



Published in final edited form as:

*J Acad Nutr Diet.* 2013 December ; 113(12): . doi:10.1016/j.jand.2013.08.011.

## Eating breakfast and dinner together as a family: Associations with sociodemographic characteristics and implications for diet quality and weight status

**Nicole Larson, PhD, MPH, RDN\* [Research Associate],**

Division of Epidemiology and Community Health School of Public Health, University of Minnesota  
1300 South Second Street, Suite 300 Minneapolis, MN 55454

**Rich MacLehose, PhD [Assistant Professor],**

Division of Epidemiology and Community Health School of Public Health, University of Minnesota  
1300 South Second Street, Suite 300 Minneapolis, MN 55454 Phone: 612-624-1932 Fax:  
612-624-0315 mac10029@umn.edu

**Jayne A. Fulkerson, PhD [Associate Professor],**

School of Nursing University of Minnesota 5-160 Weaver-Densford Hall 308 Harvard Street SE  
Minneapolis, MN 55455 Phone: 612-624-4823 Fax: 612-626-6606 fulke001@umn.edu

**Jerica M. Berge, PhD, MPH, LMFT [Assistant Professor],**

Department of Family Medicine and Community Health University of Minnesota Phillips  
Wangensteen Building 516 Delaware Street SE Minneapolis, MN 55455 Phone: 612-626-3693  
mohl0009@umn.edu

**Mary Story, PhD, RD [Professor], and**

Division of Epidemiology and Community Health School of Public Health, University of Minnesota  
1300 South Second Street, Suite 300 Minneapolis, MN 55454 Phone: 612-626-8801 Fax:  
612-624-9328 story@epi.umn.edu

**Dianne Neumark-Sztainer, PhD, MPH, RD [Professor]**

Division of Epidemiology and Community Health School of Public Health, University of Minnesota  
1300 South Second Street, Suite 300 Minneapolis, MN 55454 Phone: 612-624-0880 Fax:  
612-626-7103 neumark@epi.umn.edu

### Abstract

**Background**—Research has shown that adolescents who frequently share evening meals with their families experience more positive health outcomes, including diets of higher nutritional quality. However, little is known about families eating together at breakfast.

**Objectives**—This study examined sociodemographic differences in family meal frequencies in a population-based adolescent sample. Additionally, this study examined associations of family breakfast meal frequency with dietary quality and weight status.

**Design**—Cross-sectional data from EAT 2010 (Eating and Activity in Teens) included anthropometric assessments and classroom-administered surveys completed in 2009-2010.

---

© 2013 The Authors. Published by Elsevier Inc. on behalf of Academy of Nutrition and Dietetics. All rights reserved.

\*Corresponding author Phone: 612-625-5881 Fax: 612-626-7103 larsonn@umn.edu.

**Publisher's Disclaimer:** This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

**Participants/setting**—Participants included 2,793 middle and high school students (53.2% girls, mean age=14.4 years) from Minneapolis/St. Paul, MN, public schools.

**Main outcome measures**—Usual dietary intake was self-reported on a food frequency questionnaire. Height and weight were measured.

**Statistical analyses performed**—Regression models adjusted for sociodemographic characteristics, family dinner frequency, family functioning, and family cohesion were used to examine associations of family breakfast frequency with dietary quality and weight status.

**Results**—On average, adolescents reported having family breakfast meals 1.5 times ( $SD=2.1$ ) and family dinner meals 4.1 times ( $SD=2.6$ ) in the past week. There were racial/ethnic differences in family breakfast frequency, with the highest frequencies reported by adolescents of Black, Hispanic, Native American, and mixed race/ethnicity. Family breakfast frequency was also positively associated with male sex; younger age; and living in a two-parent household. Family breakfast frequency was associated with several markers of better diet quality (such as higher intake of fruit, whole grains, and fiber) and lower risk for overweight/obesity. For example, adolescents who reported seven family breakfasts in the past week consumed an average of 0.37 additional daily fruit servings compared to adolescents who never had a family breakfast meal.

**Conclusions**—Results suggest that eating breakfast together as a family may have benefits for adolescents' dietary intake and weight status.

## Keywords

Adolescents; Family meals; Breakfast; Dietary intake; Overweight

## INTRODUCTION

A growing body of research indicates that adolescents who frequently share mealtimes with their families have diets of higher nutritional quality<sup>1-9</sup> and some studies indicate that having more family meals may support youth in achieving and maintaining a healthy weight.<sup>10-15</sup> For example, one prospective study showed that having regular family meals ( 5 times/week) during middle school was associated with increased intake of vegetables, calcium-rich foods, dietary fiber, and key nutrients such as calcium and iron in high school.<sup>6</sup> While efforts aimed at disseminating research regarding the benefits of family meals and promoting the practice of eating together have increased over the past decade, a recent analysis showed the frequency of family meals remained constant from 1999-2010 in the overall adolescent population and decreased among adolescents from low socioeconomic backgrounds.<sup>16</sup> More work is needed to help families overcome barriers to eating together and to ensure that the potential benefits can be shared equally by all youth.

Although the majority of parents as well as adolescents feel it is important for their family to eat together and that family meals are enjoyable, they also report several barriers to sharing mealtimes.<sup>17</sup> Common barriers to having family meals include different schedules and difficulty finding time to eat together.<sup>17, 18</sup> A survey of 902 parent-adolescent pairs found that 79% of parents and 54% of adolescents had different schedules making it hard to eat together.<sup>17</sup> Therefore, a frequent question raised by parents and the popular media in response to research regarding family meals is whether it matters if families eat together in the evening versus other times of the day. Research focused on the frequency of sharing the evening meal<sup>1, 5, 7, 8</sup> has demonstrated nutritional benefits similar to those observed by studies that have more broadly assessed overall meal frequency;<sup>2, 6</sup> however, little is known about the benefits associated with eating breakfast together with one's family. Likewise, population-based research about the frequency of eating breakfast together among families

of adolescents and how meal patterns may differ according to sociodemographic characteristics is lacking in the peer-reviewed literature.

