Family Dinner and Diet Quality Among Older Children and Adolescents

Matthew W. Gillman, MD; Sheryl L. Rifas-Shiman, MPH; A. Lindsay Frazier, MD; Helaine R. H. Rockett, MS, RD; Carlos A. Camargo, Jr, MD; Alison E. Field, ScD; Catherine S. Berkey, ScD; Graham A. Colditz, MD

Context: The proportion of children eating dinner with their families declines with age and has decreased over time. Few data exist concerning the nutritional effect of eating family dinner.

Objective: To examine the associations between frequency of eating dinner with family and measures of diet quality.

Design: Cross-sectional.

Setting: A national convenience sample.

Participants: There were 8677 girls and 7525 boys in the study, aged 9 to 14 years, who were children of the participants in the ongoing Nurses' Health Study II.

Main Outcome Measures: We collected data from a self-administered mailed survey, including food and nutrient intakes from a validated semiquantitative food frequency questionnaire. Main outcome measures included servings per day of selected foods and food groups, daily intakes of selected macronutrients and micronutrients, and frequency of multivitamin use.

Results: Approximately 17% of participants ate dinner with members of their family never or some days, 40% on most days, and 43% every day. More than half of the 9-year-olds ate family dinner every day, whereas only about one third of 14-year-olds did so. In age- and sex-adjusted logistic regression models, the odds ratios associated with a frequency of family dinner of most days compared with never or some days, or every day compared with most days, were as follows: for eating at least 5 servings per day of fruits and vegetables, 1.45 (95% confidence interval [CI], 1.37-1.53); for eating any fried foods away from home, 0.67 (95% CI, 0.64-0.70); and for drinking any soda, 0.73 (95% CI, 0.66-0.80). Multiple linear regression showed that an increased frequency of family dinner was also associated with substantially higher intake of several nutrients, including fiber, calcium, folate, iron, vitamins B_6, B_{12}, C, and E; lower glycemic load; and lower intake of saturated and trans fat as a percentage of energy. We observed little or no effect on intakes of whole dairy products, red meat, or snack foods. Patterns were similar for boys and girls.

Conclusions: Eating family dinner was associated with healthful dietary intake patterns, including more fruits and vegetables, less fried food and soda, less saturated and trans fat, lower glycemic load, more fiber and micronutrients from food, and no material differences in red meat or snack foods.

Arch Fam Med. 2000;9:235-240

The affiliations of the authors appear in the acknowledgment section at the end of the article.

AMONG school-aged children and adolescents, the evening meal provides a larger proportion of intake of energy and key nutrients than other meals and snacks.[1] National surveys in the 1990s have indicated that a large majority of parents consider eating dinner with their children very important.[2-4] Compared with other activities done with their children, more than 80% of parents rank eating dinner together as either one of the most important activities or a very important activity.[5]

Despite the importance placed on family dinner by parents, the proportion of children eating dinner with their families is not high. A national telephone survey of parents of 12- to 17-year-olds in 1991 indicated that 27% ate dinner together as a family every day, 47% did so 4 to 6 days per week, 27% did so 1 to 3 days per week, and 2% never did.[6] In addition, the frequency of eating family dinner has waned over time. In telephone interviews with 410 children aged 9 to 15 years in 1995, 5% fewer children reported eating together with their families than in a similar study in 1991.[7] In a survey of 1101 adult women in 1997, 80% reported eating dinner together sometimes, but 91% reported doing so growing up.[8] This

SUBJECTS AND METHODS

SUBJECTS

The subjects in this study were sons and daughters of participants in the ongoing Nurses' Health Study II, a cohort study of over 116 000 female registered nurses.[14] From study records, we identified the approximately 40 000 Nurses' Health Study II participants who had at least 1 child aged 9 to 14 years in 1996. We sent letters to all of these women asking them to identify all of their age-eligible children by name and date of birth, and seeking consent to enroll each child in a cohort study of diet, activity, and growth. We sent a letter of invitation and our baseline questionnaire to the approximately 25 000 children whose mothers gave consent. A total of 9019 girls and 7843 boys completed and returned the questionnaire, thus forming the "Growing Up Today Study" cohort.

