

## Dietary Change through African American Churches: Baseline Results and Program Description of the Eat for Life Trial

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Resnicow K, Wallace DC, Jackson A, Digirolamo A, Odom E, Wang T, [Dudley WN](#), Davis M, Mitchell D, Baranowski T. (2000). Dietary change through African American churches: baseline results and program description of the eat for life trial. *J Cancer Educ*, 15(3), 156-63.

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### **Abstract:**

Background. Eat for Life, a multicomponent intervention to increase fruit and vegetable (F & V) consumption among African Americans, is delivered through African American churches. Methods. Fourteen churches were randomly assigned to one of three treatment conditions: 1) comparison; 2) culturally-sensitive multicomponent intervention with one phone call; and 3) culturally-sensitive multicomponent intervention with four phone calls. The intervention included an 18-minute video, a project cookbook, printed health education materials, and several "cues" imprinted with the project logo and a 5 A Day message. A key element of the telephone intervention was the use of motivational interviewing, a counseling technique originally developed for addictive behaviors. Major outcomes for the trial included total F & V intake, assessed by food-frequency questionnaires (FFQs) and 24-hour recalls, and serum carotenoids. Psychosocial variables assessed included outcome expectations, barriers to F & V intake, preference for meat meals, neophobia, social support to eat more F & V, self-efficacy to eat more F & V, and nutrition knowledge. Results. Baseline mean F & V intakes across the three FFQs ranged from 3.45 to 4.28 servings per day. Intake based on a single 24-hour recall was 3.0 servings. Variables positively correlated with F & V intake included self-efficacy, outcome expectations, and a belief that F & V contain vitamins. Factors negatively correlated with intake include perceived barriers, meat preference, neophobia, and high-fat cooking practices. The completion rate for the first telephone counseling call was 90%. Completion rates for the remaining three calls ranged from 79% to 86%. Conclusion. The recruitment and intervention methods of the Eat for Life study appear promising. The telephone intervention based on motivational interviewing is potentially useful for delivering dietary counseling.

### **Article:**

Increasing Americans' intakes of fruit and vegetables (F & V) to at least five servings per day is a national health priority.<sup>1,2</sup> Like most other Americans, African Americans (AAs) consume fewer than the recommended five servings per day.<sup>3-5</sup> Whereas data regarding African

American/white differences in mean F & V intakes are inconsistent,<sup>3-7</sup> ethnic and geographic differences regarding which F & V are consumed and how they are prepared are well established.<sup>7-10</sup> AAs may also differ in their nutrition knowledge,<sup>5</sup> as well as the factors that influence their F & V intake.<sup>11-13</sup>

The church represents a potentially effective channel for delivering health programs to AAs. Many African American churches include health as part of their overall mission, offering health services through special committees.<sup>14-16</sup> Given the potential ease of participant recruitment and tracking, churches also represent an excellent research setting. Several studies have been successfully conducted in churches, including some that have addressed dietary behaviors.<sup>15-20</sup> Another advantage of working in African American churches is that they offer access to AAs of middle and upper socioeconomic status, a group often underrepresented in health-promotion studies. This article reports the development, feasibility, and baseline results of the Eat for Life (EFL) program, an intervention to increase F & V intake conducted through African American churches in the metropolitan Atlanta area. We describe the study sample, and the feasibility of the telephone intervention, as well as the demographic, behavioral, and psychosocial determinants of baseline F & V intake in this population.

## METHODS

### *Design*

Fourteen churches, matched for socioeconomic status of the congregations (low, mixed, or high) and size, were randomly assigned to three treatment conditions: 1) comparison (usual nutrition education); 2) culturally-sensitive multicomponent intervention with one telephone call; and 3) culturally-sensitive multicomponent intervention with four telephone calls. Four churches were assigned to conditions 1, another four churches were assigned to condition 3, and six churches including two smaller churches were assigned to condition 2. Only Baptist and Methodist (including AME) denominations were included. Baseline and one-year follow-up data were obtained at health fairs conducted at these churches. The study was powered to detect a half-serving difference between conditions 3 and 1, with a power of 0.80 and an  $\alpha$  of 0.05, with the church as the unit of analysis.

