

# A Review of Associations Between Family or Shared Meal Frequency and Dietary and Weight Status Outcomes Across the Lifespan

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## ABSTRACT

**Objective:** To summarize the research literature on associations between family meal frequency and dietary outcomes as well as weight status across the lifespan.

**Methods:** Reviewed literature of family or shared meals with dietary and weight outcomes in youth, adults, and older adults.

**Results:** Across the lifespan, eating with others, particularly family, is associated with healthier dietary outcomes. Among children and adolescents, these findings appear to be consistent for both boys and girls, whereas mixed findings are seen by gender for adult men and women. The findings of associations between family or shared meals and weight outcomes across the lifespan are less consistent and more complicated than those of dietary outcomes.

**Conclusions and Implications:** Now is the time for the field to improve understanding of the mechanisms involved in the positive associations seen with family meal frequency, and to move forward with implementing interventions aimed at increasing the frequency of, and improving the quality of, food served at family meals, and evaluating their impact. Given the more limited findings of associations between family or shared meals and weight outcomes, capitalizing on the positive benefits of family and shared meals while addressing the types of foods served, portion sizes, and other potential mechanisms may have a significant impact on obesity prevention and reduction. Future research recommendations are provided.

**Key Words:** family meals, shared meals, dietary outcomes, weight status, lifespan (*J Nutr Educ Behav.* 2014;46:2-19.)

## INTRODUCTION

Over the past 2 decades, the scientific literature and popular press have focused considerable attention on patterns of food consumption and factors influencing dietary intake. Much of this focus has to do with the proliferation of options for consumers (eg, increased fast-food availability), the low percentages of youth and adults meeting dietary recommendations,<sup>1</sup> and the high rates of obesity.<sup>2,3</sup> Scientists and the general population are interested in identifying causes of poor dietary intake and obesity and

particular subpopulations that may need targeted interventions. An area of study that has received particular attention is the potential benefits of family meals and eating together with others with regard to dietary outcomes. Reviews reported to date have assessed associations between family meals and dietary outcomes for children and adolescents; however, no systematic reviews have included adults to fully address these associations across the lifespan. Relative to the sizeable literature on dietary outcomes, less research has examined how family meals are

associated with more distal outcomes such as weight status, and existing findings are less consistent. Thus, using Life Course Theory (LCT) as a guide, the present review summarized the research literature on associations between the frequency of sharing mealtimes and dietary outcomes as well as weight status across the lifespan to draw attention to knowledge gaps and provide guidance for future studies. The aim of this comprehensive descriptive report was to identify overarching themes to facilitate future research.

Although family meals have been defined in a variety of ways in the literature (eg, how often most or all family members shared a meal together, “regular” family dinners), a common thread across assessments of family meals is that various family members are together, sharing a meal. This is particularly true in the literature on meal patterns of children and adolescents. Furthermore,

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most studies either assess “meals” globally or “dinner.” Furthermore, when the population of focus is adults, the literature is more likely to describe commensal meals or meals eaten with other people, because eating companions could include one's own children, spouse, significant other, or non-family members. As with family meals, commensal eating is the shared mealtime experience shaped by social relationships.<sup>4</sup>

The goals of the present review were to provide an overview of family or shared meals and to describe how they are associated with dietary and weight outcomes, using a definition with sufficient flexibility to allow for the inclusion of literature on adults of all ages. Thus, in addition to meals eaten with members of a family unit, the present review provides a review of literature in adult populations regarding associations between eating in groups (and alone, if that was the comparison) with dietary and weight outcomes. Furthermore, the focus of this report is on family meal “frequency”; studies that did not assess frequency as a main predictor of dietary or weight outcomes are not included. That being said, the importance of the family meal context is appreciated, and this review provides information and commentary about demographic characteristics and contextual issues such as the complexity of household configurations, meal sources, and mealtime environments that have been identified in the literature and appear to affect the associations between family meal frequency and dietary and weight outcomes. The discussion of these contextual issues provides a description of potential mechanisms of how family meal frequency affects dietary and weight outcomes and may inform future research and expand family meals research beyond mealtime frequency.

