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## Associations of family meal frequency with family meal habits and meal preparation characteristics among families of youth with type 1 diabetes

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### Abstract

**Background**—While benefits of family mealtimes, such as improved dietary quality and increased family communication, have been well-documented in the general population, less is known about family meal habits that contribute to more frequent family meals in youth with type 1 diabetes.

**Methods**—This cross-sectional study surveyed 282 youth ages 8–18 years with type 1 diabetes and their parents on measures regarding diabetes-related and dietary behaviours. *T*-tests determined significant differences in youth's diet quality, adherence to diabetes management and glycaemic control between those with and without regular family meals (defined as ≥ 5 meals per week). Logistic regression analyses determined unadjusted and adjusted associations of age, socio-demographics, family meal habits, and family meal preparation characteristics with regular family meals.

**Results**—57% of parents reported having regular family meals. Families with regular family meals had significantly better diet quality as measured by the Healthy Eating Index ( $P < 0.05$ ) and the NRF9.3 ( $P < 0.01$ ), and adherence to diabetes management ( $P < 0.001$ ); the difference in glycaemic control approached statistical significance ( $P = 0.06$ ). Priority placed on, pleasant atmosphere and greater structure around family meals were each associated with regular family meals ( $P < 0.05$ ). Meals prepared at home were positively associated with regular family meals, while convenience and fast foods were negatively associated ( $P < 0.05$ ). Families in which at least one parent worked part-time or stayed at home were significantly more likely to have regular family meals than families in which both parents worked full-time ( $P < 0.05$ ). In the multivariate logistic regression model, greater parental priority given to family mealtimes ( $P < 0.001$ ) and

more home-prepared meals ( $P < 0.001$ ) predicted occurrence of regular family meals; adjusting for parent work status and other family meal habits.

**Conclusions**—Strategies for promoting families meals should not only highlight the benefits of family meals, but also facilitate parents' skills for and barriers to home-prepared meals.

### Keywords

adolescents; diabetes; family meals; nutrition

## Introduction

Consuming meals as a family is associated with multiple positive health outcomes, such as improved dietary quality, better weight management, decreased eating disorder risk, and improved family communication and support (Gillman & Frazier 2000; Neumark-Sztainer *et al.* 2004; Fulkerson *et al.* 2006b; Franko *et al.* 2008; Burgess-Champoux *et al.* 2009; Larson *et al.* 2009; Woodruff 2010; Hammons & Fiese 2011). Demographic characteristics, such as younger adolescents, part-time or stay-at-home parent, families with married parents and higher socio-economic status (SES), are associated with more frequent family meals (Gillman & Frazier 2000; Neumark-Sztainer *et al.* 2003, 2010; Burgess-Champoux *et al.* 2009; Sobal & Hanson 2011). While families report diverse practices regarding family meals, in general family meals are viewed positively by both parents and adolescents (Fulkerson *et al.* 2006a; Rovner *et al.* 2010).

Qualitative research has documented that youth with type 1 diabetes and their parents value family meals; however, the relation of demographic and behavioural characteristics with family meals has not been studied among these families (Rovner *et al.* 2010). Further, previous research has not addressed various characteristics of family meals, including the priority that families place on family meals, the atmosphere during family meals, and use of home-prepared versus prepackaged foods among youth with type 1 diabetes. Diet is a cornerstone of diabetes management (Bantle *et al.* 2008); however, it represents only one of the many demands diabetes management places on a family's time and resources. Given the benefits of family meals observed in the general population, it would be informative to examine factors that may promote the occurrence of family meals in this population. Hence, the purpose of this study was to examine associations of socio-demographic characteristics, family meal habits and meal preparation characteristics with the occurrence of regular family meals in families of youth with type 1 diabetes and the impact of regular family meals on overall dietary quality, diabetes management adherence and glycaemic control in youth with type 1 diabetes.

## Methods

### Sample and study design

Data were collected from children with type 1 diabetes and their parents participating in a cross-sectional study of daily diabetes management and lifestyle behaviours. Eligibility criteria for youth included age 8–18 years, diabetes duration ≥ 1 year, daily insulin dose ≥ 0.5 units per kilogram, absence of additional chronic illness or medication that would interfere

diabetes management or glucose metabolism including gastrointestinal conditions that may uniquely impact dietary habits, and ability to communicate in English. The study was approved by the Institutional Review Board. Written informed consent for parents and youth 18 years and assent for children <18 years were obtained. A total of 455 eligible youth and their parents were invited to participate; 302 youth from 291 families enrolled in the study. In families with multiple siblings enrolled; data from the sibling with the longest diabetes duration were retained. Of the 291 families, 282 completed survey measures.