**Formative research.** The developmental phase began with a review of the literature as well as discussions with researchers and practitioners. We then convened four focus groups of AAs who regularly attended church, one group from each of the following segments: low income/low F & V intake; low income/high F & V intake; middle income/ low F & V intake; and middle income/high F & V intake. Low intake was defined as two or fewer servings per day and high intake as four or more servings. Intake was determined during the telephone recruitment. Key findings from the focus groups included generally low awareness of F & V serving sizes, low awareness of the national 5-A-Day campaign, and strong perceived differences regarding which F & V are consumed by African Americans versus whites. For example, asparagus, artichokes, and pumpkin pie were seen as foods eaten exclusively by whites, whereas fried okra, collards, and sweet potato pie were seen as "black foods."<sup>21</sup> With regard to religion and diet, the participants felt that overeating, although not necessarily a "sin," was a sign of poor discipline, whereas eating healthfully was seen as "spiritually" beneficial, if not a religious imperative.

An advisory board composed of eight local pastors plus several opinion leaders from the local faith community was formed to help provide ideas for conveying health messages using religious themes and to review project artwork. Following the synthesis of focus group and advisory board responses, a draft of a video script was developed and reviewed by several experts in nutrition education as well as the advisory board. A "rough cut" of the video was shown to two focus groups composed of AAs who regularly attended church as well as to the advisory board. Feedback from these sources guided the final editing of the video as well as selection of the project name and logo.

**Intervention materials.** Individuals in the two intervention arms received: an 18-minute video, a project cookbook, printed education materials, including a quarterly newsletter, and several "cues" imprinted with the project logo and 5 A Day message (e.g., refrigerator magnet, pen scratch pad, pot holder, and erasable writing tablet). The video, entitled *Forgotten Miracles*, used biblical and spiritual themes to motivate healthful eating. The EFL cookbook contained recipes submitted by members of the participating churches. Qualifying recipes were required to contain at least a fourth of a serving of fruit or vegetable per portion and to be low in fat. Recipes were analyzed with Nutrient Data System software (University of Minnesota) to determine nutrient content. Qualifying recipes were taste-tested, and the 60 most preferred recipes were included in the book. The cookbook also contains information about the health benefits of F & V, tips for shopping and storing F & V, and cooking techniques. Printed health education materials included a National Cancer Institute brochure (#95-3862), a food-guide pyramid slide card (Positive Promotions, Brooklyn, NY), and the Soul Food Pyramid (Hebni Consultants, Orlando, FL). With the exception of the quarterly newsletter, which was mailed to participants, all intervention materials were distributed at the health fair exit booth. For participants who completed the baseline questionnaire but did not attend the health fair, the intervention materials were mailed to their homes approximately a week after the health fairs in their churches.

In addition to the health education materials, individuals in the first intervention group received one telephone call, approximately two weeks following the baseline health fair. The goal of the call was primarily to cue participants to use the materials (e.g., watch the video, read the brochures, and try the recipe book). Individuals in the second intervention group received three additional calls. The three additional calls focused more on increasing F & V intake than on the use of materials.

The telephone counseling in the second intervention group was based on motivational interviewing (MI). MI is a counseling technique originally developed for addictive disorders that has potential application to other health behaviors.<sup>22,23</sup> Key strategies of MI include reflective listening, rolling with resistance, and eliciting self-motivational statements, rather than providing unsolicited advice. Our MI script was adapted from the protocol of Rollnick,<sup>24</sup> previously applied to smoking cessation. In brief, this technique begins with two questions: 1) On a scale of 1 to 10 (with 10 being the highest), how motivated/interested are you in increasing your fruit/vegetable consumption? 2) On a scale of 1 to 10 (with 10 being the highest), assuming you wanted to, how confident are you that you could increase your fruit/vegetable consumption? Each of the two questions was asked separately for fruits and vegetables. Following the client's response, the counselor asked two questions: 1) Why did you not choose a lower number, such as 1 or 2? (this elicits positive motivational statements), and 2) Why did you not choose a higher

number? (this elicits barriers). If barriers are presented, the counselor prompted the participant to offer solutions. After the participant has exhausted his or her own solutions (or in the event that none are offered), the counselor sought permission to list other solutions "that have worked for other people." The encounter ended with a contract to try at least one of the solutions offered. The counselors were either registered dietitians or dietetic interns. Counselors participated in three two-hour training sessions conducted by the first author (KR) and each was observed performing at least two phone counseling encounters prior to being certified. The last three MI calls were delivered three, six, and ten months after baseline.