As recommended by the National Institutes of Health Obesity Research Task Force,<sup>5</sup> this review used an LCT approach that provides an understanding of how health develops over a lifetime and across populations.<sup>6</sup> Life Course Theory is population-focused and emphasizes social determinants of health, which makes it useful in the context of family meals and associations with dietary

intake and weight status across the lifespan. In particular, as described by Fine and Kotelchuck,<sup>6</sup> LCT considers concepts of *timing* (ie, how often meals are consumed during specific developmental periods, including childhood, adolescence, young and middle adulthood, and older adulthood), *environment* (ie, the context of meals with family or others [for older adults]), and the influence of risk and protective factors on *lifelong development* (ie, family or shared meals and dietary intake and weight status).

## METHODS

Searches in PubMed and OVID Medline were conducted from June to August, 2012 using the key words “family meals” and “commensal eating” to identify relevant peer-reviewed studies. Identified studies were included in this review if they met the following inclusion criteria: (1) publication in the past 2 decades, to allow a focus on the most current literature on the potential benefits of family meals/commensal eating; (2) measurement of the frequency of family meals in child, adolescent, or young/middle adult samples or frequency of eating alone in late adulthood samples; and (3) inclusion of dietary or weight outcomes. The reference lists of included studies were also reviewed to ensure all relevant studies were retrieved. All articles of children and adolescents were reviewed by JAF, NL reviewed all articles of adults, and MH reviewed all articles of older adults. In addition, DN, who is familiar with this literature in several populations, assisted with article review.

For the 4 reviews and 23 additional studies meeting inclusion criteria, the following information was systematically extracted: (1) sample characteristics (eg, size, age, location of study); (2) study design; (3) measure of family meals or eating alone; (4) outcomes measures; and (5) findings for dietary and weight outcomes. Table 1 lists the extracted information, with the studies arranged in chronological order and grouped by sample age. Several of the included articles were reviews of the literature regarding family meals and dietary outcomes among youth,<sup>7-10</sup> and rather than

repeating the full details of these studies, summaries and key highlights are provided. However, pertinent research studies that were not included in these reviews are included in the present review to account for review-specific selection bias and for articles published post-review. The present review is divided into 3 age groups: (1) studies of children and adolescents (through the high school years), (2) studies of young and middle adults (primarily age 18 years to the mid-fifties), and (3) older adults (most participants were in their seventies; however, a few samples also included some middle-aged participants). Each section starts with a summary of the *numbers* and *types* of studies describing family or shared meal frequency and dietary and weight outcomes, followed by a description of the findings. Although all relevant primary source articles are cited within the text, to limit redundancy, Table 1 includes details of the review articles (with citations but not details for the primary sources) and details of articles that were not included in the 4 previous reviews. Limitations of these studies across both outcomes are then described, as well as a brief summary of the literature for each age grouping.

## Childhood and Adolescence

*Literature.* The earliest research describing the associations between family meal frequency and dietary outcomes among youth included 3 large-scale, cross-sectional studies in the United States in the early 2000s.<sup>11-13</sup> The findings from these studies were reviewed by Neumark-Sztainer and colleagues in 2006.<sup>7</sup> The family meal frequency and dietary outcomes literature reviewed by Woodruff and Hanning<sup>8</sup> in 2008 included the same 3 studies as well as 2 additional studies from Canada and assessed study quality.<sup>14,15</sup> In 2010, Neumark-Sztainer and colleagues<sup>9</sup> described the contributions of 4 adolescent-focused articles with outcomes related to diet and/or weight status from Project EAT (Eating and Activity among Teens and Young Adults),<sup>13,16-20</sup> a longitudinal research program that has substantially contributed to the literature on the implications of family meals for adolescents, young adults, and

**Table 1.** Literature Regarding Associations Between Family or Shared Meals and Dietary or Weight Outcomes Among Children, Adolescents, Young, Middle-aged, and Older Adults