For this analysis, we excluded 197 girls and 150 boys outside the age range of 9 to 14 years, 33 girls and 52 boys who reported implausible daily energy intake (<2100 kJ or >21 000 kJ), and 112 girls and 116 boys who did not answer the question about family dinner. The final sample, therefore, included 16 202 subjects (8677 girls and 7525 boys). Approximately 93% of subjects were white. For analyses involving the covariate body mass index (calculated as weight in kilograms divided by the square of height in meters), we also excluded 189 girls and 140 boys with outlying values, which we detected by inspecting age- and sex-specific distributions of this variable.

MEASUREMENTS

All measurements except household income were by self-report on the mailed baseline questionnaire. The instrument included current age, sex, race, height and weight, and adults with whom the subject lived; a frequency-type physical activity questionnaire; questions about television watching, self-esteem, body image, smoking, weight concerns, dieting habits, and menarche (girls only); and drawings for indicating Tanner stage. To estimate food and nutrient intake, we used a semiquantitative food frequency questionnaire that had been validated for use among older children and adolescents.[15] The validation study used three 24-hour recalls as the standard for comparison. Mean nutrient intakes were similar for the recall and food frequency methods. The average correlation coefficient between the 2 methods for a range of nutrient intakes was 0.54, similar to results from studies among adults.[15]

Along with questions about the frequency of consuming ready-made dinner and making one's own dinner, we also asked the question, "How often do you sit down with other members of your family to eat dinner or supper?" Response categories to this question, which formed our exposure variable, were "never, some days, most days, and every day." Because of the very low proportion (1%) of subjects answering "never," we grouped these subjects with those reporting "some days" for the analysis. We chose outcome variables based on current knowledge of foods, nutrients, and dietary behaviors that are associated with increased or decreased risk of diseases of adolescence and adulthood, including iron-deficiency anemia, diabetes, osteoporosis, cardiovascular disease, and cancer.[16-23] To obtain estimates of household income, we mapped each subject's address to a census tract. We used US census data from 1990 to assign the median household income for that census tract to the individual subject.

DATA ANALYSIS

We calculated intake of nutrients by use of the Harvard University Food Composition Database, updated through February 1998.[21] For continuous variables, we report means within categories of frequency of family dinner. For categorical variables except fruits and vegetables, we report proportions of subjects who gave non-zero responses for each category of family dinner. For intake of fruits and vegetables, we report both mean intakes and proportions of subjects consuming 5 or more servings per day. A total of 3939 subjects had a sibling in the study. Results with and without excluding a random sibling were similar, so we present results on the entire sample.

We employed a separate multivariate model for each outcome, linear regression for continuous outcomes, and logistic regression for binary outcomes, and we included covariates to examine their potentially confounding or intervening effects. We report results using family dinner as a continuous variable (taking the values 1, 2, or 3), as categorical analysis gave similar results. For the energy-containing nutrient outcomes, types of fat, and glycemic load, we report results as a proportion of energy intake. For other nutrients, because national recommendations are usually based on total consumption, we report our main results without adjusting for energy intake.

reported percentage was higher among women currently in their 60s and 70s (97%-98%) than among women in their 20s and 30s (83%-88%). Further, eating family dinner is less common among older than younger children. Surveys of families that include younger children indicate that 41% to 46% of them eat dinner together every day,[4,9] compared with 27% in families of 12- to 17-year-olds.[6]

Although eating together with one's family has been associated with improved school and psychological performance,[10,11] only indirect information exists about the relationships between family dinner and the quality of children's diets. In 2 studies of school-aged children, frequency of eating family dinner was associated with increased discussion and knowledge of topics related to nutrition.[12,13] Even less information is available about older children and adolescents. In a 1995 survey of 9- to 15-year-old children, only 52% had heard of the US Department of Agriculture Food Guide Pyramid.[7] More than 75% cited their parents as a source of nutrition information, however, and 98% found their parents' information useful.