Studies addressing these research gaps are needed to help inform the design of public health messages and interventions to promote family meals and reduce disparities in the frequency of eating together among families of adolescents. The current study was designed to provide more information on patterns of eating meals together as a family in a diverse, population-based sample of adolescents. The first aim of this study was to examine and compare the frequency of having family meals at breakfast and at dinner according to sociodemographic characteristics. The second aim was to examine associations of eating together as a family at breakfast with measures of dietary quality and weight status while accounting for potentially important covariates.

## METHODS

### Study Design and Population

The EAT 2010 (Eating and Activity in Teens) study was designed to examine dietary intake, physical activity, weight control behaviors, weight status, and factors associated with these outcomes in adolescents.<sup>19</sup> Classroom-administered surveys, food frequency questionnaires (FFQ), and anthropometric measures were completed by 2,793 adolescents during the 2009-2010 academic year. The study population includes adolescents from 20 public middle schools and high schools in the Minneapolis/St. Paul metropolitan area of Minnesota, which serve socioeconomically and racially/ethnically diverse communities. The mean age of the study population was 14.4 years (SD=2.0); 46.1% were in middle school (6th-8th grades) and 53.9% were in high school (9th-12th grades). Participants were equally divided by gender (46.8% boys, 53.2% girls). Approximately 71% of participants qualified for free or reduced-price school meals. The racial/ethnic backgrounds of the participants were as follows: 29.0% African American or Black, 18.9% white, 19.9% Asian American, 16.9% Hispanic, 3.7% Native American, and 11.6% mixed or other.

Trained research staff administered surveys and measured adolescents' height and weight at school. Measurements were completed in a private area and surveys were administered during two 50-minute class periods. All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the research boards of the participating school districts. Adolescents were not given the opportunity to assent if their parent/guardian returned a signed letter indicating refusal to have their child participate. Among adolescents who were at school on the days of survey administration, 96.3% were given the opportunity to assent and chose to participate.

### Survey Development and Measures

The EAT 2010 survey is a 235-item, self-report instrument assessing a range of factors of potential relevance to weight status and weight-related behaviors among adolescents. Survey development was guided by a review of previous Project EAT surveys<sup>20, 21</sup> to identify the most salient items; the study's theoretical framework;<sup>22, 23</sup> review by a team of experts in the domains of nutrition, physical activity, adolescent development, body image, and family relations; and extensive pilot testing with adolescents. The test-retest reliability of measures over a one-week period was examined in a diverse sample of 129 middle school and high school students.

**Family meals**—Frequency of having a family meal at breakfast was assessed on the EAT 2010 survey with the question: “During the past seven days, how many times did all, or most, of your family living in your house eat breakfast together?” (Test-retest  $r=0.60$ ). A

similar question was used to assess how often adolescents had a family meal at dinner (Test-retest  $r=0.76$ ). Response categories for each question were “zero days,” “one to two days,” “three to four days,” “five to six days,” and “seven days”. To allow for comparison of mean meal frequencies, the number of meals was assigned a score of 0.0, 1.5, 3.5, 5.5, or 7 to correspond to the five possible responses.

**Dietary intake**—Past year, usual dietary intake was assessed with the semi-quantitative Youth and Adolescent FFQ.<sup>24</sup> Daily servings of fruit (excluding juice), vegetables (excluding potatoes), milk products, whole grains, and sugar-sweetened beverages were examined. A daily serving was defined as the equivalent of one-half cup for fruit and vegetables, 16 g for whole grains, and one cup for milk products. For sugar-sweetened beverages, a serving was defined as the equivalent of one glass, bottle, or can. In addition, the FFQ was used to assess daily consumption of total energy; percentages of energy from total fat and saturated fat; fiber; and micronutrients. Dietary intake outcomes were selected for consideration with an emphasis on foods and nutrients identified to be of public health concern in the Dietary Guidelines for Americans, 2010.<sup>25</sup> Nutrient intakes were determined in 2010 by the Nutrition Questionnaire Service Center at the Harvard School of Public Health using a specially designed database, primarily based on the United States Department of Agriculture's Nutrient Database for Standard Reference (release 19).<sup>26</sup> Intakes of foods and nutrients were respectively compared to intakes recommended in the Dietary Guidelines for Americans<sup>25</sup> and the Institute of Medicine's Dietary Reference Intakes.<sup>27-30</sup> Previous studies have examined and reported on the reliability and validity of intake estimates.<sup>24, 31</sup> Responses to the FFQ were excluded for 123 participants that reported a biologically implausible level of total energy intake ( $<400$  kcal/day or  $>7,000$  kcal/day).

**Weight Status**—Research staff measured adolescents' height and weight following standardized procedures.<sup>32</sup> Students were first asked to remove shoes, outerwear (e.g., heavy sweaters), and other items (e.g., wallets, cell phones) from their pockets. Height was assessed to the nearest 0.1 cm using a Shorr Board (Weight and Measure LLC, Olney, MD) and weight to the nearest 0.1 kg using a calibrated scale. Body mass index (BMI) values were calculated and sex- and age-specific cutoff points were used to classify respondents as overweight/obese ( $>85$ th percentile) based on reference data from the Centers for Disease Control and Prevention growth tables.<sup>33</sup>

**Family Environment**—Two measures of the overall family environment, family functioning and cohesiveness, were included as covariates in analytic models where a measure of dietary intake or weight status was the outcome of interest as these factors have previously been associated with family meal frequency and dietary intake.<sup>34, 35</sup> Family functioning was assessed using six items drawn from the general functioning scale of the Family Assessment Device that captures structural and organizational properties of the family group and patterns of transactions, including problem solving, communication, roles, affective responsiveness, affective involvement, and behavior control among family members.<sup>36-38</sup> The range of responses for this scale was 6-24, with higher scores representing higher family functioning (Cronbach's  $\alpha = 0.70$ ). To assess family cohesiveness, adolescents were asked the following questions separately for mothers and fathers:<sup>39, 40</sup> (1) “How much do you feel your mother/father cares about you?” and (2) “How much do you feel you can talk to your mother/father about your problems?”. Both questions had response options ranging from “not at all” to “very much” on a 5-point scale. Adolescents' responses to these two questions were summed together for each parent and averaged when adolescents responded about both parents (range=4-20, Cronbach's  $\alpha = 0.67$ , Test-retest  $r=0.68$ ).

