frequency questionnaires developed for predominantly White samples<sup>5,6</sup> may not adequately capture the nutrient profile of Blacks' diets because certain foods commonly consumed by this population are not included. Estimates of relative risks of disease are biased by such errors in dietary assessment.<sup>7</sup>

The Adventist Health Study-2 (AHS-2) is a cohort study designed to examine the relationship between diet/ physical activity and cancer outcomes and includes an ethnically diverse memSeventh-Day Adventists value adherence to a healthy lifestyle, and many, but not all, avoid meat consumption and use of alcohol or tobacco.

bership from all 50 states and Canada. Black Seventh-Day Adventists are a particular focus of recruitment efforts, and a current goal is to enroll >25,000 Blacks among the 100,000 participants.

The purpose of the sub-study described here, the Southern and Caribbean Food Study (SCFS), is to identify patterns of "special" food consumption among Black Adventists in the southern and eastern United States, some of whom are from the Caribbean. We use the word "Black" as the label for subjects of African descent rather than African American because it includes Afro-Caribbeans living in the United States.

## MATERIALS AND METHODS

## SCFS Study Population

Subjects were recruited from 60 randomly selected Black Adventist English-speaking congregations in the southern and northeastern United States. Each church's health ministries director agreed to recruit five subjects from his or her church to represent a spectrum of socioeconomic status. In order to improve response rates, subjects were assured of anonymity. Thus names and contact information were not

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collected in the dietary questionnaires. Subjects in these regions had not yet been invited to participate in the parent AHS-2. Approximately 24% of Black Adventists are vegetarian (never eat meat but may eat eggs or dairy). The main island that is represented by Caribbean members of these English-speaking churches was Jamaica, with approximately an equivalent number also from Guyana, Trinidad, Barbados, and other islands combined. Those from Haiti and Puerto Rico were not well represented because of language barriers.

#### **Demographic Questionnaires**

Of the  $\approx$ 300 subjects originally contacted, 161 completed the SCFS food frequency questionnaire, and of these 134 later provided demographic data in a separate five-item questionnaire. These demographic data could not be linked to individual dietary questionnaires but were used to describe the study group. Demographic variables included gender, age range, birthplace, parental Caribbean ancestry, and region of residence. The brief demographic questionnaire was interviewer-administered by telephone.

#### **Dietary Assessment**

The SCFS questionnaire is a limited food frequency questionnaire designed to assess only the intake of foods relatively unique to Black subjects in these regions. Two experienced Black dietitians, one of whom had lived and practiced for many years in the South, and the other who practiced in the Caribbean region but was temporarily living in California, helped to assemble the questions. Each dietitian identified foods common to their region.

These foods were then compiled into the SCFS questionnaire, a 10-page instrument consisting of two sections: southern/soul food and Caribbean dishes. The food list for the southern/ soul food section comprised 25 foods and two spaces for write-in items; the Caribbean section included 35 foods and 20 spaces for write-in items. The Caribbean section covered several different cultural groups, and flexibility was achieved with more open-ended questions. Foods were grouped under the following categories: raw or cooked vegetables, fruits, legumes, breads, cooked cereals and grains, sweets and desserts, beverages, dairy products and oils, meats and fish, and mixed dishes. The frequency section for each question consisted of nine categories: never or rarely, 1-3 per month, 1 per week, 2-4 per week, 5-6 per week, 1 per day, 2-3 per day, 4–5 per day,  $\geq 6$  per day. Portion size was not assessed in this pilot study. Subjects were requested to report on their intake over the previous one year. The questionnaire was designed to be optically scanned with Teleform software.8

#### Data Analyses

Dietary intake data were analyzed by using the Nutrition Data System for Research software version 5.03 (May 2004), developed by the Nutrition Coordinating Center, University of Minnesota, Minneapolis, Minn.9 Nutrient composition data of whole foods not included in this database were obtained from the Caribbean Food and Nutrition Institute (personal communication, Audrey Morris, September 2004). Responses written in to openended questions were not included in the analysis, as no one item appeared with sufficient frequency to warrant its inclusion in the more comprehensive AHS-2 dietary questionnaire.

Nutrient intake was calculated as the sum of products of nutrient content of each special food and the frequency of intake of that food, according to standard portion sizes. Occasional subjects left whole pages blank. All items on these pages were considered missing unless some other question was answered on the same double page. It was assumed then that the question had been seen and if not selected, never consumed. Results are presented as mean values with their standard errors. The statistical analyses were conducted by using S-PLUS software (Mathsoft, Seattle, Wash, 1998).