The purpose of our analysis was to examine the associations between frequency of eating family dinner and several measures of diet quality in a large national sample of 9- to 14-year-old children.

Table 1. Characteristics of 16 202 Girls and Boys, Aged 9 to 14 Years, by Category of Family Dinner*

Characteristic	Frequency of Family Dinner: Never or Some Days (n = 2748)	Most Days (n = 6434)	Every Day (n = 7020)
	Percent of Subjects (Row Percent)		
Age, y			
9	12.1	37.3	50.7
10	13.1	38.2	48.8
11	15.5	40.1	44.4
12	17.8	40.8	41.4
13	20.5	40.6	38.9
14	23.7	40.9	35.4
	Mean		
Make own dinner, times per wk	2.3	1.9	1.6
Ready-made dinner, times per wk	1.9	1.5	1.4
Physical activity, h/wk	15.9	15.8	15.2
Team sports, number of seasons	2.6	2.7	2.6
Television watching, h/d	2.5	2.3	2.1
Tanner stage†	2.8	2.8	2.8
Body mass index, kg/m^2	19.5	19.2	19.0
Household income, $1000s‡	40.1	41.4	41.2

*Except for age, estimates are age adjusted.
†Breast development for girls and pubic hair development for boys (1 = least mature; 5 = most mature).
‡Household income estimated by the median household income for the census tract in which each subject resides.

Table 2. All Intake of Selected Foods and Food Groups, by Category of Family Dinner, for 16 202 Girls and Boys, Aged 9 to 14 Years

Food Group	Frequency of Family Dinner: Never or Some Days (n = 2748)	Most Days (n = 6434)	Every Day (n = 7020)
	Mean Number of Servings per Day		
Fruits and vegetables	3.0	3.5	3.8
Whole grain foods	0.4	0.4	0.5
Skim or 1% dairy foods	1.0	1.2	1.2
Whole dairy foods	0.6	0.6	0.7
Red and processed meat	0.7	0.8	0.8
Snack foods	2.8	2.9	3.0
	Percent of Subjects		
Fruits and vegetables (≥5 servings per day)	12.9	19.6	24.2
Multivitamin use	39.7	42.6	44.1
Fried food at home	38.1	36.0	33.3
Fried food away from home	70.2	63.9	52.9
Soda	95.3	94.5	91.7

Table 3. Mean Intake of Selected Nutrients, by Category of Family Dinner, for 16 202 Girls and Boys, Aged 9 to 14 Years*

Nutrient	Frequency of Family Dinner: Never or Some Days (n = 2748)	Most Days (n = 6434)	Every Day (n = 7020)
Energy, kJ	8677.2	9130.8	9294.6
Percentage of energy intake from			
Trans fat	2.1	2.0	1.9
Saturated fat	11.0	10.8	10.8
Monounsaturated fat	11.4	11.3	11.2
Polyunsaturated fat, n-3	0.53	0.54	0.54
Polyunsaturated fat, n-6	5.1	5.1	5.1
Glycemic load/4200 kJ	27 305	26 987	26 692
Dietary fiber, g	15.2	16.5	17.2
Calcium, mg	1115	1208	1255
Folate, µg	264	288	299
Vitamin B_6, mg	1.6	1.7	1.8
Vitamin B_{12}, µg	4.7	5.2	5.4
Vitamin C, mg	132	143	146
Vitamin E, mg	6.7	7.1	7.2
Iron, mg	13.3	14.5	14.9

*Nutrients are from foods only, not supplements.