**Participant recruitment.** In each church a liaison officer was hired to assist in recruitment and coordination of the health fair. This individual was asked to provide at least 60 names and telephone numbers of participants and to distribute questionnaires approximately three weeks before the health fair. Pastors were asked to encourage congregants to attend the health fairs, which were generally conducted immediately after Sunday services. Flyers were posted and announcements were placed in church bulletins. To encourage participation, the churches were provided with a \$10 donation for each participant (up to 60 per church) who completed the screening. To assist members who might have had limited literacy skills, staff at the health fairs inquired of all participants whether they would like to have someone from the program read the questionnaire with them.

### *Measures*

**Diet.** Multiple measures of dietary intake were obtained to provide a converging (i.e., triangulated) estimate of true intake. All participants completed a seven-item F & V food-frequency questionnaire (FFQ) assessing intake in the preceding month, based on the Behavioral Risk Factor Surveillance System (BRFSS).<sup>25</sup> To reduce overreporting, the response categories of four and five times per day were removed. A two-item measure was used to assess usual F & V intake (one item each for F & V consumed "each day"). The third instrument was a 36-item F & V FFQ developed for this study, based on the Health Habits and History Questionnaire (HHHQ).<sup>26</sup> To improve validity, several modifications were made to the HHHQ. First, participants were asked to indicate the number of times they had consumed each item in the preceding week, rather than using the longer retrospective time frame typically employed.<sup>27</sup> Second, respondents indicated frequencies of consumption using an open-ended rather than a closed-ended format. Third, portion size of each fruit and vegetable was embedded in the item, e.g., one whole apple. Finally, several items that were paired on the original HHHQ instrument, e.g., tomato and tomato juice, were separated into individual items. We excluded from the analysis any participant who was missing more than half of the vegetable items, i.e., ten items, or fruit items, i.e., eight items from the 36-item FFQ. Subjects missing fewer than half of the fruit or vegetable items were assigned a frequency of "never" for those missing items. These three measures were averaged to yield a composite F & V variable. The three FFQs assessed only F & V intake, the primary outcome for the intervention trial. Participants were also asked about low-fat (e.g., broiling, steaming, adding turkey bacon) and high-fat (e.g., adding bacon, deep frying) practices used when preparing vegetables.

In addition to the FFQs, approximately 40% of the sample (n = 415) was randomly selected to receive a single 24-hour telephone recall using the Minnesota Nutrient Data System (NDS; Food Database Version 12A and Nutrient Database Version 27, University of Minnesota). Recalls

were elicited using a multiple-pass approach devised by the Diet Assessment Center of Pennsylvania State University. A two-dimensional food-portion poster was mailed to participants prior to their interviews to assist in estimation of portion sizes. F & V contained in mixed dishes were generally counted in the F & V computation. Small amounts in baked products such as muffins or bagels were excluded from the F & V computation, as were potato chips, french fries, avocado, olives, and catsup. Recalls and FFQs were completed before the baseline health fair, and prior to receipt of intervention materials.

**Physiologic measures.** Total cholesterol was measured in non-fasting capillary blood samples using the Johnson and Johnson/Kodak DT60. Systolic and diastolic blood pressures were assessed using manual aneroid sphygmomanometry according to the JNC-V protocol.<sup>28</sup> Height and weight were obtained by trained staff, with shoes and heavy outer clothing removed, using the Healthometer Digital Office Scale (Model 551, Springfield, IL), and converted to body mass index. Screening values (excluding carotenoids, which were analyzed offsite) were provided to the participants as they exited the health fair, along with a personalized letter that explained their results and listed referral information.

**Psychosocial measures.** Outcome expectations for F & V intake were assessed with a 19-item scale (nine fruit items and ten vegetable items;  $\alpha = 0.88$ ) based on the instrument developed by Baranowski.<sup>29</sup> Sample item: "Eating fruit gives me more energy." A single item was used to assess nutritional benefits of F & V. Sample item: "a major reason I eat F & V is that they are high in vitamins and minerals." A two-item scale ( $\alpha = 0.77$ ) was used to assess perceived benefits of eating F & V. Sample item: "One reason for eating F & V is to set a good example for my family." Preference for meat meals was assessed with a three-item scale ( $\alpha = 0.82$ ) developed by the investigators. Sample item: "Dinner doesn't seem right without meat." Neophobia was assessed with a two-item scale

TABLE 1. Baseline Sample Description: Eat for Life Program Baseline Results (n = 1,011)