Reference	Sample	Design/Measures	Dietary Outcomes	Weight Outcomes
<b>Children and Adolescents</b>				
Neumark-Sztainer et al, 2006 <sup>7</sup>	Review of associations between family meal frequency and nutritional outcomes among adolescents (from 3 large-scale studies). <sup>11-13</sup>	Examined family meal frequency and dietary outcomes among adolescents in 3 large-scale, cross-sectional studies in US.	Family meal frequency was significantly and positively correlated with quality dietary intake (consumption of fruits, vegetables, grains, and calcium-rich foods) and inversely associated with ready-made meals.	Not examined.
Befort et al, 2006 <sup>27</sup>	228 black and white adolescents aged 10–19 y (90 girls, 54 boys), selected from urban children's hospital adolescent prevention and wellness clinic, Kansas City, MO.	Cross-sectional survey in which questions were read aloud by research staff. Meals: Frequency of meals with family (0 = never; 7 = ≥ 2/d). Outcomes: NCI Fruit and Vegetable Screener, translated to times per day and averaging across items. NCI Fat Screener using algorithm that sums 13 items.	Family meal frequency was significantly and positively correlated with fruit intake.	Not examined.
Woodruff and Hanning, 2008 <sup>8</sup>	Review of associations between family meals and dietary intake for 5 studies of adolescents. <sup>11-15</sup>	Meals: Family meal frequency (undefined). Outcomes: Study-specific foods were summarized but details were not provided.	Among studies with overall ratings of moderate strength of evidence, family meal frequency was positively associated with intakes of fruits, vegetables, dairy foods, overall energy, and several nutrients. Inverse associations were found for intakes of fried foods and soft drinks.	Not examined.
Wurbach et al, 2009 <sup>30</sup>	1,571 schoolchildren aged 7–14 y (810 boys, 761 girls), randomly recruited in Jena, East Germany.	Cross-sectional survey given to parent; anthropometry of children measured directly. Meals: Frequency of main meals (breakfast, lunch, and dinner) eaten together with all family members (ranging from 0 to 3). Outcomes: Age- and gender-adjusted BMI percentiles (non-overweight BMI% ≤ 90th percentile; overweight > 90th percentile).	Not examined.	Family meal frequency was not significantly associated with age- and gender-adjusted BMI.

Burgess-Champoux et al, 2009 <sup>16</sup>	Population-based sample of 677 adolescents (mean age, 12.8 y) in Minneapolis/St Paul, MN metropolitan area.	Longitudinal survey (school-based, in-person survey in 1998–1999 and mailed survey in 2003–2004). Meals: Past wk frequency of eating meal together with family members living in same household; regular family meals coded as $\geq 5$ /wk. Outcomes: Comprehensive assessment of dietary intake (149-item YAQ), including servings of fruits, vegetables, dark green and orange vegetables, whole grains, calcium-rich foods, soft drinks, and several micronutrients.	Regular family meals in middle school were positively associated with mean daily intakes of vegetables and calcium-rich foods during adolescence.	Not examined.
Woodruff et al, 2010 <sup>29</sup>	1,288 6th- through 8th-grade students in Southern Ontario, Canada.	Cross-sectional survey and single dietary recall. Meals: Family dinner frequency in days per wk. Outcomes: Diet quality scores calculated with HEI-C.	Diet quality scores were higher among students reporting 6–7 dinners/wk than those who had fewer family dinners.	Not examined.
Neumark-Sztainer et al, 2010 <sup>9</sup>	Review of associations between family meal frequency and nutritional <sup>13,16,17,20</sup> and weight outcomes <sup>18</sup> among adolescents (all studies from larger Project EAT and Project EAT II studies).	Cross-sectional and longitudinal analyses of students in middle and high school (n = 4,746) in 1998–1999 and 2003–2004. Meals: “During the past 7 days, how many times did all or most of your family living in your house eat a meal together?” Six response categories ranged from “never” to “ $\geq 7$ seven times.”	Frequency of family meals was related to higher energy-adjusted intakes of fruit, vegetables, grains, calcium-rich foods, and several micronutrients, and lower intake of soft drinks.	Significant inverse associations between family meal frequency and overweight status for young females in cross-sectional analyses, but not young males or older adolescents. Associations did not hold longitudinally.
Rollins et al, 2010 <sup>31</sup>	Subset of US-based 2003 National Survey of Children’s Health.	Cross-sectional telephone interview with mothers of non-Hispanic white, non-Hispanic black, and Hispanic children aged 6–11 y. Meals: Frequency of days family members in household ate together in past wk (none/few, some days, almost every day, every day). Outcomes: Parent report of height and weight calculated to BMI percentile (overweight $\geq 85$ th and $< 95$ th percentile; obese $\geq 95$ th percentile).	Not examined.	Family meal frequency was protective factor for obesity in non-Hispanic white children and non-Hispanic black boys; family meals associated with increased obesity risk among Hispanic boys from low-education households.