RESULTS

Table 1 demonstrates, as expected, that older participants were less likely to report eating dinner with their families than younger participants. Levels of age-adjusted body mass index, physical activity, and Tanner stage declined modestly across category of family dinner frequency. We report all results for girls and boys combined, because sex-specific analyses were similar. **Table 2** shows intakes of selected foods and food groups by frequency of family dinner. We found that subjects who ate family dinner every day consumed an average of 0.8 more servings of fruits and vegetables than those who ate family dinner never or some days, but only about one fifth of girls and boys met the national recommendations of at least 5 servings per day. Consumption of fried food and soda was reported much less frequently by subjects who ate family dinner more frequently. More than 40% of girls and boys used multivitamins, and such use appeared slightly more prevalent in those eating family dinner more often. No material trends were evident for whole grain foods, dairy products, red and processed meat, or snack foods.

Table 3 shows similar results for nutrients. Participants who ate family dinner more frequently reported slightly higher energy intakes and also reported substantially higher intakes of several nutrients, including dietary fiber, calcium, folate, vitamins B_6, B_{12}, C, and E, and iron. In addition, they consumed less trans fat and saturated fat as a percentage of energy intake, and had lower glycemic loads.

The linear regression results in **Table 4** confirm and quantify the univariate associations of family dinner frequency with intakes of foods and nutrients. In addition, the logistic regression results in **Table 5** show that an increase in 1 category of frequency of family dinner was associated with a 45% increase in the odds of eating at least 5 daily servings of fruits and vegetables (age- and sex-adjusted odds ratio [OR], 1.45 [95% confidence

Table 4. Daily Increment in Food or Nutrient Intake Associated With a 1-Category Increase in Family Dinner Frequency, ie, Most Days vs Never or Some Days, or Every Day vs Most Days*

Food Group or Nutrient	Unadjusted Estimate (95% Confidence Interval)	Age- and Sex-Adjusted Estimate (95% Confidence Interval)
Serving of		
Fruits and vegetables	0.35 (0.31, 0.40)	0.37 (0.33, 0.41)
Whole grain foods	0.07 (0.05, 0.09)	0.07 (0.05, 0.09)
Skim or 1% dairy foods	0.06 (0.02, 0.10)	0.07 (0.03, 0.11)
Whole dairy foods	0.04 (0.02, 0.06)	0.04 (0.02, 0.06)
Red and processed meat	0.03 (0.02, 0.04)	0.03 (0.02, 0.04)
Snack foods	0.04 (0.0008, 0.08)	0.03 (–0.009, 0.07)
Percentage of energy intake from		
Trans fat	–0.09 (–0.10, –0.08)	–0.10 (–0.11, –0.09)
Saturated fat	–0.09 (–0.13, –0.05)	–0.12 (–0.16, –0.08)
Monounsaturated fat	–0.09 (–0.13, –0.05)	–0.12 (–0.16. –0.08)
Polyunsaturated fat, n-3	0.006 (0.002, 0.01)	0.007 (0.003, 0.01)
Polyunsaturated fat, n-6	0.02 (–0.18, 0.22)	0.01 (–0.006, 0.03)
Glycemic load/4200 kJ	–304 (–390, –218)	–233 (–319, –145)
Dietary fiber, g	0.95 (0.81, 1.09)	0.94 (0.80, 1.08)
Calcium, mg	65.7 (55.1, 76.3)	61.8 (51.4, 72.2)
Folate, µg	16.3 (14.0, 18.7)	16.1 (13.8, 18.5)
Vitamin B_6, mg	0.11 (0.10, 0.12)	0.11 (0.10, 0.12)
Vitamin B_{12}, µg	0.33 (0.27, 0.39)	0.31 (0.25, 0.37)
Vitamin C, mg	6.4 (4.5, 8.3)	7.1 (5.2, 9.0)
Vitamin E, mg	0.22 (0.14, 0.30)	0.21 (0.13, 0.29)
Iron, mg	0.75 (0.63, 0.87)	0.71 (0.59, 0.83)