**Physical activity**—Weekly hours of moderate-to-vigorous physical activity (Test-retest  $r=0.73$ ) was also examined as a covariate in analytic models where weight status was the outcome of interest. Items on the EAT 2010 survey individually assessed strenuous and moderate activity using questions adapted from the widely used Godin Leisure-Time Exercise Questionnaire.<sup>41</sup> Examples of specific activities were given after each question.

**Sociodemographic characteristics**—Sociodemographic characteristics were self-reported and included sex, age, race/ethnicity, socioeconomic status (SES), and household structure. Race/ethnicity was assessed with the question: “Do you think of yourself as...? 1) White, 2) Black or African American, 3) Hispanic or Latino, 4) Asian American, 5) Native Hawaiian or Pacific Islander, 6) American Indian or Native American, or 7) Other” (Test-retest agreement = 98-100%). Since very few adolescents reported “Hawaiian or Pacific Islander” they were coded as “mixed/other”. SES was determined primarily using the higher education level of either parent (range: 1-5, test-retest  $r=0.90$ ). To address possible misclassification of participants facing economic distress as high SES based on parental education, an algorithm was developed that also took into account family eligibility for public assistance, eligibility for free or reduced-price school meals, and parental employment status.<sup>42, 43</sup> Household structure was assessed with the question: “Which adults do you live with?” Participants were instructed to select all applicable categories from the following response options “my mother,” “my father,” “sometimes with my mother, sometimes with my father (they have separate homes),” “stepmother,” “stepfather,” “my grandparents,” “other relatives,” and “an adult or adults I am not related to (other than stepparents)” (Test-retest agreement = 91-100%).

### Statistical Analysis

To assess unadjusted and adjusted associations of family meal patterns (breakfast frequency, dinner frequency) with sociodemographic characteristics, descriptive statistics and regression models were examined respectively. Multinomial regression models were used to estimate the adjusted frequency for each category of family meal; models included sex, school level, race/ethnicity, household structure, and SES. A Spearman's correlation showed there was a moderately strong correlation ( $r=0.42$ ) between frequency of eating breakfast together and frequency of eating dinner together over the past week. Therefore, all regression models used to examine associations between family breakfast frequency and the outcomes of interest accounted for frequency for eating dinner together. Two sets of regression analyses were conducted in examining associations for each of the outcomes. Model 1 accounted for sociodemographic factors, family dinner frequency, and family environment. For nutrition outcomes assessed by the FFQ, Model 2 additionally accounted for total energy intake using the nutrient density approach;<sup>44</sup> however, only means from the first model were included here as these values representing total daily intake were more readily comparable to recommended Dietary Reference Intakes for adolescents. For examining associations with weight status, Model 2 included usual weekly hours of moderate-to-vigorous physical activity as a proxy for energy expenditure. Separate regression models that included family meal frequency as a continuous variable were used to test for linear trends. A 95% confidence level was used to interpret the statistical significance of probability tests, corresponding to  $P$ value $<0.05$ . Additional regression models were fit to test for interactions by race/ethnicity and SES but none were identified and thus these models are not further discussed. All analyses were conducted using the Stata (version 12.1, 2012, StataCorp, College Station, TX).

## RESULTS

### Frequency of Eating Together at Breakfast and Dinner

On average, adolescents reported eating together with “all or most” of their family 1.5 times (SD=2.1) at breakfast and 4.1 times (SD=2.6) at dinner in the past week. Frequency of eating breakfast together over the past week was as follows: never (53.0%, n=1,450), one or two times (26.2%, n=718), three to six times (12.9%, n=352), and seven times (7.9%, n=217). Frequency of eating dinner together over the past week was more common: never (14.4%, n=395), one or two times (17.8%, n=487), three to six times (35.9%, n=981), and seven times (31.9%, n=872).

### Frequency of Eating Together by Sociodemographic Characteristics

Frequencies of eating together at breakfast (Table 1) and at dinner (Table 2) were compared across sociodemographic characteristics. Differences in the frequency of eating together were found by adolescent sex, school level, race/ethnicity, household structure, and socioeconomic status. Boys reported more family meals at breakfast than girls, but the frequency of family meals at dinner was similar for boys and girls. Middle school students also reported more family meals at breakfast and at dinner than high school students. There were racial/ethnic differences in the frequency of family meals at breakfast, with the highest frequencies reported by adolescents of Black, Hispanic, Native American, and mixed race/ethnicity. In comparison to other household structures, adolescents living in households with two parents in the same home tended to report the highest frequency of eating together at breakfast and dinner. SES was positively associated with frequency of eating together at dinner.

### Adolescents' Dietary Intake by Frequency of Family Meals at Breakfast

Models accounting for sociodemographic characteristics, family environment, and family dinner frequency (Table 3, Model 1) showed the frequency of eating together at breakfast was positively associated with intakes of fruit, vegetables, milk products, whole grains, total daily energy (kcal), calcium, iron, vitamin D, folate, potassium, and fiber. For example, compared to adolescents who never had a family breakfast, those adolescents who reported seven family breakfasts in the past week consumed an average of 0.37 additional daily fruit servings. Intakes of fruit, whole grains, and fiber continued to be significantly associated with family breakfast frequency after additionally accounting for total energy intake (Table 3, Model 2), and an inverse association with intake of sugar-sweetened beverages became statistically significant.

### Adolescents' Weight Status by Frequency of Family Meals at Breakfast

Associations between the frequency of eating together at breakfast and weight status were similar in models adjusted for sociodemographic characteristics and family environment (Model 1), and additionally adjusted for weekly hours of moderate-to-vigorous physical activity (Model 2). Therefore, only the results from Model 2 are presented here in detail (Table 3). A lower prevalence of overweight/obesity was observed among adolescents who reported eating together with their family at breakfast. Statistically significant differences in overweight/obesity prevalence were found for having family breakfasts at a frequency of one to two ( $P$ value=0.001) or seven ( $P$ value=0.005) times in the past week compared to never eating together.