### Family meal habits and family meal characteristics

Parental report of family meal habits was measured using the Family Eating Habits questionnaire, (Neumark-Sztainer *et al.* 2004, 2010; Fulkerson *et al.* 2006a), which consists of 14 items assessing the priority, atmosphere and structure for family meals. The questionnaire has been found to have adequate internal consistency and test-retest reliability (Neumark-Sztainer *et al.* 2004). Responses were given on a 4-point Likert scale (1 = strongly disagree to 4 = strongly agree) where higher scores indicated greater priority to family meals, more positive atmosphere at family meals, or greater rules and expectations regarding mealtime behaviour. Items assessing priority included questions on importance of family meals and making time in busy schedules for family meals (Cronbach's  $\alpha = 0.80$ ). Atmosphere items queried enjoyment and social aspects of family meals (Cronbach's  $\alpha = 0.84$ ). Questions on structure addressed rules at mealtime, manners and allowances for family members to choose foods other than those being served (Cronbach's  $\alpha = 0.59$ ).

Frequency of family meals was assessed by parent response to the question, 'In the past seven days, how many days did all or most of the family living in your home eat the main meal together?' with responses ranging from 0 to 7 days. Consistent with previous studies (Neumark-Sztainer *et al.* 2004; Fulkerson *et al.* 2006a; Burgess-Champoux *et al.* 2009), having regular family meals was defined as participating in 5 or more family meals per week. This categorization represented a median split in the current study. Characteristics of family meal preparation were assessed by parent responses to questions regarding the number of days in the prior week that the family's main meal of the day was (1) made at home 'from scratch' (not using pre-prepared foods), (2) made at home from pre-prepared, frozen or convenience foods, and (3) prepared at a restaurant, including fast food chains. Response options for each question ranged on a 7-point scale from 0 to 7 days.

### Dietary intake

The child's usual dietary intake was estimated using three-day food records. Children and parents were jointly provided with detailed instructions on how to accurately measure and report food and beverage intake, and were given a sample diet record. Families were instructed to keep records on three consecutive days in one week, including two weekdays and one weekend day, and were asked to use measuring utensils at home, or if away from home, to provide their best estimate of portion size. Families were reminded to provide all specific details for each food item, including names of brands or restaurants and specific item labelling (e.g. low fat, 1% milk) and to leave no blank fields on the form. Research staff reviewed the completed records upon receipt from the family to ensure completeness, and solicited missing information (e.g. brand names) from the family as needed. Nutrition

Data System for Research software (NDSR; Nutrition Coordinating Center, University of Minnesota, Minneapolis, MN) was used to analyse the records. The Healthy Eating Index 2005 measures conformance to the 2005 Dietary Guidelines for Americans (DGA) and is an indicator of diet quality (Guenther *et al.* 2007). Dietary nutrient density also was measured using the Nutrient Rich Foods Index (NRF9.3), which is based on 9 nutrients to encourage (protein, fibre, vitamin A, vitamin C, vitamin E, calcium, iron, magnesium and potassium) and 3 nutrients to limit (saturated fat, added sugar and sodium), and calculated for intake from food (not including dietary supplements) relative to energy intake (Fulgoni *et al.* 2009).

### Socio-demographic and diabetes characteristics

Demographic characteristics included child age and race/ethnicity, family income, family structure, parent(s) work status, and highest attained parent education. Age was categorized as 8.0–12.9 years and 13.0–18.0 years in order to consider children and early adolescents versus older adolescents. Race/ethnicity was classified as White, Black, Hispanic and other. SES was based on household poverty income ratio and calculated using self-reported income, household size and the 2008 federal poverty thresholds (US Census Bureau 2010). Lower scores represent lower incomes relative to the poverty level (adjusted for household size and composition, and inflation).

Biomedical data including diabetes duration, insulin regimen and glycated haemoglobin (HbA1c, reference range 4–6% or 20–42 mmol/mol) were obtained from the electronic medical record. Adherence to diabetes management was reported by parents using the Diabetes Management Questionnaire, a 20-item measure that has shown good psychometric properties and associations with HbA1c and other relevant diabetes management behaviours (Mehta *et al.* 2010).