**Results are from multiple logistic regression models.*

Table 5. Odds Ratio for Each Specified Food Group or Dietary Habit Associated With a 1-Category Increase in Family Dinner Frequency*

Food Group or Dietary Habit	Unadjusted Odds Ratio (95% Confidence Interval)	Age- and Sex-Adjusted Odds Ratio (95% Confidence Interval)
Fruits and vegetables (≥5 servings per day)	1.42 (1.35, 1.50)	1.45 (1.37, 1.53)
Multivitamin use	1.09 (1.04, 1.14)	1.06 (1.02, 1.11)
Fried food at home	0.90 (0.86, 0.94)	0.90 (0.86, 0.94)
Fried food away from home	0.68 (0.65, 0.71)	0.67 (0.64, 0.70)
Soda	0.71 (0.65, 0.78)	0.73 (0.66, 0.80)

**Family dinner frequency was defined as most days vs never or some days, or everyday vs most days. Results are from multiple logistic regression models.*

interval [CI], 1.37-1.53]). We also observed reductions of approximately 30% in the odds of eating any fried foods away from home (0.67 [95% CI, 0.64-0.70]) and drinking any soda (0.73 [95% CI, 0.66-0.80]). As seen in the tables, univariate and adjusted results were similar, indicating little confounding by age and sex. Similarly, we found no material changes in effect estimates after further adjustment for body mass index, physical activity, hours of television watched, smoking intention, presence of smoking in the home, 2-parent home vs other arrangement, household income, or frequency of the child making his or her own dinner (data not shown).

Multivariate adjustment for energy intake attenuated estimates for foods modestly and estimates for nutrients by an average of about one half. For example, we estimated an age- and sex-adjusted increase of 0.37 servings of fruits and vegetables for each category increase in family dinner frequency (Table 4). Adjustment for energy intake reduced the estimate to 0.27 servings. Other examples: energy adjustment reduced estimates for whole dairy foods from 0.04 to 0.01 servings, for red and processed meat from 0.03 to 0.009 servings, for fiber intake from 0.94 g to 0.50 g, for calcium intake from 61.8 mg to 30.7 mg, and for folate from 16.1 µg to 8.8 µg.

Additional adjustment for frequency with which the subjects ate ready-made dinners also attenuated the estimates, but to a lesser degree. For example, the age-, sex-, and energy-adjusted OR for soda was 0.69 for each 1-category increase in family dinner frequency. Further adjustment for ready-made dinner frequency resulted in an estimated OR of 0.75. Other examples: adjustment for ready-made dinner reduced linear regression estimates for trans fat from –0.10% to –0.06% of energy intake, and for iron intake from 0.32 mg to 0.20 mg.

Estimates of the effect of family dinner on food and nutrient outcomes were similar for younger and older children. For example, for a 1-category increase in frequency of family dinner, the age- and sex-adjusted ORs for consuming at least 5 fruits and vegetables per day were 1.46 for participants aged 9 to 12 years and 1.45 for those aged 13 to 14 years. The ORs for fried foods away from home were 0.66 for the younger children and 0.67 for the older children. Increments in dietary fiber intake were 0.99 g and 0.86 g, respectively, and in calcium intake, 62.8 mg and 59.1 mg, respectively.

COMMENT

In this study, we report associations between the frequency with which 9- to 14-year-old children eat dinner with their families and the intakes of foods and nutrients that reflect diet quality. Our results show that family dinner is associated with some healthful dietary patterns. Increasing frequency of family dinner was associated with higher consumption of fruits and vegetables and several beneficial nutrients, including fiber, folate, calcium, iron, and vitamins B_6, B_{12}, C, and E. We also observed lower consumption of saturated and trans fat, soda, and fried foods, as well as decreased glycemic load, a measure of the diet's propensity to raise blood glucose. Further, we found no material increase in the potentially harmful intakes of whole dairy foods, snack foods, and red and processed meats.