### RESULTS

According to data from the 134 respondents to the demographic survey, most participants were women (72%). The average age (standard deviation) was 52.1 (14.3) years. Most subjects were born either in the southern United States (39%) or the Caribbean (42%), but 15% were born elsewhere in the United States and 10% were born in another country. Approximately half (50.4%) of the sample had parents of Caribbean descent, and approximately equal numbers of participants lived in southern (52.1%) and northeastern (47.9%) regions.

Descriptions of the more popular traditional foods eaten by southerners and people of Caribbean descent are provided in Table 1. Participants reported eating 11 of the 60 food items in the questionnaire more than once per week on average (Table 2). Eight (72%) of these foods are raw or cooked vegetables, and the other three are based on grains. Poke salad was the most frequently eaten of these foods followed by okra-corn-tomatoes, red beans, white rice, and Johnny cake.

Table 3 shows the top five leading sources of energy, fat, saturated fats, polyunsaturated fats, carbohydrate, protein, fiber, folate, and calcium from among these foods. Red beans made the "top five" lists for eight of the nine nutrients. Other legumes that were leading contributors to one or more nutrients were pinto beans (3), blackeved peas (3), rice and beans (3), pigeon peas (2), chick peas (1), field peas (1), and split peas (1). Thus a legume was included in the "top five" special foods contributing to all of these nutrients. Further analysis showed that more than 20% of subjects ate the following foods one or more times each

Food Items	Description
Southern	
Poke salad	Turnip greens and collard greens. Usually boiled with onions and some type of meat.
Lambsquarter	Green leaves, a nutritive herb, and a relative of Swiss chard. Sometimes called pigweed or goosefoot. Usually boiled or put in soup, salad, or cooked in a pie.
Okra-corn-tomato	Fresh okra, tinned corn kernels, and canned tomatoes are boiled. Sometimes fresh tomatoes are used instead of canned tomatoes.
Johnny cake	A dry flatbread made with cornmeal (or other types of meal), salt and water. May be cooked over griddle, cast iron pan, or in the oven.
Hot water cornbread Grits	Cornbread batter usually fried in oil. Skinned kernels of corn that are coarsely ground. This is widely known in the South.
Gumbo	A soup like dish that includes tomatoes, onions, garlic, bell peppers, celery. Many different combinations of which some include vegetarian, chicken, fish/seafood, and meat. Often times a combination of meats are used.
Caribbean	
Cassava	A starchy tuberous root vegetable. Must be boiled, and can be put into soup (eaten less often than yams).
Dasheen	Both Dasheen leaves and roots are eaten and prepared differently. The leaves are boiled and cooked served with meat. Dasheen leaves are also called Callaloo in the Caribbean. The root is peeled and either fried, baked, roasted or steamed. Usually served along side meat dishes.
Breadfruit	A well-known Caribbean tree. Its fruit can be roasted, fried or boiled.
Tamarind	The fruit is a brown pod-like legume containing an edible soft pulp, which can be used as a spice in savory dishes or snacks.
Paw paw	Small yellowish fruit with a ripe taste that resembles a mixture of a banana, mango, and pineapple.
Corn porridge	Made with hot milk and cornmeal (condensed milk may be added) flavored with fresh nutmeg, salt, sugar, and vanilla.
Soursop punch	The soursop fruit is crushed in water to extract the juice. More water, milk, little salt and sugar are added.
Sorrel	The cloves of sorrel minus the seeds are boiled and then sweetened with sugar. Usually consumed during holidays.
Mauby drink	Mauby bark is boiled. The bark is then removed and the liquid is sweetened with sugar.
Callaloo	Dasheen green leaves (like spinach), available tinned (usually in brine) or fresh, often cooked with salt fish, onions, and oil usually boiled or fried.
Cho-cho	Cauliflower, carrots, and peas are boiled. Usually flavored with curry and chili pepper. Not to be confused with the fruit that bears the same name.

# Table 1. Description of selected traditional foods eaten by this population of Black Seventh-Day Adventists

week: okra-corn-tomatoes, white rice, red beans, rice and beans, sweet potato, pinto beans, cho-cho, lima beans, grits, black-eyed peas, plantains, butter beans, poke salad, pigeon peas, Johnny cake, cucumber salad, coconut milk, baked yam, and field peas.