## DISCUSSION

This study described patterns of eating family meals at breakfast and dinner as well as associations with nutrition outcomes and weight status among a population of adolescents

from diverse sociodemographic backgrounds. The results suggest that, on average, family breakfast meals occur less often than family dinners (1.5 breakfast meals versus 4.1 dinner meals per week) but participation in family meals was found to vary widely according to sociodemographics. Participation in more frequent family breakfast meals was associated with several markers of better diet quality and lower risk for overweight/obesity. These associations were observed while accounting for the structural and organizational properties of the family group, family cohesiveness, and family dinner frequency, suggesting that for most families when it is not always possible to eat dinner together that coming together for other meals such as breakfast may also provide benefits for dietary intake and weight status.

The findings build on what has already been learned from previous studies regarding sociodemographic differences in the frequency of family meals.<sup>1, 5, 9, 11, 12, 14, 45</sup> In line with this previous research focused on the overall frequency of family meals or sharing the evening meal, the current study found that frequency of family dinners was significantly higher among adolescents in middle school than among those in high school and positively associated with SES. While no significant difference in the frequency of family dinner was found according to adolescent sex, results showed that boys tended to report more family breakfast meals than girls. This observation aligns with research on the overall frequency of family meals and one other study among adolescents which reported a slightly higher percentage of boys (49%) than girls (46%) ate breakfast with family member(s) on the previous day.<sup>46</sup> In contrast to some prior research, family dinner frequency was not found to differ according to racial/ethnic background but adolescents of Black, Hispanic, Native American, and mixed race/ethnicity reported more frequent family breakfast meals than white and Asian youth.<sup>14, 45, 47</sup> The results of the current study further add to the very limited existing knowledge regarding how family meal frequency may be influenced by challenges faced by single-parent households.<sup>14, 48</sup>

Similar to other research that has examined relationships between overall family meal frequency or the frequency of sharing the evening meal<sup>1, 5, 7, 8</sup> with nutrition outcomes and weight status, the current study found that the frequency of families eating together at breakfast is, in general, associated with better outcomes for young people. The findings help to fill an important gap in the literature as only two previous studies, one in Latino elementary school children and one in Canadian adolescents, were found to have examined similar relationships in regards to nutrition outcomes and only one of these studies addressed weight status. Results from the study among 794 Latino children in San Diego, CA demonstrated that children who ate breakfast with their families at least four times per week were more likely to frequently consume fruit and vegetables.<sup>49</sup> Likewise, results from the study among 1,288 students in grades 6-8 at schools in Ontario, Canada showed that eating breakfast with one or more family members on the previous day was associated with a higher diet quality score but unrelated to weight status.<sup>46</sup>

Certain strengths and limitations are important to consider in drawing conclusions from this study. Strengths of this study included the large and diverse population-based sample, collection of measured heights and weights, and ability to account for both family dinner frequency and measures of the overall family environment. The comprehensive examination of usual dietary intake using a validated FFQ was another study strength;<sup>24, 31</sup> however, the tool did not specifically allow for investigation of the types of foods and beverages consumed at family meals or at different times of the day. Some misclassification may have influenced the results due to a difference between the time period referenced in the measure of family meals (past week) and the period referenced in the FFQ (past year). Although the survey separately assessed frequency of eating meals together with all or most other household members at breakfast and dinner, no additional information was collected to allow for further investigation of variation in which members were involved in preparing or

purchasing meals, which members participated in meals, or the mealtime environment at different times of the day. Because of the correlation between family breakfast frequency and overall breakfast frequency, we were unable to account for overall frequency in examining associations of family breakfast frequency with adolescent outcomes; it is possible that part of the observed benefits reported here can be attributed to the role of the family in providing social support to eat breakfast. Finally, it is possible that frequency of family breakfast meals is a marker of some other factor that was not fully accounted for in the analysis and that may be more predictive of adolescent outcomes.

## CONCLUSIONS

The study results indicate that family breakfast meals contribute to the shared mealtime experiences of many adolescents. Additionally, the results suggest that adolescents who more frequently eat breakfast together with their family generally experience better nutrition and weight outcomes. Food and nutrition professionals should work with families of adolescents to overcome barriers to eating together and consider encouraging parents to share breakfast meals with their children when sharing the evening meal is not possible due to conflicting commitments or schedules. In addition, food and nutrition professionals can play a role at the community level by helping businesses, schools, and other organizations in making changes to reduce barriers to family meals (e.g., scheduling events and allowing flexible schedules so that families can eat breakfast or dinner together). Eating together as a family at breakfast may also further benefit young people who regularly eat the evening meal with their families, and parents should therefore be provided with supports for addressing challenges such as lack of time, food insecurity, and food preparation skills. There is a particular need for messages regarding family breakfasts to be targeted to the families of adolescent girls, high school-aged youth, and youth of white and Asian racial/ethnic backgrounds.

Future studies in adolescent populations will be needed to confirm the results described here and also to develop a better understanding of mealtime factors (e.g., meal location, total time spent eating, time spent talking versus using media, adolescent involvement in food preparation) that may vary according to time of day. In addition, research should be conducted to build on what is known about family mealtime environments among adolescents with diverse living arrangements. Little previous research has explored variation in mealtime environments despite some initial evidence that factors such as where food is purchased, by whom it is prepared, and where it is served may be related to diet quality.<sup>50</sup> Qualitative work may be useful for exploring what factors enable households headed by a single mother or father to more frequently eat meals together as a family. Finally, given the observation that frequency of family breakfast meals was associated with nutritional benefits, further research should be conducted to investigate associations with other outcomes previously linked to overall family meal frequency, including disordered eating behaviors, school performance, and better psychosocial health.<sup>51</sup>

## Acknowledgments

### FUNDING/SUPPORT DISCLOSURE

This study was supported by Grant Number R01HL084064 from the National Heart, Lung, and Blood Institute (PI: *Blinded for peer review*). The content of this manuscript is solely the responsibility of the authors and does not necessarily represent the official views of the National Heart, Lung, and Blood Institute or the National Institutes of Health.