One way that eating family dinner could improve diet quality is that family dinners contain foods that are more healthful than children and adolescents would otherwise eat. This interpretation of our findings is sup-

ported by the fact that most of the associations were attenuated by adjusting for the frequency with which the subjects ate ready-made dinners. In our data, the frequencies of ready-made dinner and family dinner were inversely correlated (Pearson $r = -0.27$). Because the examples of ready-made dinners we provided were "frozen dinners, Spaghetti-Os, and microwave meals," it is possible that the nutritional quality of ready-made dinners was on average less than that of family dinners. Our findings thus suggest that eating family dinner could lead to fewer ready-made dinners, which in turn results in a better-quality diet.

One might also speculate that our findings reflect that eating dinner together engenders family conversations about healthful eating practices. Among 507 families with school-aged children in upstate New York, Gillespie and Achterberg[13] reported that 95% of mothers and 83% of fathers almost always ate dinner with their children. Nutritional topics were often a topic of conversation.[13] The fact that a high proportion of 10- to 15-year-old children report that their parents provide useful nutrition information[7] suggests that family dinner conversation could be a rich source of such information in this age group as well.

Another potential explanation for our results is confounding: children who eat family dinner more frequently have healthier eating habits that are not related to eating family dinner. Our results, however, were not materially changed after adjustment for a wide range of variables that might reflect a healthier home or lifestyle, including age, sex, body mass, physical activity, television watching, active and passive smoking, household income, and presence of 2 parents in the home.

We chose our diet quality variables based on known relationships of certain foods, food groups, and nutrients with health outcomes in adolescence and adulthood. For example, in adolescents, calcium intake is an important determinant of bone mass, and iron intake is necessary to sustain enlarging hemoglobin and muscle mass.[17,18] Intake of fruits and vegetables and associated vitamins and minerals is associated with reduced risk of cancers and cardiovascular disease.[19,24-26] Glycemic load represents a combination of the quality and quantity of carbohydrates consumed and, thus, dietary insulin demand. It is a predictor of the incidence of type 2 diabetes.[20] Consumption of trans fat and saturated fat are determinants of atherosclerotic heart disease, the first manifestations of which appear in childhood.[21,22] Consumption of monounsaturated fat is variably related to coronary heart disease, probably depending on how much of the fat is derived from meat vs vegetable sources, and is thus a less reliable measure of diet quality.[21,23] Dietary indexes are alternatives to examination of single foods and nutrients.[27,28] It is not clear, however, whether existing indices contain appropriate combinations of foods, nutrients, and scoring systems that result in accurate predictions of health outcomes.

Strengths of the study include that the study population comprised a large number of girls and boys living in all 50 states and several US territories. In addition, we collected detailed dietary information using a validated assessment tool. The cross-sectional design is only a minor limitation, because it is much more likely that family dinner leads to improved eating habits than the converse. Generalizability may be limited, because the subjects were sons and daughters of registered nurses, and largely white. Dietary practices may have been different in these families than in families of different professions or racial/ethnic groups. However, intakes of a wide range of nutrients in our study population (data not shown) were very similar to those of both white and black children of similar ages as determined by the US Department of Agriculture's Continuing Survey of Food Intakes of Individuals.[29,30] Further, although food frequency methods can estimate food or nutrient intakes that are different, often higher, than food record or recall methods, our main results are about differences in intakes rather than absolute levels. For some of the food and nutrient differences we found between groups of subjects, the absolute magnitudes were small. We emphasize, however, that the overall pattern of intakes tended to be more healthful among subjects who ate family dinner more often.