We used recommended intakes,<sup>10–13</sup> called dietary reference intakes (DRI), as

standards by which to judge the relative contributions of SCFS food items for nutrients that have such recommendations (see Table 3). The SCFS foods (excluding write-ins) contributed on average 726 kcal, more than half the DRI for fiber and protein, essentially the whole DRI for folate and carbohydrate, and for calcium 26% of the DRI. Table 2. Average frequency (perweek) of consumption of the mostfrequently eaten special foods

Food Items*	Frequency per Week
Poke salad	2.29
Okra-corn-tomatoes	2.24
Red beans	2.12
White rice	1.97
Johnny cake	1.46
Rice and beans	1.41
Grits	1.18
Cucumber salad	1.07
Sweet potato	1.07
Plantains	1.05
Cho-cho	1.01
Vegetarian gumbo	.98
Black-eyed peas	.93
Pinto beans	.93
Evaporated milk (Carna- tion)	.88
Lima beans	.78
Pigeon peas	.73
Butter beans	.69
Yams	.66
Field peas	.61
Coconut milk	.59
Chick peas (garbanzo	.59
beans)	
Hot water cornbread	.56
Cassava	.56
Green beans/red potatoes	.55
Callaloo	.48
Split peas	.48
Biscuits and syrup	.48
Macaroni and cheese	.46
(macaroni pie)	
Condensed milk	.45
Salt fish	.43
Ovaltine	.42
Roti	.42
Gungo peas	.40
Black-eyed peas with okra	.38
Swoot potato pio	37
Melangen (egg nlant)	.57
Corn porridge	34
Soursop	.34

\* For different foods between 0-6 subjects were considered to have missing data (ie, no entry on the page containing that food).

They provided  $\approx 120$  kcal of fat, 37% saturated and 22% polyunsaturated. The legumes listed in the questionnaire, in all, accounted for >60% of the DRI for folate and nearly 50% of that for fiber. Macaroni and cheese and coconut milk were the greatest contributors to saturated fats.