## References

1. Gillman M, Rifas-Shiman S, Frazier A, et al. Family dinner and diet quality among older children and adolescents. *Arch Fam Med*. 2000; 9(3):235–240. [PubMed: 10728109]
2. Neumark-Sztainer D, Hannan PJ, Story M, Croll J, Perry C. Family meal patterns: associations with sociodemographic characteristics and improved dietary intake among adolescents. *J Am Diet Assoc*. 2003; 103(3):317–322. [PubMed: 12616252]
3. Videon T, Manning C. Influences on adolescent eating patterns: The importance of family meals. *J Adolesc Health*. 2003; 32(5):365–373. [PubMed: 12729986]
4. Mamun A, Lawlor D, O'Callaghan M, Williams G, Najman J. Positive maternal attitude to the family eating together decreases the risk of adolescent overweight. *Obes Res*. 2005; 13(8):1422–1430. [PubMed: 16129725]
5. Utter J, Scragg R, Schaaf D, Mhurchu C. Relationships between frequency of family meals, BMI and nutritional aspects of the home food environments among New Zealand adolescents. *Int J Behav Nutr Phys Act*. 2008; 5:50. [PubMed: 18947431]
6. Burgess-Champoux T, Larson N, Neumark-Sztainer D, Hannan P. Are family meal patterns associated with overall diet quality during the transition from early to middle adolescence? *J Nutr Educ Behav*. 2009; 41(2):79–86. [PubMed: 19304252]
7. Fulkerson J, Kubik M, Story M, Lytle L, Arcan C. Are there nutritional and other benefits associated with family meals among at-risk youth? *J Adolesc Health*. 2009; 45(4):389–395. [PubMed: 19766944]
8. Woodruff S, Hanning R. Associations between family dinner frequency and specific food behaviors among grade six, seven, and eight students from Ontario and Nova Scotia. *J Adolesc Health*. 2009; 44(5):431–436. [PubMed: 19380089]
9. Utter J, Denny S, Robinson E, Fleming T, Ameratunga S, Grant S. Family meals among New Zealand young people: relationships with eating behaviors and body mass index. *J Nutr Educ Behav*. 2013; 45(1):3–11. [PubMed: 23110750]
10. Lehto R, Ray C, Roos E. Longitudinal associations between family characteristics and measures of childhood obesity. *Int J Public Health*. 2012; 57(3):495–503. [PubMed: 21814847]
11. Goldfield G, Murray M, Buchholz A, et al. Family meals and body mass index among adolescents: effects of gender. *Appl Physiol Nutr Metab*. 2011; 36(4):539–546. [PubMed: 21851205]
12. Yuasa K, Sei M, Takeda E, et al. Effects of lifestyle habits and eating meals together with the family on the prevalence of obesity among school children in Tokushima, Japan: a cross-sectional questionnaire-based survey. *J Med Invest*. 2008; 55:71–77. [PubMed: 18319548]
13. Fulkerson J, Neumark-Sztainer D, Hannan P, Story M. Family meal frequency and weight status among adolescents: cross-sectional and 5-year longitudinal associations. *Obesity*. 2008; 16(11):2529–2534. [PubMed: 18719674]
14. Sen B. Frequency of family dinner and adolescent body weight status: Evidence from the National Longitudinal Survey of Youth, 1997. *Obesity*. 2006; 14(12):2266–2276. [PubMed: 17189555]
15. Gundersen C, Lohman B, Eisenmann J, Garasky S, Stewart S. Child-specific food insecurity and overweight are not associated in a sample of 10- to 15-year old low-income youth. *J Nutr*. 2008; 138(2):371–378. [PubMed: 18203906]
16. Neumark-Sztainer D, Wall M, Fulkerson J, Larson N. Changes in the frequency of family meals from 1999–2010 in the homes of adolescents: trends by sociodemographic characteristics. *J Adolesc Health*. 2013; 52(2):201–206. [PubMed: 23332485]
17. Fulkerson JA, Neumark-Sztainer D, Story M. Adolescent and parent views of family meals. *J Am Diet Assoc*. 2006; 106(4):526–532. [PubMed: 16567147]
18. Boutelle K, Birnbaum A, Lytle L, Murray D, Story M. Associations between perceived family meal environment and parent intake of fruit, vegetables, and fat. *J Nutr Educ Behav*. 2003; 35(1):24–29. [PubMed: 12588677]
19. Neumark-Sztainer D, Wall M, Eisenberg ME, Story M, Hannan PJ. Overweight status and weight control behaviors in adolescents: longitudinal and secular trends from 1999 to 2004. *Prev Med*. 2006; 43(1):52–59. [PubMed: 16697035]

20. Neumark-Sztainer D, Story M, Perry C, Casey M. Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. *J Am Diet Assoc.* 1999; 99(8):929–937. [PubMed: 10450307]
21. Neumark-Sztainer D, Croll J, Story M, Hannan PJ, French SA, Perry C. Ethnic/racial differences in weight-related concerns and behaviors among adolescent girls and boys: findings from Project EAT. *J Psychosom Res.* 2002; 53(5):963–974. [PubMed: 12445586]
22. Bandura, A. *Social foundations of thought and action: A social cognitive theory.* Prentice-Hall; Englewood Cliffs, NJ: 1986.
23. Sallis, J.; Owen, N.; Fisher, E. Ecological models of health behavior.. In: Glanz, K.; Rimer, B.; Viswanath, K., editors. *Health Behavior and Health Education: Theory, Research, and Practice.* 4th ed.. Jossey-Bass; San Francisco: 2008. p. 465-485.
24. Rockett H, Wolf A, Colditz G. Development and reproducibility of a food frequency questionnaire to assess diets of older children and adolescents. *J Am Diet Assoc.* 1995; 95(3):336–340. [PubMed: 7860946]
25. U.S. Department of Agriculture. U.S. Department of Health and Human Services. [March 30, 2013] Dietary guidelines for Americans. 2010. [Online]. 2011; <http://www.health.gov/dietaryguidelines/>.
26. U.S. Department of Agriculture. Agricultural Research Service. [March 30, 2013] USDA National Nutrient Database for Standard Reference, Release 19. Nutrient Data Laboratory Home Page. [Online]. <http://www.ars.usda.gov/Services/docs.htm?docid=15973>.
27. Institute of Medicine. *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline.* National Academy Press; Washington, D.C.: 1998.
28. Institute of Medicine. *Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc.* National Academy Press; Washington, D.C.: 2001.
29. Ross, A.; Taylor, C.; Yaktine, A.; Del Valle, HB. *Dietary reference intakes for calcium and vitamin D.* National Academy Press; Washington, D.C.: 2010. Committee to Review Dietary Reference intakes for vitamin D and calcium, Institute of Medicine..
30. Institute of Medicine. *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients).* National Academy Press; Washington, D.C.: 2005. Food and Nutrition Board..
31. Rockett H, Breitenbach M, Frazier A, et al. Validation of a youth/adolescent food frequency questionnaire. *Prev Med.* 1997; 26(6):808–816. [PubMed: 9388792]
32. Gibson, R. *Principles of Nutritional Assessment.* Oxford University Press; New York, NY: 1990.
33. Kuczmarski R, Ogden C, Grummer-Strawn L, et al. CDC growth charts: United States. *Adv Data.* 2000; 314:1–27. [PubMed: 11183293]
34. Berge J, Wall M, Larson N, Loth K, Neumark-Sztainer D. Family functioning: associations with weight status, eating behaviors, and physical activity in adolescents. *J Adolesc Health.* 2013; 52(3):351–357. [PubMed: 23299010]
35. Neumark-Sztainer D, Story M, Resnick MD, Blum RW. Correlates of inadequate fruit and vegetable consumption among adolescents. *Prev Med.* 1996; 25(5):497–505. [PubMed: 8888316]
36. Epstein NB, Baldwin LM, Bishop DS. The McMaster Family Assessment Device. *Journal of Marital and Family Therapy.* 1983; 9(2):171–180.
37. Miller IW, Epstein NB, Bishop DS, Keitner GI. The McMaster Family Assessment Device: Reliability and validity. *Journal of Marital and Family Therapy.* 1985; 11:345–356.
38. Berge J, Wall M, Larson N, Eisenberg M, Loth K, Neumark-Sztainer D. The unique and additive associations of family functioning and parenting practices with disordered eating behaviors in diverse adolescents. *J Behav Med.* 2012 Epub ahead of print.
39. Blum RW, McKay C, Resnick MD. *Adolescent Health Database Project: The state of adolescent health in Minnesota.* 1989
40. Resnick MD, Harris LJ, Blum RW. The impact of caring and connectedness on adolescent health and well-being. *Journal of Paediatric and Child Health.* 1993; 29(Suppl 1):S3–S9.