Age, mean range	43.1 years (18–87)
Gender	
Female	72.9%
Male	27.1%
Ethnicity African American	99.0%
Marital status	
Married or living with partner	51.9%
Single, divorced, separated or widowed	48.1%
Income	
< \$10,000	9.6%
\$10–\$19,999	14.0%
\$20–\$29,999	15.8%
\$30–\$39,999	16.1%
\$40–\$49,999	11.8%
\$50–\$59,999	9.4%
\$60–\$69,999	6.9%
> \$70,000	16.4%
Education	
< high school	8.6%
Completed high school or vocational school	34.8%
Some college	23.5%
Completed college or higher	33.1%

( $\alpha = 0.35$ ), derived from a five-item version developed by the investigators. The two items were: "I enjoy trying new foods" and "when it comes to food, I'm a creature of habit." Perceived need to increase F & V consumption was assessed with two items "I need to eat more vegetables" and "I need to eat more fruit" ( $\alpha = 0.81$ ), with higher values indicating greater perceived need. For each of the measures above, the items were answered on a four-point continuum ranging from "strongly agree" to "strongly disagree."

Barriers to F & V intake were assessed with a 27-item (13 fruit items and 14 vegetable items) index developed by the investigators. Sample item: "Fresh fruit spoils too quickly." The items were answered on a four-point continuum ranging from "doesn't affect me at all" to "makes it very difficult." Since this measure (and all subsequent measures denoted as indices rather than scales) was conceptualized as an index, rather than a series of items tapping a latent psychologic construct, coefficient alpha is not presented. Social Support to eat more F & V was assessed with six items based on instruments developed by Sallis<sup>31</sup> and Baranowski.<sup>29</sup> Two items (one for fruit and one for vegetables) assessed perceived support from family, friends/work colleagues, and church members to eat more F & V ( $\alpha = 0.88$ ). Sample item: "How much encouragement do you get from your family to eat more fruit?" The items were answered on a four-point continuum ranging from "none" to "a lot."

Self-efficacy to eat more F & V was assessed with a ten-item scale ( $\alpha = 0.90$ ) based on the work of Sallis<sup>32</sup> and others.<sup>29,33</sup> Sample item: "How confident are you that you could eat healthy foods like fruits and vegetables when you are depressed or in a bad mood?" Responses range from "not at all confident" to "very confident." Nutrition knowledge was measured with an eight-item scale

that assessed awareness of serving sizes for fruits and vegetables. Two serving sizes were presented, and the respondent was asked to check which of the two represented a single serving.

**Other variables assessed.** Income was assessed with an eight-category ordinal item, with answers ranging from < \$10,000 to > \$70,000. Education was categorized as "less than high school," "completed high school or equivalent," "started college," and "completed college." Work status was categorized as "unemployed," "retired," and "working part or full time." Participants were also asked about marital status and the numbers of people living in their homes. Use of cigarettes and use of alcohol in the preceding 30 days were assessed with single-items. Exercise was assessed with a single open-ended item: "How many times per week do you exercise hard enough to make you breathe hard or sweat?" Use of vitamin supplements in the preceding year was assessed with a single item, with three categories: "never," "yes, not regularly," and

TABLE 2. Mean Fruit and Vegetable (F & V) Intake and Correlations\* among Measures: Eat for Life Program Baseline Results (n = 900)

	Intake in Servings Mean (SD)	Correlation† with				
		2-item FFQ‡	7-item FFQ	36-item FFQ	Average F & V§	24-hour recall F & V
2-item FFQ‡ (usual intake)	3.62 (1.89)	—	0.51	0.53	0.79	0.31
7-item FFQ (past month)	3.45 (2.68)	—	—	0.55	0.84	0.28
36-item FFQ (past week)	4.28 (2.73)	—	—	—	0.85	0.31
Average F & V§	3.80 (2.01)	—	—	—	—	0.35
24-hour recall F & V	3.04 (2.46)	—	—	—	—	—

\*Values for fruit and vegetable intake were transformed for correlation analyses.

†All correlations are significant,  $p < 0.001$ .

‡FFQ = food-frequency questionnaire.

§Computed as the mean of the responses to the three food-frequency questionnaires.

"yes, regularly." Church involvement was assessed with a single open-ended item: "How many times per week do you go to your church either for services or other activities?" The number of glasses of water consumed per day was assessed with a single open-ended question.