### Statistical analyses

Descriptive statistics (e.g. mean, standard deviation, frequency) for all socio-demographic characteristics and scale scores were computed. *T*-tests were calculated to determine associations between the occurrence of regular family meals (defined as ≥ 5 meals per week) and outcome variables of interest (i.e. youth's dietary quality, adherence to diabetes management, glycaemic control). Logistic regression analyses were conducted to determine unadjusted and adjusted associations of age, socio-demographics, family meal habits, and family meal preparation characteristics by regular family meals. Each socio-demographic, family meal habits subscale, and family meal preparation characteristic demonstrating a significant unadjusted association ( $P < 0.05$ ) with regular family meals was entered in a multivariate logistic regression model to determine independent predictors of regular family meals. Due to multicollinearity among meal preparation characteristics (i.e. home from scratch; home using packaged, frozen or convenience foods; fast food and restaurant food), and based on findings from the unadjusted analyses, only the number of days meals were prepared at home from scratch was included in the multivariate logistic regression analysis. Analyses were run using PASW statistics spss version 21 (El Paso, TX, USA).

## Results

The mean youth age was 13.3 (SD 2.9) years; 48.8% were female. Diabetes duration was 6.4 (SD 3.4) years; 65.8% used insulin pump therapy and 34.3% used multiple daily insulin injections. Average glycaemic control, as measured by HbA1c, was 8.6% (SD 1.4, range 5.9–15.0%), 70 mmol/mol (SD 8.2, range 41–140 mmol/mol). Families consumed the main meal together a mean of 4.5 (SD 1.9) days a week (median of 5; range 0–7 days/week), and 57% of families reported occurrences of regular family meals (i.e. 5 meals/week). Families with regular family meals had significantly better overall diet quality, both as measured by the Healthy Eating Index (54.5 vs. 51.7,  $P = 0.047$ ) and the NRF9.3 (22.3 vs. 18.7,  $P = 0.007$ ). They also demonstrated greater adherence to diabetes management (81.9 vs. 75.5,  $P < 0.001$ ); however, the association with improved glycaemic control, as measured by HbA1c, only approached statistical significance (8.4% vs. 8.8%; 68 mmol/mol vs. 73 mmol/mol,  $P = 0.06$ ).

Families in which at least one parent worked part-time or stayed at home were significantly more likely to have regular family meals than families in which both parents worked full-time (Table 1). Race/ethnicity, age of child, family structure (i.e. number of parents living in the household), parent education level and poverty income ratio were not significantly associated with the occurrence of regular family meals.

All family meal habits and preparation characteristics, except for the number of days the main meal was eaten at a restaurant, were significantly associated with the occurrence of regular family meal meals in unadjusted analyses (Table 1). For instance, families who provide mealtime structure and a pleasant mealtime atmosphere were nearly two times more likely to have regular family meals. Additionally, preparing meals from scratch was positively associated with regular family meals, while meals based on convenience foods or fast foods were negatively associated with regular family meals.

Parental work structure, all three family meal characteristics (priority, atmosphere, structure) and meals prepared from scratch that were associated with regular family meals in unadjusted analyses were entered into the multivariate regression analysis to determine factors that independently predict regular family meals. In the multivariate model, greater parental priority given to family mealtime and more home-prepared meals were independently associated with occurrence of regular family meals (Table 2).

## Discussion

Family meal frequency in this sample of youth with type 1 diabetes is consistent with findings in the general US population (Gillman & Frazier 2000; Neumark-Sztainer *et al.* 2010; Hammons & Fiese 2011). The frequency of consumption of commercially prepared foods for youth with type 1 diabetes was also similar to reports in the literature for children and adults in the general population (Gillman & Frazier 2000; Kant & Graubard 2004). Adults consume commercially prepared meals an average of 2.8 days each week (Kant & Graubard 2004). Children and adolescents consume ready-made dinners 1 to 2 days a week (Gillman & Frazier 2000). Our findings indicate that families dealing with type 1 diabetes

appear to be similar to other families in family meal frequency and pattern of convenience food consumption. Consistent with previous research, families who had frequent family meals had better overall diet quality (Gillman & Frazier 2000; Neumark-Sztainer *et al.* 2004; Fulkerson *et al.* 2006b; Franko *et al.* 2008; Burgess-Champoux *et al.* 2009; Larson *et al.* 2009; Woodruff 2010; Hammons & Fiese 2011). Additionally, they also demonstrated better adherence to the diabetes regimen, suggesting that family meal frequency may be a marker of overall attentiveness to family health needs.