41. Godin G, Shephard R. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci.* 1985; 10(3):141–146. [PubMed: 4053261]
42. Sherwood NE, Wall M, Neumark-Sztainer D, Story M. Effect of socioeconomic status on weight change patterns in adolescents. *Prev Chronic Dis.* 2009; 6(1):A19. [http://www.cdc.gov/pcd/issues/2009/jan/07\\_0226.htm](http://www.cdc.gov/pcd/issues/2009/jan/07_0226.htm). [PubMed: 19080025]
43. Neumark-Sztainer D, Story M, Hannan PJ, Croll J. Overweight status and eating patterns among adolescents: Where do youth stand in comparison to the Healthy People 2010 Objectives? *Am J Public Health.* 2002; 92(5):844–851. [PubMed: 11988458]
44. Willett WC, Howe GR, Kushi LH. Adjustment for total energy intake in epidemiologic studies. *Am J Clin Nutr.* 1997; 65(4 Suppl):1220S–1228S. [PubMed: 9094926]
45. Neumark-Sztainer D, Hannan P, Story M, Croll J, Perry C. Family meal patterns: Associations with sociodemographic characteristics and improved dietary intake among adolescents. *J Am Diet Assoc.* 2003; 103(3):317–322. [PubMed: 12616252]
46. Woodruff S, Hanning R, McGoldrick K, Brown K. Healthy eating index-C is positively associated with family dinner frequency among students in grades 6-8 from Southern Ontario, Canada. *Eur J Clin Nutr.* 2010; 64(5):454–460. [PubMed: 20197788]
47. Fulkerson J, Story M, Mellin A, Leffert N, Neumark-Sztainer D, French S. Family dinner meal frequency and adolescent development: Relationships with developmental assets and high-risk behaviors. *J Adolesc Health.* 2006; 39(3):337–345. [PubMed: 16919794]
48. Fulkerson J, Pasch K, Stigler M, Frabakhsh K, Perry C, Komro K. Longitudinal associations between family dinner and adolescent perceptions of parent-child communication among racially-diverse urban youth. *J Fam Psychol.* 2010; 24(3):261–270. [PubMed: 20545399]
49. Andaya A, Arredondo E, Alcaraz J, Lindsay P, Elder J. The association between family meals, TV viewing during meals, and fruit, vegetables, soda, and chips intake among Latino children. *J Nutr Educ Behav.* 2011; 43(5):308–315. [PubMed: 20965787]
50. Woodruff S, Hanning R. Effect of meal environment on diet quality rating. *Can J Diet Pract Res.* 2009; 70(3):118–124. [PubMed: 19709467]
51. Neumark-Sztainer D, Larson N, Fulkerson J, Eisenberg M, Story M. Family meals and adolescents: What have we learned from Project EAT (Eating Among Teens)? *Public Health Nutr.* 2010; 13(7):1113–1121. [PubMed: 20144257]