### Statistical Analyses

Frequencies and means were determined for demographic variables. Next, bivariate correlations between psychosocial variables and F & V intake (based on the average of the responses to the three FFQs and the single 24-hour recall) were determined, followed by stepwise regression analyses using the F & V values from the FFQs (the means of the responses to the three instruments), and 24-hour recalls as the dependent variables, and psychosocial, behavioral, and demographic variables, as independent variables. Variables with  $p > 0.10$  were not included in the model. A final model was then fit using PROC MIXED, a mixed regression program that adjusts for the intraclass correlation of individuals within churches.<sup>34</sup> PROC MIXED does not provide a traditional R<sup>2</sup> estimate, so the percentage of

TABLE 3. Predictors of Fruit and Vegetable (F & V) Intake\*: Eat for Life Program Baseline Results

	Bivariate Correlation		Regression Coefficient	
	With Total F & V FFQ† (n = 896)	Without 24-hour Recall (n = 395)	With Total F & V FFQ‡ (n = 780)	Without 24-hour Recall§ (n = 291)
<b>Demographics</b>				
Age	0.18††	0.18*††	0.003*††	0.010*††
Gender (M/F)	— <sup>¶</sup>	—	—	—
Family size	-0.08**	-0.11**	—	—
Marital status (Y/N)	—	0.14**	—	—
Income	0.08**	0.24††	—	0.080*††
Employment status (unemployed, retired, working)	-0.07**	—	—	—
Education level (< HS, HS, > HS)	—	—	—	—
Comorbidities (CHD, diabetes)	0.09*††	0.12**	—	—
<b>Non-diet-related behaviors</b>				
Church attendance (times per week)	0.11*††	—	0.028*††	—
Smoking (Y/N)	—	—	—	—
Alcohol Use (Y/N)	—	—	—	—
Exercise (times per week)	0.27*††	—	0.032*††	—
<b>Dietary behaviors</b>				
Vitamin use	0.25††	0.11**	0.059††	—
Drink water (glasses per day)	0.32††	0.19††	0.023††	—
Vegetarian meals per month	0.39††	0.16††	0.061††	—
High-fat cooking practices	-0.16††	-0.14††	—	—
Low-fat cooking practices	0.25††	—	0.068**	—
<b>Psychosocial</b>				
F & V outcome expectations	0.26††	0.15**	0.126††	0.353††
Set example for others	0.18††	—	—	—
Perceived need to eat more F & V	-0.21††	—	-0.093††	—
Meat preference	-0.26††	-0.20††	—	—
Neophobia	-0.25††	-0.19††	—	-0.195††
F & V contain vitamins	0.23††	0.14††	0.092††	—
F & V barriers	-0.16††	-0.12**	—	—
Social support from family and friends	0.17††	—	—	—
F & V knowledge	0.08**	—	—	—
Self-efficacy to eat F & V	0.38††	0.20††	0.178††	0.174**

\*Values for fruit and vegetable intake were transformed for analysis.

†FFQ = food-frequency questionnaire. Computed as the mean of the responses to the three food-frequency questionnaires.

‡R<sup>2</sup> for FFQ regression model 41%.

§R<sup>2</sup> for 24-hour-recall regression model 18%.

¶— denotes nonsignificant correlation of variable excluded from the final regression model as it did not contribute to the prediction of F & V intake, p > 0.10.

\*\*p < 0.05.

††p < 0.01.

TABLE 4. Telephone Counseling Call Completion Rates

	Condition*	No. of Participants	Completion Rate			
			Call 1 (%)	Call 2 (%)	Call 3 (%)	Call 4 (%)
Church 1	2	72	89	na	na	na
Church 2	2	72	88	na	na	na
Church 3	2	72	92	na	na	na
Church 4	2	62	84	na	na	na
Church 5	2	64	97	na	na	na
Church 6	3	58	91	84	86	79
Church 7	3	82	98	91	84	85
Church 8	3	67	82	79	63	79
Church 9	3	60	88	88	82	85
TOTAL	—	609	90	86	79	82

\*Condition 2 churches were scheduled to receive one call. Condition 3 churches were scheduled to receive four calls.

variance accounted for was based on the fixed regression model. Prior to correlation and regression analyses, servings of F & V from the FFQs and 24-hour recall were transformed by either natural log or square root, depending on which method better normalized the variable.

## RESULTS

### *Sample Description*

A total of 1,011 individuals were recruited across the 14 churches. The numbers of participants per church averaged 72 (range: 53 to 130). As shown in Table 1, the baseline sample was predominantly female, with a mean age of 43 years. Approximately half of the sample were married or living with a partner, and approximately a third reported incomes > \$50,000 and college education or higher. Mean F & V intakes across the three FFQ measures ranged from 3.45 to 4.28 servings per day, with the mean based on the single 24-hour recall mean of 3.0 servings. Correlations between the responses to the three FFQs ranged from 0.51 to 0.55 (Table 2). Correlations of the FFQ measures with 24-hour recall values ranged from 0.28 for the seven-item measure to 0.31 for the two-item and 36-item measures.