The reduction in the frequency of family dinner in the past few decades in the United States has not been accompanied by a perceived lessening of its importance.[2,3,5] Because women continue to be the most frequent preparers of meals in the United States,[31] it is possible that the increasing number of women in the workforce has made it more difficult for families to eat together. We emphasize, however, that our results do not suggest that working women and family dinners are incompatible. First, more than 88% of mothers of the subjects in this study were employed, adjusting for employment status did not change the results (data not shown), and the frequency of eating family dinner in this cohort is at least as high as in national surveys. Second, the results of a study by Gillespie and Achterberg[13] indicate that mothers who work at least part time discuss nutrition topics more often with their families than do those who do not work. Third, our results were similar among subjects with and without another sibling in the study. Finally, adjustment of the results for 2-parent households vs other family structures did not alter the results.

Based on the results of this study, health professionals may support the efforts of family members to eat together as a means for improving the quality of diet among older children and adolescents. Future research in this area should focus on the pathways by which eating dinner with one's family may increase diet quality.

Accepted for publication July 28, 1999.

From the Department of Ambulatory Care and Prevention, Harvard Medical School and Harvard Pilgrim Health Care (Drs Gillman and Ms Rifas-Shiman); the Dana Farber Cancer Institute (Dr Frazier), the Department of Emergency Medicine, Massachusetts General Hospital (Dr Camargo), the Channing Laboratory, Department of Medicine, Brigham and Women's hospital Harvard Medical School (Drs Frazier, Camargo, Field, Berkey, and Colditz and Mss Rockett and Berkey), and the Department of Epidemiology, Harvard School of Public Health, Boston, Mass.

This study was supported by grants DK 46834 and HL 03533(Dr Colditz) from the National Institutes of Health, Bethesda, Md and by Harvard Medical School and the Har-

vard Pilgrim Health Care Foundation, Boston, Mass. Dr Gillman is a Robert Wood Johnson Generalist Faculty Physician Scholar.

We thank Gary Chase, Karen Corsano, Robin Blum, Anna Mariani, Catherine Tomeo, and Francine Laden for their diverse contributions to this study.

Corresponding author: Matthew W. Gillman, MD, Department of Ambulatory Care and Prevention, Harvard Medical School, 126 Brookline Ave, Suite 200, Boston, MA 02215.