**Table 1**  
Frequency of eating *breakfast together* as a family in the past week by sociodemographic characteristics

	N	Frequency of family breakfast meals <sup>a, b</sup>				Mean frequency <sup>a, b</sup>	SE <sup>c</sup>	Adjusted P value <sup>d</sup>
		Never (%)	1-2 times (%)	3-6 times (%)	7 times (%)			
<b>Overall</b>	2737	53.0	26.2	12.9	7.9	1.5	2.1	<0.001
<b>Sex</b>								
Boys	1273	47.7 <sup>x</sup>	28.2 <sup>x</sup>	15.5 <sup>x</sup>	8.6 <sup>x</sup>	1.6 <sup>x</sup>	0.1	
Girls	1464	58.0 <sup>y</sup>	24.3 <sup>y</sup>	10.6 <sup>y</sup>	7.1 <sup>x</sup>	1.3 <sup>y</sup>	0.1	
<b>School level</b>								<0.001
Middle school	1261	48.8 <sup>x</sup>	27.3 <sup>x</sup>	14.1 <sup>x</sup>	9.8 <sup>x</sup>	1.7 <sup>x</sup>	0.1	
High school	1472	57.0 <sup>y</sup>	25.1 <sup>x</sup>	11.8 <sup>x</sup>	6.1 <sup>y</sup>	1.3 <sup>y</sup>	0.1	
<b>Race/ethnicity</b>								<0.001
White	516	61.0 <sup>z</sup>	26.4 <sup>x</sup>	7.4 <sup>x</sup>	5.1 <sup>x</sup>	1.1 <sup>x</sup>	0.2	
Black	785	49.6 <sup>x</sup>	25.2 <sup>x</sup>	15.3 <sup>y</sup>	9.8 <sup>y</sup>	1.7 <sup>y</sup>	0.1	
Hispanic	464	48.7 <sup>x</sup>	28.5 <sup>x</sup>	14.7 <sup>y</sup>	8.1 <sup>x, y</sup>	1.6 <sup>y</sup>	0.2	
Asian	552	56.7 <sup>x, z</sup>	26.0 <sup>x</sup>	11.8 <sup>y</sup>	5.4 <sup>x</sup>	1.2 <sup>x</sup>	0.2	
Native American	101	49.7 <sup>x, y</sup>	23.9 <sup>x</sup>	13.3 <sup>x, y</sup>	13.1 <sup>y</sup>	1.8 <sup>y</sup>	0.2	
Mixed/other	310	51.3 <sup>x, y</sup>	24.8 <sup>x</sup>	14.4 <sup>y</sup>	9.5 <sup>y</sup>	1.6 <sup>y</sup>	0.1	0.01
<b>Household structure</b>								
Two parents in same home	1495	51.1 <sup>x</sup>	26.8 <sup>x</sup>	12.4 <sup>x</sup>	9.8 <sup>y</sup>	1.6 <sup>y</sup>	0.1	
Two parents in separate homes	204	57.3 <sup>x, y</sup>	26.0 <sup>x</sup>	13.2 <sup>x</sup>	3.6 <sup>x</sup>	1.2 <sup>x</sup>	0.1	
Single mother	764	56.0 <sup>y</sup>	24.9 <sup>x</sup>	13.2 <sup>x</sup>	5.9 <sup>x</sup>	1.3 <sup>x</sup>	0.1	
Single father	82	61.8 <sup>x, y</sup>	19.0 <sup>x</sup>	12.1 <sup>x</sup>	7.0 <sup>x, y</sup>	1.3 <sup>x, y</sup>	0.2	
Other adult(s)	188	51.3 <sup>x, y</sup>	28.3 <sup>x</sup>	14.2 <sup>x</sup>	6.1 <sup>x, y</sup>	1.4 <sup>x, y</sup>	0.1	0.05
<b>Socioeconomic status</b>								
Low	1063	51.1 <sup>x</sup>	26.3 <sup>x</sup>	13.8 <sup>x</sup>	8.7 <sup>y</sup>	1.6 <sup>y</sup>	0.1	
Lower middle	586	52.7 <sup>x, y</sup>	26.9 <sup>x</sup>	11.9 <sup>x</sup>	8.5 <sup>x, y</sup>	1.5 <sup>y</sup>	0.1	
Middle	464	57.7 <sup>y</sup>	25.4 <sup>x</sup>	11.2 <sup>x</sup>	5.7 <sup>x</sup>	1.2 <sup>x</sup>	0.1	
Upper middle	346	54.7 <sup>x, y</sup>	26.1 <sup>x</sup>	13.9 <sup>x</sup>	5.3 <sup>x</sup>	1.3 <sup>x, y</sup>	0.1	
High	199	54.3 <sup>x, y</sup>	24.2 <sup>x</sup>	12.0 <sup>x</sup>	9.5 <sup>x, y</sup>	1.5 <sup>x, y</sup>	0.1	

<sup>a</sup>Estimates and *P* values are mutually adjusted for sociodemographic characteristics (sex, school level, race/ethnicity, household structure, and socioeconomic status)

<sup>b</sup>Different superscript letters (x,y,z) within columns indicate statistically significant differences.