The inverse association of parent work status (i.e. both parents working full-time vs. at least one part-time or stay-at home parent) with occurrence of regular family meals in unadjusted analysis is consistent with previous research. For example, adolescents whose mothers were not employed outside the home had greater family meal frequency as compared with those whose mothers were working full time (Neumark-Sztainer *et al.* 2003). In the present study, however, parent work status was not independently associated with regular family meals in the multivariate logistic regression model including family meal habits. This finding suggests that the effect parent work status on family meals may be accounted for by the influence that work status has on the priority parents place on family meals and the frequency of home-prepared meals. Families in which all parents worked full-time had fewer home-prepared meals prepared compared with families that had at least one parent stay at home or work part-time. Previous research suggests that parent employment may promote consumption of foods prepared outside the home. In a survey of employed parents, the majority of families often ate meals from sources such as fast-food or take-out food, and included pre-prepared and/or frozen foods in their family meals (Devine *et al.* 2009). In addition, compared with two-parent households, single-parent households have increased fast-food intake (Stewart 2009). Parents who are busy due to full-time employment may rely on convenience and fast foods as a time-saving strategy. Interventions to promote family meals may benefit from fostering the development of skills in time-saving strategies for home-prepared meals and the identification of the healthier convenience food options.

We found that parental prioritization of family meals was positively related to regular family meals. A similar positive relation between priority and family meal frequency was reported in a cross-sectional study of adolescents and their parents (Fulkerson *et al.* 2006a). It is possible that immediate benefits provided by family meals, such as increased family cohesiveness, communication and support, increase parental prioritization of family meals (Fulkerson *et al.* 2006b; Arcan *et al.* 2009; Rovner *et al.* 2010; Hammons & Fiese 2011).

Preparing meals from scratch was the only meal preparation method positively associated with family meals. Preparing meals at home from convenience foods was negatively associated with family meal frequency. An association between more frequent home cooking and increased dietary quality has previously been reported, which may account for the positive relations between family meals and diet quality reported in other studies (Blake *et al.* 2011). In the present study, frequency of consuming fast-food meals during the week was also inversely associated with regular family meals. Frequent fast-food consumption during family meals has been associated with several negative health outcomes, including increased availability of unhealthy food choices such as soda and chips in the home, lower overall dietary quality, and increased parental body mass index (Boutelle *et al.* 2007;



Woodruff 2009). Consumption of fast-food at family meals has also been associated with unhealthy dietary practices such as skipping breakfast and lunch (Boutelle *et al.* 2007; Blake *et al.* 2011). The inverse relationship between fast-food consumption and regular family meals may also contribute to the associations previously found between family meals and diet quality.

Findings should be interpreted in light of study limitations. The cross-sectional design does not allow for interpretation of the causality between family meals and associated factors. In addition, the relatively homogenous sample characteristics may have precluded finding relations between family meals and some socio-demographic characteristics reported in previous research, such as parent marital status or SES (Gillman & Frazier 2000; Neumark-Sztainer *et al.* 2003, 2010; Sobal & Hanson 2011). Finally, because the study population was a convenience sample obtained from one paediatric diabetes centre, the findings may not be generalizable to all youth with type 1 diabetes. As noted above, however, our findings are similar to those found in the general population.

Findings from this study suggest the importance of parental priority given to family meals and the type of meal preparation methods used for increasing family meal frequency. Both the frequency of family meals and home-prepared meals has declined over time suggesting these may be intertwined (Kant & Graubard 2004). Further research is needed to examine how families of youth with type 1 diabetes deal with competing priorities to successfully maintain regular family meals, and to develop intervention strategies that address perceived barriers to and enhance parent's skills for providing healthful family meals.

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## References

- Arcan C, Kubik M, Fulkerson J, Story M. Sociodemographic differences in selected eating practices among alternative high school students. *Journal of the American Dietetic Association*. 2009; 109:823–829. [PubMed: 19394468]
- Bantle JP, Wylie-Rosett J, Albright AL, Apovian CM, Clark NG, Franz MJ, Hoogwerf BJ, Lichtenstein AH, Mayer-Davis E, Mooradian AD, Wheeler ML. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. *Diabetes Care*. 2008; 31(Suppl. 1):S61–S78. [PubMed: 18165339]
- Blake C, Wethington E, Farrell T, Bisogni C, Devine C. Behavioral contexts, food-choice coping strategies, and dietary quality of a multiethnic sample of employed parents. *Journal of the American Dietetic Association*. 2011; 111:401–407. [PubMed: 21338739]
- Boutelle K, Fulkerson J, Neumark-Sztainer D, Story M, French S. Fast food for family meals: relationships with parent and adolescent food intake, home food availability and weight status. *Public Health Nutrition*. 2007; 10:16–23. [PubMed: 17212838]
- Burgess-Champoux T, Larson N, Neumark-Sztainer D, Hannan P, Story M. Are family meal patterns associated with overall diet quality during the transition from early to middle adolescence? *Journal of Nutrition Education and Behavior*. 2009; 41:79–86. [PubMed: 19304252]