(continued)

Table 1. Continued

Reference	Sample	Design/Measures	Dietary Outcomes	Weight Outcomes
<b>Children and Adolescents</b>				
Goldfield et al, 2011 <sup>32</sup>	School-based sample of 734 male and 1,030 females (mean age, 14.12 y; SD, 1.62 y) in Canada. Participants involved in larger longitudinal study: REAL.	Cross-sectional, in-person survey. Meals: Frequency of family meals with family at home sitting at table together (frequency from never, infrequent over year, monthly, weekly, to $\geq 2$ times/d). Outcome: Directly measured BMI.	Not examined.	Family meal frequency was significantly and inversely associated with BMI among females but not males.
Hammons and Fiese, 2011 <sup>10</sup>	Meta-analysis of children and adolescents (2000–2009). Nutritional outcomes available for 8 studies <sup>8,11,12,21-23,25,26</sup> (n = 56,919; 2–17 y of age). Weight outcomes available for 8 studies <sup>8,18,25,33-37</sup> (n = 44,016; 4–17 y of age).	Meals: Meal frequency compared $\geq 3$ family meals/wk with $< 3$ meals/wk. Outcomes: Food consumption was measured with 2 variables: unhealthy (soda, fast food, fried foods, and sweets/candy) and healthy (fruit, vegetables, multivitamin use, and breakfast) foods.	20% reduction in odds of eating unhealthy foods. 24% increase in odds of eating healthy foods.	12% reduction in odds of overweight status.
Welsh et al, 2011 <sup>28</sup>	Community-based sample of 75 adolescents (12–17 y of age), representing 90 households in Minneapolis/St Paul, MN metropolitan area.	Cross-sectional, in-person assessments. Meals: Self-reported past wk frequency of eating a meal together with all or most household members. Outcomes: Usual food choices in past month were self-reported using a brief food frequency questionnaire.	Family meal frequency was inversely associated with sweets and sugar-sweetened beverages.	Not examined.
<b>Adults</b>				
De Bourdeaudhuij and van Oost, 2000 <sup>52</sup>	Community-based sample of 104 parents (mean age, 43 y) from 2-parent families with at least 2 adolescents in Ghent, Belgium.	Cross-sectional, in-person survey. Meals: Extent to which breakfast and/or hot meals were shared within families. Outcomes: Usual dietary intake in past month assessed by a food frequency questionnaire; healthy food score was defined based on intake of fat, fruit, vegetables, soft drinks, and sweet and salty snack foods.	Sharing breakfast with family members was related to lower intake of snacks and soft drinks and higher healthy food scores.	Not examined.

Koszewski et al, 2011 <sup>53</sup>	Low-income sample of 108 parents ( $\geq 19$ y) enrolled in the Nebraska Nutrition Education Program.	Cross-sectional mailed surveys collected in 2008. Meals: Typical weekly frequency of eating meals together with family members at breakfast, lunch, and dinner. Outcomes: Nutritional adequacy was assessed by asking participants to record typical intake for 1 24-h period.	Nutritional adequacy of parent dietary intake was unrelated to family meal frequency at breakfast, lunch, or dinner.	Not examined.
Welsh et al, 2011 <sup>28</sup>	Community-based sample of 152 parents with at least 1 child $\geq 5$ y, representing 90 households in Minneapolis/St Paul, MN metropolitan area.	Cross-sectional, in-person assessments. Meals: Self-reported past wk frequency of eating meals together with all or most household members. Outcomes: Usual food choices in past month were self-reported using a brief food frequency questionnaire.	Family meal frequency was positively associated with fruit and vegetable intake.	Not examined.
Sobal and Hanson, 2011 <sup>54</sup>	Nationally representative US sample of 884 adults (mean age, 49 y) living with family members.	Cross-sectional telephone survey in 2009. Meals: Typical weekly frequency of eating meals together with family members living in the same household. Outcomes: Height, weight.	Not examined.	Family meal frequency was not significantly associated with BMI, overweight, or obesity in the overall sample. Among adults in households with children, more frequent family meals were associated with lower BMI.
Blake et al, 2011 <sup>55</sup>	Community-based sample of 50 employed parents (23–56 y) living in low- to moderate-income urban neighborhoods of upstate New York.	Cross-sectional telephone survey in 2006. Meals: Weekly frequency of home-cooked, takeout, fast-food, and restaurant family meals. Outcomes: Dietary quality assessed by 2 24-h recalls on days after working days and calculation of HEI 2005 scores.	Three clusters of food-choice coping strategies were identified. Parents in the home cooking cluster reported the highest frequency of home-cooked family meals and lowest frequency of family meals away from home; these parents had higher HEI scores and substantially higher scores for dark green and orange vegetables, total grains, whole grains, and milk compared with parents in the other 2 clusters.	Not examined.
Chan and Sobal, 2011 <sup>56</sup>	Convenience sample of 86 fathers (median age, 53 y) and 92 mothers (median age, 50 y), representing 103 families of prospective university students.	Cross-sectional surveys, completed during campus visits to 1 large Eastern US university in 2005–2006. Meals: Typical weekly frequency of eating meals together with family members living in the same household; separate questions were asked to assess eating at home and outside/at restaurants. Outcomes: Height, weight.	Not examined.	Frequency of family meals at home was inversely related to BMI, whereas frequency of family meals at restaurants was positively related to BMI among fathers. No association between frequency of family meals and BMI was found among mothers.