Total energy lkcah         n/d         1         Red beans         46.8         74 (10.9)         n/d           n/d         n/d         2         Macaroni and cheese         9.7         30 (8.0)         n/d           n/d         discuits/yrup         12.9         29 (8.2)         n/d           n/d         Kiter and beans         40.3         28 (8.2)         n/d           Total fat         <31% energy!         1         Macaroni and cheese         9.7         17 (4.5)         n/d           and         All fonds         2.2         33 (2.2)         n/d         n/d         n/d           grams)         2         Ked beans         46.6         13.2(2.0)         n/d           All fonds         2.2         33 (2.2)         n/d         n/d           Saturated fat         <10% energy!         1         Macaroni and cheese         9.7         10.(2.7)         n/d           grams)         2         Coconut milk         23.1         .73 (11)         n/d           All fonds         5.0         13.0 (90)         n/d         Macaroni and cheese         9.7         .20 (12)         n/d           grams)         2         Coconut milk         23.1         .73 (11)	Nutrient	Dietary Recommendations	Rank	Food	% Consuming ≥1/week	Mean Intake/Day (SE)	% Contribution to DR
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rid         4         Biscuissymp         12.9 <th12.9< th="">         12.9         12.9         &lt;</th12.9<>	(Real)	n/d	3	Johnny cake	23.2	29 (6.7)	n/d
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Total carbohy- drate (grams)       130 g/d for males       1       Red beans       15.1       1.5 (.03)       n/d         Total carbohy- drate (grams)       130 g/d for males       1       Red beans       46.8       11.6 (1.7)       8.9         Mil foods       2.9 (2.3)       n/d       3.5       3.5       3.5       3.5         Mil foods       2.9 (2.3)       0.4.5       3.5       3.5       3.5         Mil foods       1.2.9       5.4 (1.5)       4.5       3.5         Mil foods       1.2.9       5.4 (1.5)       4.2         Total protein       56 g/d for males <sup>4</sup> 1       Red beans       40.3       5.7 (70)       4.4         Sinceit/syrup       12.9       5.4 (1.5)       4.2       9.7.8         Total protein       56 g/d for males <sup>4</sup> 1       Red beans       30.5       1.7 (20)       3.3         Black-eyed peas       27.9       1.6 (2.6)       3.2       3.2         (grams)       46 g/d for males <sup>4</sup> 1       Red beans       30.5       1.7 (2.0)       3.3         (grams)       21-25 g/d for females <sup>4</sup> 1       Red beans       30.5       1.8 (2.1)       6.2         (grams)       21-25 g/d for females <sup>4</sup> </td <td></td> <td>2</td> <td>Johnny cake</td> <td>2.7</td> <td>17(04)</td> <td>n/d</td>			2	Johnny cake	2.7	17(04)	n/d
			4	Sweet notato Pie	5.8	15 (05)	n/d
Total carbohy- drate (grams)       130 g/d for males       1       Red beans       46.8       11.6 (1.7)       8.9         Total carbohy- drate (grams)       and females <sup>4</sup> 2       Plantains       26.3       7.2 (1.3)       5.5         3       White rice       51.6       5.8 (60)       4.5         4       Rice and beans       40.3       5.7 (70)       4.4         5       Biscuits/syrup       12.9       5.4 (1.5)       4.2         All foods       127 (8.2)       97.8         Total protein       56 g/d for males <sup>4</sup> 1       Red beans       46.8       4.4 (65)       8.6         (grams)       46 g/d for females <sup>4</sup> 1       Red beans       30.5       1.7 (20)       3.3         3       Black-eyed peas       27.9       1.6 (26)       3.2         4       Macaroni and cheese       9.7       1.4 (38)       2.7         5       Pigeon peas       23.7       1.3 (20)       25.6         All foods       29 (2.0)       57.6       7.6       7.6         Total fiber       30–38 g/d for males <sup>4</sup> 1       Red beans       46.8       3.2 (48)       11.4         (grams)       21–25 g/d for females <sup>4</sup> <td< td=""><td></td><td></td><td>5</td><td>Chick peas</td><td>15.1</td><td>15 (.03)</td><td>n/d</td></td<>			5	Chick peas	15.1	15 (.03)	n/d
Total carbohy- drate (grams)       130 g/d for males       1       Red beans       46.8       11.6 (1.7)       8.9         drate (grams)       and females <sup>4</sup> 2       Plantains       26.3       7.2 (1.3)       5.5         3       White rice       51.6       5.8 (60)       4.5         4       Rice and beans       40.3       5.7 (70)       4.4         5       Biscuits/syrup       12.9       5.4 (1.5)       4.2         All foods       127 (8.2)       97.8       8.6         (grams)       46 g/d for females <sup>4</sup> 1       Red beans       30.5       1.7 (20)       3.3         3       Black-eyed peas       27.9       1.6 (26)       3.2         4       Macroni and cheese       9.7       1.4 (38)       2.7         5       Pigeon peas       23.7       1.3 (20)       2.6         All foods       29 (2.0)       57.6       11.4       4.9         (grams)       21–25 g/d for females <sup>4</sup> 1       Red beans       46.8       3.2 (48)       11.4         (grams)       21–25 g/d for females <sup>4</sup> 1       Red beans       46.8       3.2 (48)       11.4         (grams)       21–25 g/d for males <sup>4</sup>			5	All foods	15.1	2.9 (23)	n/d
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Total carbohy-	130 g/d for males	1	Red beans	46.8	11.6(1.7)	8.9
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	drate (grams)	and females <sup>‡</sup>	2	Plantains	26.3	7 2 (1 3)	5.5
		and remains	2	White rice	51.6	5.8 (60)	4.5
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			2 2	Rice and beans	40.3	5.7 (70)	4.5
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			5	Riscuits/syrup	12.9	5.7(.70) 5.4(1.5)	4.2