<sup>c</sup>SE=standard error

**Table 2**  
 Frequency of eating *dinner together* as a family in the past week by sociodemographic characteristics

	N	Frequency of family dinner meals <sup>a, b</sup>					Mean frequency <sup>a, b</sup>	SE <sup>c</sup>	Adjusted P value <sup>d</sup>
		Never (%)	1-2 times (%)	3-6 times (%)	7 times (%)	4.1			
<b>Overall</b>	2735	14.4	17.8	35.9	31.9	4.1	2.6		
<b>Sex</b>								0.11	
Boys	1267	13.4 <sup>x</sup>	16.3 <sup>x</sup>	38.1 <sup>x</sup>	32.2 <sup>x</sup>	4.2 <sup>x</sup>	0.1		
Girls	1468	15.1 <sup>x</sup>	19.3 <sup>y</sup>	34.5 <sup>x</sup>	31.1 <sup>x</sup>	4.0 <sup>x</sup>	0.1		
<b>School level</b>								<0.001	
Middle school	1258	12.2 <sup>x</sup>	16.3 <sup>x</sup>	33.1 <sup>x</sup>	38.4 <sup>x</sup>	4.5 <sup>x</sup>	0.1		
High school	1473	16.0 <sup>y</sup>	19.2 <sup>x</sup>	38.7 <sup>y</sup>	26.0 <sup>y</sup>	3.8 <sup>y</sup>	0.1		
<b>Race/ethnicity</b>								0.16	
White	517	14.0 <sup>x,y</sup>	15.7 <sup>x</sup>	41.6 <sup>z</sup>	28.6 <sup>x</sup>	4.1 <sup>x,y</sup>	0.1		
Black	781	17.2 <sup>y</sup>	19.3 <sup>x,y</sup>	30.9 <sup>x</sup>	32.6 <sup>x,y</sup>	3.9 <sup>x</sup>	0.1		
Hispanic	466	12.2 <sup>x</sup>	17.6 <sup>x,y</sup>	35.4 <sup>x,y,z</sup>	34.8 <sup>y</sup>	4.4 <sup>y</sup>	0.1		
Asian	553	10.3 <sup>x</sup>	20.8 <sup>y</sup>	38.7 <sup>y,z</sup>	30.2 <sup>x,y</sup>	4.1 <sup>x,y</sup>	0.3		
Native American	100	14.0 <sup>x,y</sup>	14.4 <sup>x,y</sup>	44.9 <sup>z</sup>	26.6 <sup>x,y</sup>	4.2 <sup>x,y</sup>	0.3		
Mixed/other	309	17.7 <sup>y</sup>	14.7 <sup>x</sup>	33.5 <sup>x,y</sup>	34.1 <sup>x,y</sup>	4.1 <sup>x,y</sup>	0.1	0.004	
<b>Household structure</b>									
Two parents in same home	1492	13.9 <sup>x</sup>	15.8 <sup>x</sup>	35.6 <sup>x</sup>	34.7 <sup>y</sup>	4.3 <sup>y</sup>	0.1		
Two parents in separate homes	206	10.7 <sup>x</sup>	20.5 <sup>x,y</sup>	39.8 <sup>x</sup>	4.2 <sup>x,y</sup>	4.2 <sup>x,y</sup>	0.2		
Single mother	764	15.0 <sup>x</sup>	21.5 <sup>y</sup>	36.4 <sup>x</sup>	27.1 <sup>x</sup>	3.8 <sup>x</sup>	0.1		
Single father	83	15.9 <sup>x</sup>	20.0 <sup>x,y</sup>	39.3 <sup>x</sup>	24.9 <sup>x,y</sup>	3.8 <sup>x,y</sup>	0.3		
Other adult(s)	186	17.5 <sup>x</sup>	17.0 <sup>x,y</sup>	34.7 <sup>x</sup>	30.8 <sup>x,y</sup>	4.0 <sup>x,y</sup>	0.2		
<b>Socioeconomic status</b>								<0.001	
Low	1066	16.6 <sup>y</sup>	18.3 <sup>y</sup>	35.0 <sup>x</sup>	30.0 <sup>x</sup>	3.9 <sup>x</sup>	0.1		
Lower middle	584	15.4 <sup>y</sup>	18.7 <sup>y</sup>	33.6 <sup>x</sup>	32.2 <sup>x</sup>	4.1 <sup>x</sup>	0.1		
Middle	464	14.7 <sup>y</sup>	18.6 <sup>y</sup>	36.3 <sup>x</sup>	30.4 <sup>x</sup>	4.1 <sup>x</sup>	0.1		
Upper middle	344	8.9 <sup>x</sup>	13.3 <sup>x</sup>	43.7 <sup>y</sup>	34.1 <sup>x</sup>	4.6 <sup>y</sup>	0.1		
High	197	6.9 <sup>x</sup>	19.8 <sup>x,y</sup>	36.3 <sup>x,y</sup>	37.0 <sup>x</sup>	4.7 <sup>y</sup>	0.2		

<sup>a</sup>Estimates and *P* values are mutually adjusted for sociodemographic characteristics (sex, school level, race/ethnicity, household structure, and socioeconomic status)

<sup>b</sup>Different superscript letters (x,y,z) within columns indicate statistically significant differences.

<sup>c</sup>SE=standard error

Table 3

Adolescents' adjusted mean (SE) daily food and nutrient intake and weight status by past week frequency of eating breakfast together as a family (n=2507)

	Never n=1353	Model 1 <sup>c</sup>			Model 2 <sup>b</sup>	
		1-2 times n=647	3-6 times n=321	7 times n=186	P trend <sup>c</sup>	P trend <sup>c</sup>
<b>Food intake(servings)</b>						
	DG <sup>d</sup>					
Fruit	2.0	1.21 (0.03)	1.26 (0.04)	1.60 (0.06)	1.57 (0.08)	<0.001
Vegetables	2.5	1.47 (0.04)	1.46 (0.06)	1.74 (0.08)	1.92 (0.11)	<0.001
Milk products	3.0	2.52 (0.05)	2.57 (0.07)	2.68 (0.10)	3.06 (0.14)	0.001
Whole grains	3.0	0.89 (0.03)	0.98 (0.04)	1.14 (0.06)	1.36 (0.08)	<0.001
Sugar-sweetened beverages	NA <sup>e</sup>	0.84 (0.03)	0.77 (0.04)	0.75 (0.05)	0.81 (0.07)	0.25
<b>Nutrient intake</b>						
	DRI <sup>f</sup>					
Energy (kcal)	NA	1817 (30)	1899 (42)	2096 (61)	2229 (82)	<0.001
Energy from fat (%)	25-35	30 (0)	30 (0)	30 (0)	30 (0)	0.12
Energy from saturated fat (%)	<10	11 (0)	11 (0)	10 (0)	11 (0)	0.21
Calcium (mg)	1300	925 (17)	958 (23)	1025 (34)	1154 (46)	<0.001
Iron (mg)	11-15	12.3 (0.2)	12.8 (0.3)	14.1 (0.4)	15.4 (0.6)	<0.001
Vitamin D (IU)	200	193 (4)	202 (6)	208 (9)	242 (12)	<0.001
Folate (mcg) <sup>g</sup>	400	556 (10)	583 (14)	631 (20)	697 (27)	<0.001
Potassium (mg)	4700	2479 (42)	2574 (58)	2882 (85)	3090 (115)	<0.001
Fiber (g)	26-38	14.5 (0.3)	15.2 (0.4)	17.8 (0.6)	19.0 (0.8)	<0.001
<b>Weight status</b>						
Overweight or obese (%)	NA	44 (1)	36 (2)	38 (3)	33 (3)	0.01

<sup>a</sup>Model 1 is adjusted for sex, school level, race/ethnicity, household structure, socioeconomic status, socioeconomic status, family dinner frequency, family functioning, and family cohesiveness

<sup>b</sup>For food and nutrient intake, Model 2 is adjusted for the covariates in Model 1 and total energy intake. For weight status, Model 2 is adjusted for the covariates in Model 1 and weekly hours of moderate-to-vigorous physical activity.

<sup>c</sup>P-value for linear trend across categories of family breakfast frequency

<sup>d</sup>DG=Dietary Guidelines for Americans 2010 recommended servings for a 2,000 kcalorie diet

<sup>e</sup>NA=not applicable



<sup>f</sup>DRI=Dietary Reference Intakes (DRI) for calcium, iron, and folate are Estimated Average Requirements. Reference value for fiber is an Adequate Intake. Ranges for iron and fiber reflect recommendations for boys and girls.

<sup>g</sup>As dietary folate equivalents