### *Predictors of Fruit and Vegetable Intake Based on FFQs*

The psychosocial variable most strongly correlated with F & V intake was self-efficacy,  $r = 0.38$ . Other variables positively associated with F & V intake included: outcome expectations, setting an example for others, F & V contain vitamins, low-fat cooking practices, vitamin use, glasses of water consumed per day, number of vegetarian meals per month, exercise, and church attendance. Variables negatively associated with intake included: perceived barriers, perceived need to eat more F & V, meat preference, neophobia, and high-fat cooking practices. Regression analyses indicated that approximately 41% of the variance in F & V intake could be accounted for by the demographic, behavioral, and psychosocial variables listed in Table 3. Alone, the psychosocial variables accounted for 29% of the variance.

### *Predictors of Fruit and Vegetable Intake from 24-hour Recall*

Significant positive correlations with F & V intake based on the single 24-hour recall were observed for: outcome expectations, F & V contain vitamins, glasses of water consumed per day, vitamin use, and number of vegetarian meals per month. Variables negatively associated with intake included: perceived barriers, meat preference, neophobia, and high-fat cooking practices. The regression model accounted for 19% of the variance in F & V intake, with only five variables remaining in the final model.

### *Feasibility of Telephone Counseling*

The completion rate for the first telephone call was 90%. Rates for the remaining three calls ranged from 79% to 86%. A total of 6,425 calls were attempted, yielding 1,266 completed encounters (20%). The primary reason for incomplete calls was inability to reach the participant. Up to seven calls, which included at least one day, evening, weekday, and weekend call, were attempted prior to considering the participant unreachable. Only five participants did not provide a phone number.

## DISCUSSION

African American churches were selected as the setting for this project because of the assumed ease of recruitment as well as the access they provide to large numbers of middle- and upper-socioeconomic-status AAs. In recruiting the baseline sample, these positive expectations were largely met, if not exceeded. The "hit rate" for the telephone counseling was promising, as 90% of the participants were reached for the first call, with the rate remaining high, around 80%, for the remaining three calls. Telephone counseling appears to be a promising mode for delivering motivational interviewing interventions.

Mean baseline F & V intakes ranged from 3.5 to 4.3 servings per day across the three FFQ methods, compared with 3.0 servings based on the 24-hour recall. That intake estimates increased with the numbers of items on the FFQs is consistent with prior studies.<sup>35</sup> The estimate from the seven-item measure, 3.5 servings per day, is similar to the mean found in a sample of North Carolina African American church members using a similar instrument.<sup>36</sup> This value is slightly higher, however, than the mean intake (3 servings per day) found in a national sample of African Americans in the 1990 BRFSS, again using a similar instrument.<sup>36</sup> The higher intake found here may be due to the fact that our measure included separate items for citrus juice and other fruit juices, whereas the BRFSS instrument contained only a single juice item. It is also possible that our sample of AAs in Atlanta is not representative of the nation.

That self-efficacy was positively associated with F & V intake is consistent with prior studies.<sup>37-</sup>  
<sup>38</sup> The impact of the intervention on efficacy and other psychosocial variables as well as the association between change in the mediator and change in F & V intake will be examined at one-year follow-up. Barriers were negatively associated with intake, which is consistent with several prior studies.<sup>12,39,40</sup> The absence of an association between F & V intake and smoking and alcohol use is inconsistent with prior research.<sup>41</sup> One reason for this may be the relatively low rates of smoking (11%) and alcohol use (32%) found here as well as in other church surveys,<sup>42</sup> relative to national norms.<sup>41,43</sup> The association between predictor variables and F & V intake based on the 24-hour recall was generally weaker than the association with F & V intake based on the mean of the three FFQs. This is not surprising, as a single recall may not be representative of usual diet. Several variables not previously included in dietary-correlates research were found

to be significant predictors of the F & V intake. These included neophobia, meat preferences, water intake, number of vegetarian meals consumed per week, and use of vitamins. Whether changes in these variables will occur as the result of the intervention, and whether changes in these variables will predict changes in F & V intake, will be examined at one-year follow-up.

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