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			5	All foods	12.5	127 (8.2)	97.8
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Total protein	56 g/d for males <sup>‡</sup>	1	Red beans	46.8	4 4 ( 65)	8.6
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	(grams)	$46 \text{ g/d for females}^{\ddagger}$	2	Pinto beans	30.5	1.7 (20)	3 3
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(grains)	to gra for ternales	2	Black-eved neas	27.9	1.6 (26)	3.5
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			4	Macaroni and cheese	9.7	1.4 (38)	2.7
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			5	Pigeon neas	23.7	1 3 ( 20)	2.7
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			5	All foods	23.7	29 (2 0)	57.6
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Total fiber	$30-38 \text{ g/d for males}^{\ddagger}$	1	Red beans	46.8	32(2.0)	11.4
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	(grams)	21-25 g/d for females <sup>‡</sup>	2	Pinto beans	30.5	1.8 (21)	6.2
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	(8141115)	21 25 guild lemales	3	Pigeon neas	23.7	1 7 (25)	5.9
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			4	Solit neas	15.8	1.4 (21)	4 9
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			5	Black eved-neas	27.9	14(22)	4.8
Folate (mcg)       400 mcg/day for males and females <sup>§</sup> 1       Red beans       46.8       66 (9.7)       16.4         2       Black-eyed peas       27.9       44 (7.1)       11.0         3       Pinto beans       30.5       35 (4.2)       8.8         4       Poke salad       24.7       27 (6.6)       6.7         5       Rice and beans       40.3       25 (3.0)       6.2         All foods       418 (30)       104.4         Calcium (mg)       1200 mg/d for males and females <sup>II</sup> 1       Poke salad       24.7       33 (8.1)       2.7         2       Macaroni and cheese       9.7       27 (7.3)       2.3       3       Ovaltine       9.0       21 (6.6)       1.7         4       Evaporated milk       16.7       19 (5.3)       1.6       5       Field peas       20.8       18 (2.6)       1.5         All foods       313 (25)       26 1       26 1       313 (25)       26 1			5	All foods	27.5	22 (1.5)	77.2
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Folate (mcg)	400 mcg/day for males	1	Red beans	46.8	66 (9.7)	16.4
and remarks       1       Pinto beans       30.5       35 (4.2)       8.8         3       Pinto beans       30.5       35 (4.2)       8.8         4       Poke salad       24.7       27 (6.6)       6.7         5       Rice and beans       40.3       25 (3.0)       6.2         All foods       418 (30)       104.4         Calcium (mg)       1200 mg/d for males       1       Poke salad       24.7       33 (8.1)       2.7         3       Oke salad       24.7       33 (8.1)       2.7       2.3         3       Ovaltine       9.0       21 (6.6)       1.7         4       Evaporated milk       16.7       19 (5.3)       1.6         5       Field peas       20.8       18 (2.6)       1.5         All foods       313 (25)       26 1       26 1	rolato (mog/	and females <sup>§</sup>	2	Black-eved peas	27.9	44 (7.1)	11.0
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$			3	Pinto beans	30.5	35 (4.2)	8.8
Calcium (mg)       1200 mg/d for males       1       Poke salad       24.7       33 (8.1)       6.2         All foods       418 (30)       104.4         Calcium (mg)       1200 mg/d for males       1       Poke salad       24.7       33 (8.1)       2.7         and females <sup>III</sup> 2       Macaroni and cheese       9.7       27 (7.3)       2.3         3       Ovaltine       9.0       21 (6.6)       1.7         4       Evaporated milk       16.7       19 (5.3)       1.6         5       Field peas       20.8       18 (2.6)       1.5         All foods       313 (25)       26 1			4	Poke salad	24.7	27 (6 6)	6.7
Calcium (mg)     1200 mg/d for males and females <sup>  </sup> 1     Poke salad     24.7     33 (8.1)     2.7       3     Ovaltine     9.0     21 (6.6)     1.7       4     Evaporated milk     16.7     19 (5.3)     1.6       5     Field peas     20.8     18 (2.6)     1.5       All foods     313 (25)     26 1			5	Rice and beans	40.3	25 (3.0)	6.2
Calcium (mg)       1200 mg/d for males and females          1       Poke salad       24.7       33 (8.1)       2.7         and females          2       Macaroni and cheese       9.7       27 (7.3)       2.3         3       Ovaltine       9.0       21 (6.6)       1.7         4       Evaporated milk       16.7       19 (5.3)       1.6         5       Field peas       20.8       18 (2.6)       1.5         All foods       313 (25)       26 1			5	All foods	1010	418 (30)	104.4
and females <sup>  </sup> 2     Macaroni and cheese     9.7     27 (7.3)     2.3       3     Ovaltine     9.0     21 (6.6)     1.7       4     Evaporated milk     16.7     19 (5.3)     1.6       5     Field peas     20.8     18 (2.6)     1.5       All foods     313 (25)     26 1	Calcium (mg)	1200 mg/d for males	1	Poke salad	24 7	33 (8 1)	2 7
and reflects       2       Machine in the crease       5.7       27 (7.5)       2.5         3       Ovaltine       9.0       21 (6.6)       1.7         4       Evaporated milk       16.7       19 (5.3)       1.6         5       Field peas       20.8       18 (2.6)       1.5         All foods       313 (25)       26 1	calciant (mg/	and females	2	Macaroni and cheese	9.7	27 (7 3)	23
4     Evaporated milk     16.7     19 (5.3)     1.6       5     Field peas     20.8     18 (2.6)     1.5       All foods     313 (25)     26 1			∠ २	Ovaltine	9.7	21 (6.6)	17
5     Field peas     20.8     18 (2.6)     1.5       All foods     313 (25)     26 1			4	Evanorated milk	16.7	19 (5 3)	1.7
All foods 313 (25) 26.1			5	Field neas	20.8	18 (2.6)	1.5
			5	All foods	20.0	313 (25)	26.1