- Devine C, Farrell T, Blake C, Jastran M, Wethington E, Bisogni C. Work conditions and the food choice coping strategies of employed parents. *Journal of Nutrition Education and Behavior*. 2009; 41:365–370. [PubMed: 19717121]
- Franko D, Thompson D, Affenito S, Barton B, Striegel-Moore R. What mediates the relationship between family meals and adolescent health issues. *Health Psychology*. 2008; 27:S109–S117. [PubMed: 18377152]
- Fulgoni VL 3rd, Keast DR, Drewnowski A. Development and validation of the nutrient-rich foods index: a tool to measure nutritional quality of foods. *Journal of Nutrition*. 2009; 139:1549–1554. [PubMed: 19549759]
- Fulkerson J, Neumark-Sztainer D, Story M. Adolescent and parent views of family meals. *Journal of the American Dietetic Association*. 2006a; 106:526–532. [PubMed: 16567147]
- 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. *Journal of Adolescent Health*. 2006b; 39:337–345. [PubMed: 16919794]
- Gillman M-SS, Frazier L. Family dinner and diet quality among older children and adolescents. *Archives of Family Medicine*. 2000; 9:235–240. [PubMed: 10728109]
- Guenther, P.; Reedy, J.; Krebs-Smith, SM.; Reeve, BB.; Basiotis, PP. Development and evaluation of the Healthy Eating Index-2005: technical report. Center for Nutrition Policy and Promotion; USDOA: 2007.
- Hammons AJ, Fiese BH. Is frequency of shared family meals related to the nutritional health of children and adolescents? *Pediatrics*. 2011; 127:e1565–e1574. [PubMed: 21536618]
- Kant AK, Graubard BI. Eating out in America, 1987–2000: trends and nutritional correlates. *Preventive Medicine*. 2004; 38:243–249. [PubMed: 14715218]
- Larson N, Nelson M, Neumark-Sztainer D, Story M, Hannan P. Making time for meals: meal structure and associations with dietary intake in young adults. *Journal of the American Dietetic Association*. 2009; 109:72–79. [PubMed: 19103325]
- Mehta S, Volkening L, Nansel T, Lawlor M, Higgins L, Laffel LM. Validation of a self-report measure to assess adherence in youth with type 1 diabetes. *Diabetes*. 2010; 59(Suppl. 1):A80.
- Neumark-Sztainer D, Hannan P, Story M, Croll J, Perry C. Family meal patterns: associations with sociodemographic characteristics and improved dietary intake among adolescents. *Journal of the American Dietetic Association*. 2003; 103:317–322. [PubMed: 12616252]
- Neumark-Sztainer D, Wall M, Story M, Fulkerson J. Are family meal patterns associated with disordered eating behaviors among adolescents? *Journal of Adolescent Health*. 2004; 35:350–359. [PubMed: 15488428]
- 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 Nutrition*. 2010; 13:1113–1121. [PubMed: 20144257]
- Rovner A, Mehta S, Haynie D, Robinson E, Pound H, Butler D, Laffel L, Nansel T. Perceived benefits, barriers, and strategies of family meals among children with type 1 diabetes mellitus and their parents: focus-group findings. *Journal of the American Dietetic Association*. 2010; 110:1302–1306. [PubMed: 20800121]
- Sobal J, Hanson K. Family meals and body weight in US adults. *Public Health Nutrition*. 2011; 14:1555–1562. [PubMed: 21356147]
- Stewart S. Family structure, nonresident father involvement, and adolescent eating patterns. *Journal of Adolescent Health*. 2009; 45:193–201. [PubMed: 19628147]
- US Census Bureau. Poverty Thresholds 2008. 2010.
- Woodruff S. Effect of meal environment on diet quality rating. *Canadian Journal of Dietetic Practice and Research*. 2009; 70:118–124. [PubMed: 19709467]
- Woodruff SJ. Healthy eating index-C is positively associated with family dinner frequency among students in grades 6–8 from Southern Ontario, Canada. *European Journal of Clinical Nutrition*. 2010; 64:454–460. [PubMed: 20197788]



**Key messages**

- Given the importance of adequate nutrition in youth with type 1 diabetes and the roles families can play in supporting healthy eating, effective approaches to increase the frequency of family meals are needed.
- Families who placed a higher priority on family mealtimes and more frequently prepared meals from scratch, rather than using convenience or fast foods, reported more frequent family meals.