REFERENCES

1. Lin BH, Guthrie J, Blaylock JR. *The Diets of America's Children: Influences of Dining Out, Household Characteristics, and Nutrition Knowledge*. Washington, DC: US Dept of Agriculture; 1996. Agricultural Economic Report 746.
2. Yankelovich Partners Inc. State of the American family. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1993.
3. Bruskin Goldring Research. National survey on communicating family values. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1996.
4. CBS News, New York Times survey. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1991.
5. Mellman and Lazarus Inc. Family values survey. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1991.
6. Luntz Research Companies. CASA surveys of teens, parents, teachers, and principals. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1997.
7. The Gallup Organization. *Food, Physical Activity and Fun: What Kids Think*. Chicago, Ill: The American Dietetic Association National Center for Nutrition and Dietetics, The International Food Information Council, and The President's Council on Physical Fitness and Sports; 1995.
8. Princeton Survey Research Associates. State of the union mother's day poll. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1997.
9. Princeton Survey Research Associates. Speaking of kids: a national survey of children and parents. Cited in Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1994.
10. Anderson RC, Wilson PT, Fielding LG. Growth in reading and how children spend their time outside of school. *Reading Res Q*. 1988;23:286-303.
11. Bowden BS, Zeisz JM. Supper's on! adolescent adjustment and frequency of family mealtimes. Paper presented at: 105th Annual Meeting of the American Psychological Association; 1997; Chicago, Ill.
12. YOUTH Research. Kids make the grade: a quantitative research study on children's nutrition. Brookfield, Conn: The International Food Information Council; 1992.
13. Gillespie AH, Achterberg CL. Comparison of family interaction patterns related to food and nutrition. *J Am Diet Assoc*. 1989;89:509-512.
14. Rich-Edwards J, Goldman MB, Willett WC, et al. Adolescent body mass index and ovulatory infertility. *Am J Obstet Gynecol*. 1994;171:171-177.
15. Rockett HR, Breitenbach M, Witschi J, Field AE, Colditz GA. Validation of a youth/adolescent food frequency questionnaire. *Prev Med*. 1997;26:808-816.
16. Willett WC. Diet and health: what should we eat? *Science*. 1994;264:532-537.
17. Johnston CC, Miller JZ, Slemenda CW. Calcium supplementation and increase in bone mineral density in children. *N Engl J Med*. 1992;327:82-87.
18. Committee on Nutrition of the American Academy of Pediatrics. *Pediatric Nutrition Handbook*. 4th ed. Elk Grove Village, Ill: American Academy of Pediatrics; 1998:144,233-246.
19. Gillman MW. Enjoy your fruits and vegetables: eating fruit and vegetables protects against the common chronic diseases of adulthood. *BMJ*. 1996;313:765-766.
20. Salmeron J, Manson JE, Stampfer MJ, Colditz GA, Wing AL, Willett WC. Dietary fiber, glycemic load, and risk of non-insulin-dependent diabetes mellitus in women. *JAMA*. 1997;277:472-477.
21. Hu FB, Stampfer MJ, Manson JE, et al. Dietary fat intake and the risk of coronary heart disease in women. *N Engl J Med*. 1997;337:1491-1499.
22. Pathobiological Determinants of Atherosclerosis in Youth Research Group. Relationship of atherosclerosis in young men to serum lipoprotein cholesterol concentrations and smoking: a preliminary report from the Pathobiological Determinants of Atherosclerosis in Youth (PDAY) Research Group. *JAMA*. 1990;264:3018-3024.
23. Posner B, Cobb JL, Belanger A, Cupples LA, D'Agostino RB, Stokes J. Dietary lipid predictors of coronary heart disease in men. *Arch Intern Med*. 1991;151:1181-1187.
24. Block G, Patterson B, Subar A. Fruit, vegetables, and cancer prevention: a review of the epidemiological evidence. *Nutr Cancer*. 1992;18:1-29.
25. Gillman MW, Cupples LA, Posner B, Ellison RC, Castelli W, Wolf P. Protective effect of fruits and vegetables on development of stroke in men. *JAMA*. 1995;273:1113-1117.
26. Gaziano JM, Manson JE, Branch LG, Colditz GA, Willett WC, Buring JB. A prospective study of consumption of carotenoids in fruits and vegetables and decreased cardiovascular mortality in the elderly. *Ann Epidemiol*. 1995;5:255-260.
27. Patterson RE, Haines PS, Popkin BM. Diet quality index: capturing a multidimensional behavior. *J Am Diet Assoc*. 1994;94:57-64.
28. Kennedy ET, Ohls J, Carlson S, Fleming K. The healthy eating index: design and applications. *J Am Diet Assoc*. 1995;95:1103-1108.
29. Levine E, Guthrie JF. Nutrient intakes and eating patterns of teenagers. *Fam Econ Nutr Rev*. 1997;10:20-35.
30. Tippett KS, Mickle SJ, Goldman JD, et al. *Food and Nutrient Intake by Individuals in the United States, 1 Day, 1989-1991: Continuing Survey of Food Intakes by Individuals*. Washington, DC: US Dept of Agriculture; 1989-1991, 1995.
31. Roper Organization. New traditionalist family values in the 90s. Roper Center at University of Connecticut Public Opinion Online. Cited in LEXIS-NEXIS [database online]. Dayton, Ohio, 1993.

Author's Comment

With 3 young children, my wife and I sometimes find it hard to get everyone sitting down and eating at the same time. This domestic challenge got me thinking about the nutritional value of eating together as a family, which seems to be a vanishing custom, especially among adolescents. The results of the study suggest that kids who forgo the fast food and soda to eat with their families really do have better-quality diets.

Matthew W. Gillman, MD
Boston, Mass