Table 3.	Estimated mean	intake of n	utrients from	these foods	and their	contributions	to dietary	recommendations (	DR)*
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DR=dietary recommendations; m=male; f=female; n/d=not determinable.

\* The mean value for both male and female was used as the denominator in calculation of percent contribution to dietary recommendation. † Diet and health.<sup>10</sup>

Dietary Reference Intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids (macronutrients).<sup>11</sup>
 Dietary Reference Intakes for thiamin, riboflavin, niacin, vitamin B6, folate, vitamin B-12, pantothenic acid, biotin, and choline.<sup>12</sup>

|| Dietary Reference Intakes for calcium, phosphorus, magnesium, vitamin D, and fluoride.13

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## DISCUSSION

Culturally preferred foods consumed by these Black Adventists contributed substantially to total calories and to many macronutrients, vitamins, and minerals. The consumption of legumes is particularly high in this population. Eleven of these special foods were eaten at least once per week. This survey adds to the limited knowledge of dietary patterns of Black Adventists and demonstrates the need for culturally sensitive dietary questionnaires. Other groups have also drawn similar conclusions.<sup>14–18</sup> These results subsequently motivated us to add many of these foods to the AHS-2 food frequency questionnaire, in order to more accurately assess diet in these regions of the country.

Fewer Black/African Americans meet the US Department of Agriculture DRIs for fruits, vegetables, and whole grains, compared with the US population overall. These dietary deficiencies have been identified as possible contributors to obesity and chronic disease disparities in this group.<sup>16,19,20</sup> However, many of the special foods that we identified were relatively low in fat and high in complex carbohydrates, plant protein, and fiber, nutrients generally considered to be healthful. For example, poke salad, a mixture of cruciferous vegetables, contains antioxidants and other vitamins and phytochemicals that may protect against cancer.<sup>21,22</sup>

The prominence of legume consumption in this partially vegetarian population is striking. Legumes are an excellent source of protein, dietary fiber, and folate and may also confer protection against cancer and cardiovascular disease.<sup>23,24</sup> Results of previous studies in White Adventists have also found significant reductions in the rates of colon, pancreatic, and perhaps prostate cancers associated with higher legume consumption.<sup>25–27</sup>

Exclusion of these special foods from a questionnaire would likely lead

to errors in dietary assessment. For instance, macaroni and cheese (macaroni pie) was consumed fairly frequently among Blacks in our sample and contributed several nutrients, specifically total fat, saturated fat, protein, and total energy. Johnny cake and coconut milk are other frequently consumed foods that are high in total fat and saturated fat. Thus, consumption of these nutrients, which promote such disorders as obesity, cardiovascular disease, type 2 diabetes, and certain cancers prevalent among Blacks in the United States,<sup>28</sup> will be underestimated by traditional questionnaires.

Such omissions may also lead to an underestimation of diet quality, as most of the SCSF foods are thought to be health-promoting. The effect of a given higher body mass index on rates of cancer and other chronic diseases is less in Blacks compared with Whites.<sup>29</sup> This effect may be due to ethnic differences in body composition and morphology, but a better quality diet at a given body mass index in Blacks could also explain these findings.

Many of these special foods may also be frequently eaten by non-Adventist Black populations,<sup>14,30,31</sup> and indeed some of these foods are also consumed by White subjects living in the same areas. A particular item eaten exclusively by those either of Southern or Caribbean origin would actually be eaten within that group approximately twice as frequently as we report because we could only use the size of the whole study group as the denominator when calculating rates. However, many of the items were eaten by both groups.