**Table 1**

Participant characteristics, family meal habits and meal preparation characteristics by occurrence of regular family meals

Variables*	Meal frequency		Odds ratio <sup>†</sup> (95% CI)
	<5 meals/week (n = 121)	5 meals/week (n = 162)	
Child age			
8–12 years old (n = 127)	37.0	63.0	1.52 (0.94, 2.45)
13–18 years old (n = 155)	47.1	52.9	Reference
Race/ethnicity			
White (n = 252)	42.5	57.5	Reference
Black (n = 8)	62.5	37.5	0.44 (0.10, 1.89)
Hispanic (n = 13)	38.5	61.5	1.18 (0.38, 3.71)
Other (n = 10)	40.0	60.0	1.10 (0.31, 4.02)
No. of parents living in the household			
One (n = 47)	40.4	59.6	Reference
Two (n = 232)	42.7	57.3	0.91 (0.48, 1.73)
Parental work structure			
All work full-time (n = 115)	51.3	48.7	Reference
At least one part-time or stay at home (n = 164)	36.0	64.0	<b>1.88 (1.15, 3.05)</b>
Parent education			
High school or less (n = 25)	48.0	52.0	Reference
Some college (n = 51)	41.2	58.8	1.32 (0.50, 3.45)
4-year college (n = 122)	45.1	54.9	1.12 (0.48, 2.66)
Graduate or professional degree (n = 81)	37.0	63.0	1.57 (0.64, 3.88)
Socio-economic status (SES)	5.15±2.79	4.65±2.65	0.93 (0.85, 1.02)
Family meal habits			
Atmosphere	2.50±0.49	3.51±0.51	<b>2.29 (1.40, 3.72)</b>
Priority	2.50±0.49	3.14±0.49	<b>12.69 (6.71, 23.98)</b>
Structure	2.60±0.45	2.72±0.44	<b>1.83 (1.06, 3.15)</b>
Meal preparation (meals/week)			
Home from scratch	3.51±1.70	4.89±1.60	<b>1.64 (1.40, 1.93)</b>
Home using packaged, frozen or convenience foods	1.74±1.27	1.22±1.29	<b>0.73 (0.60, 0.88)</b>
Fast food	1.01±1.05	0.72±0.77	<b>0.69 (0.53, 0.91)</b>
Restaurant food	0.89±0.87	0.88±0.87	0.99 (0.75, 1.31)

SES based on household poverty income ratio calculated using self-reported income, household size and the 2008 federal poverty thresholds. Lower scores represent lower incomes relative to poverty (adjusted for household size and composition, and inflation).

\* Data presented as percentage or means (SD).

<sup>†</sup> Binary logistic regression; significant associations presented in bold font.

**Table 2**

Multivariate logistic regression predicting regular family meals

Predictor <sup>†</sup>	$\beta$	SE $\beta$	Wald's $\chi^2$	d.f.	P	e <sup>β</sup> (OR)
Constant <sup>*</sup>	-6.22	1.31	22.70	1	<0.001	NA
Parental work structure (1 = all full-time [reference], 0 = at least one part-time or less)	0.53	0.31	3.00	1	0.084	1.70
Family meal priority	2.71	0.41	43.40	1	<b>&lt;0.001</b>	<b>15.07</b>
Family meal atmosphere	-0.43	0.36	1.41	1	0.234	0.65
Family meal structure	-0.54	0.41	1.75	1	0.186	0.58
Meal preparation characteristics	0.34	0.09	13.65	1	<b>&lt;0.001</b>	<b>1.41</b>

  

Test	$\chi^2$	d.f.	P
Goodness-of-fit test			
Hosmer & Lemeshow	8.97	8	0.344

d.f., degrees of freedom; SE, standard error; OR, odds ratio.

<sup>\*</sup> Cox and Snell  $R^2 = 0.331$ .<sup>†</sup> Variables entered into the multivariate logistic regression model were the following: parental work structure, family meal habits (atmosphere, priority, structure), meal preparation characteristics (meals made from scratch).