This pilot study has a number of limitations. As there was no reference dietary data such as repeated 24-hour recalls or food records, formal validation of the SCFS questionnaire was not possible. Our goal was rather to evaluate semi-quantitatively whether these culturally preferred foods make up an important part of the diet and to identify which are most important. The response rate of 53% admits the possibility of selection bias, but this rate is very similar to that subsequently seen in AHS-2. Thus this smaller study probably reflects the larger study fairly well, which was our goal.

The inability to link demographic and food frequency questionnaires made it impossible to calculate food intake according to demographic subgroup (eg, ethnic parentage, age, gender, and region). For simplicity, we did not include portion size. Several validation studies indicate that portion size information generally improves correlation coefficients and ability to rank individuals by only small amounts.<sup>5,32</sup> However, when calculating absolute amounts, the absence of portion size is likely to bias results downwards in obese subjects who tend to consume larger meals.<sup>33</sup> Thus we may have moderately underestimated calories, although this will be partly balanced by other subjects who eat smaller meals than average. Finally, this pilot study measures only a portion of the total diet consumed by this population of Black Seventh-Day Adventists. We cannot exclude a social desirability factor associated with some responses.

None of these concerns change the finding that many of these foods make a significant contribution to the diets of these subjects. Eventually we will be able to evaluate such foods in the context of the total diet using AHS-2 data.

In summary, this work provides useful new information about the dietary habits of Black Adventists living in the eastern and southern regions of the United States and probably broadly reflects trends among other Black population in these regions. Many commonly used special foods are healthy foods, and their exclusion from traditional dietary questionnaires may lead to an underestimation of both dietary quality and quantity in Black populations. Our results further underscore the necessity of including the full range of foods when undertaking research in minority populations.

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#### ACKNOWLEDGMENT

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#### References

- Fraser GE. Diet, life expectancy, and chronic disease: studies of Seventh-Day Adventists and other vegetarians. New York, NY: Oxford University Press; 2003.
- Key TJ, Fraser GE, Thorogood M, et al. Mortality in vegetarians and nonvegetarians: detailed findings from a collaborative analysis of 5 prospective studies. *Am J Clin Nutr.* 1999; 70:516S–524S.
- US Department of Health and Human Services. *The Surgeon General's Call to Action* to Prevent and Decrease Overweight and Obesity 2001. Washington, DC: US Government Printing Office; 2001.
- Herring P, Montgomery S, Yancey AK, Williams D, Fraser G. Understanding the challenges in recruiting Blacks to a longitudinal cohort study: the Adventist Health Study. *Ethm Dis.* 2004;14:423–430.
- Block G, Woods M, Potosky A, Clifford C. Validation of a self-administered diet history questionnaire using multiple diet records. *J Clin Epidemiol.* 1990;43:1327–1335.
- Willett WC, Sampson L, Stampfer MJ, et al. Reproducibility and validity of a semiquantitative food frequency questionnaire. *Am J Epidemiol.* 1985;122:51–65.
- Thomas D, Stram D, Dwyer J. Exposure measurement error: influence on exposuredisease relationships and methods of correction. *Annu Rev Public Health*. 1993;14:69–93.
- 8. *Teleform Version 7*. Vista, Calif: Cardiff Software Inc.
- Schakel SF. Maintaining a nutrient database in a changing marketplace: keeping pace with changing food products - a research perspective. J Food Comp Anal. 2001;14:315–322.
- Food and Nutrition Board, National Research Council. *Diet and Health: Implications for Reducing Chronic Disease Risk.* Washington, DC: National Academy Press; 1989.
- Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington, DC: National Academy Press; 2002.
- US Department of Health and Human Services. Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline. 2nd ed. Washington, DC: US Government Printing Office; 1998.

- United States Department of Health and Human Services. *Dietary Reference Intakes for Calcium, Phosphorous, Magnesium, Vitamin D, and Fluoride.* 2nd ed. Washington, DC: US Government Printing Office; 1997.
- Buchowski MS, Schlundt DG, Hargreaves MK, Hankin JH, Signorello LB, Blot WJ. Development of a culturally sensitive food frequency questionnaire for use in the Southern Community Cohort Study. *Cell Mol Biol.* 2003;49:1295–1304.
- Sharma S, Cade J, Jackson M, et al. Development of food frequency questionnaires in three population samples of African origin from Cameroon, Jamaica and Caribbean migrants to the UK. *Eur J Clin Nutr.* 1996; 50:479–486.
- Subar AF, Krebs-Smith SM, Cook A, Kahle LL. Dietary sources of nutrients among US adults, 1989 to 1991. *J Am Diet Assoc.* 1998; 98:537–547.
- Tucker KL, Bianchi LA, Maras J, Bermudez OI. Adaptation of a food frequency questionnaire to assess diets of Puerto Rican and non-Hispanic adults. *Am J Epidemiol.* 1998;148:507–518.
- Tucker KL, Maras J, Champagne C, et al. A regional food-frequency questionnaire for US Mississippi Delta. *Public Health Nutr.* 2005;8: 87–96.
- Bell RA, Vitolins MZ, Arcury TA, Quandt SA. Food consumption patterns of rural older African American, Native American, and White adults in North Carolina. *J Nutr Elder*. 2003;23:1–16.
- Kant AK. Consumption of energy-dense, nutrient-poor foods by adult Americans: nutritional and health implications. The Third National Health and Nutrition Examination Survey, 1988-1994. Am J Clin Nutr. 2000;72:929–936.
- 21. Lewis SM, Mayhugh MA, Freni SC, et al. Assessment of antioxidant nutrient intake of a population of southern US African American and Caucasian women of various ages when compared to dietary reference intakes. *J Nutr Health Aging*. 2003;7:121–128.
- 22. Murillo G, Mehta RG. Cruciferous vegetables and cancer prevention. *Nutr Cancer*. 2001;41: 17–28.
- Bazzano LA, He J, Ogden LG, et al. Legume consumption and risk of coronary heart disease in US men and women: NHANES I Epidemiologic Follow-up Study. *Arch Intern Med.* 2001;161:2573–2578.
- 24. Menotti A, Kromhout D, Blackburn H, Fidanza F, Buzina R, Nissinen A. Food intake patterns and 25-year mortality from coronary heart disease: cross-cultural correlations in the Seven Countries Study. The Seven Countries

Study Research Group. *Eur J Epidemiol*. 1999;15:507–515.

- Mills PK, Beeson WL, Abbey DE, Fraser GE, Phillips RL. Dietary habits and past medical history as related to fatal pancreas cancer risk among Adventists. *Cancer*. 1988;61:2578–2585.
- Mills PK, Beeson WL, Phillips RL, Fraser GE. Cohort study of diet, lifestyle, and prostate cancer in Adventist men. *Cancer*. 1989;64: 598–604.
- Singh PN, Fraser GE. Dietary risk factors for colon cancer in a low-risk population. *Am J Epidemiol.* 1998;148:761–774.
- US Departments of Agriculture and Health and Human Services. *Dietary Guidelines for Americans.* 5th ed. Washington, DC: USDA, 2000;USDA Home and Garden Bulletin No. 232.
- Smith SC Jr, Clark LT, Cooper RS, et al. Discovering the full spectrum of cardiovascular disease. Minority Health Summit 2003: report of the Obesity, Metabolic Syndrome, and Hypertension Writing Group. *Circulation*. 2005;111:e134–e139.
- Champagne CM, Bogle ML, McGee BB, et al. Dietary intake in the lower Mississippi Delta region: results from the Foods of our Delta Study. J Am Diet Assoc. 2004;104:199–207.
- Robertson-Spencer M, Hine RJ, Ambrosone C, Savidge M. Culture-specific foods consumed by African American women in the rural South. *Ethn Dis.* 2004;14:1.
- Samet JM, Humble CG, Skipper BE. Alternatives in the collection and analysis of food frequency interview data. *Am J Epidemiol.* 1984;120:572–581.
- Wansink B, Chandon P. Meal size, not body size, explains errors in estimating the calorie content of meals. *Ann Intern Med.* 2006;145: 326–332.
- Sharma S, Cruickshank JK. Cultural differences in assessing dietary intake and providing relevant dietary information to British African Caribbean populations. *J Hum Nutr Diet*. 2001;14:449–456.

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- Manuscript draft: Akbar, Jaceldo-Siegl, Fraser, Herring, Yancey
- Statistical expertise: Jaceldo-Siegl, Fraser
- Acquisition of funding: Fraser

Administrative, technical, or material assistance: Akbar, Fraser, Herring

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