(continued)

Table 1. Continued

Reference	Sample	Design/Measures	Dietary Outcomes	Weight Outcomes
<b>Adults</b>				
Larson et al, 2012 <sup>57</sup>	Population-based cohort of 2,052 young adults (mean age, 25 y), including 314 custodial parents, who did not live alone and participated in 10-y follow-up survey of youth in Minneapolis/St Paul, MN metropolitan area.	Cross-sectional mailed and Web survey in 2008–2009. Meals: Past wk frequency of eating meals together with all or most other household members. Outcomes: Height, weight, usual dietary intake in past year assessed by a food frequency questionnaire.	Among males and females, shared meal frequency was associated with greater intake of fruit. Among females, shared meal frequency was also associated with higher intake of vegetables, milk products, energy, fiber, and some key nutrients. Among males, shared meal frequency was also associated with higher intake of whole grains. Similar associations were found among the parent subset but fewer relationships were statistically significant.	Not examined.
Berge et al, 2012 <sup>58</sup>	Population-based sample of 1,330 male and 2,158 female parents (mean age, 42 y) of adolescents in Minneapolis/St Paul, MN metropolitan area.	Cross-sectional mailed and telephone survey in 2009–2010. Meals: Past wk frequency of eating meals together with family members living in the same household. Outcomes: Height, weight, fruit and vegetable intake, fast-food restaurant use.	Among males and females, frequent family meals were associated with increased consumption of fruits and vegetables. Among males, frequent family meals were also inconsistently associated with less fast-food restaurant use.	Meal frequency was not consistently associated with BMI or prevalence of obesity; however, males who ate 3–4 family meals/wk were less likely to be obese than males who ate $\geq 7$ family meals/wk.
<b>Older Adults</b>				
Lee et al, 1996 <sup>61</sup>	Population-based sample of 2,890 men and women (mean age, 71.5 y), Southern US.	Cross-sectional survey by interview in 1987–1988. Meals: Binary self-report of eating alone. Outcomes: Dietary intake measured by a single 24-h dietary recall.	Those reporting they ate alone were significantly more likely to skip 1 meal/d, which was significantly related to lower intake of energy, protein, vitamins A and C, thiamin, riboflavin, niacin, folacin, calcium, phosphorus, iron, crude fiber, and cholesterol, as well as lower levels of consumption by food group.	Those reporting they ate alone were significantly more likely to skip 1 meal/d, which was significantly related to higher BMI.
Sahyoun et al, 1997 <sup>65</sup>	Subsample of 581 community-dwelling elders (mean age, 72 for men, 73 for women) without terminal disease, severe metabolic disorders, or dementia.	Epidemiological follow-up study of data collected over 1981–1993. Meals: Self-report of eating > 17 meals alone per wk. Outcome: Death, NSI checklist risk.	Among those identifying with eating alone on NSI, there was a significant 2-fold increase in risk of mortality.	Not examined.



Shahar et al, 2001 <sup>66</sup>	Subsample of 58 widows (widowed for > 6 mo) and 58-matched controls from a longitudinal population based study (mean age, 78 y).	Retrospective cohort 1989–1990 and in-person survey and interview in 1995–1996. Meals: Frequency of eating alone per wk. Outcomes: Weight, dietary intake as measured by food frequency questionnaires.	Not examined.	Widows were significantly more likely to report eating alone than their matched controls and had significantly higher odds of weight loss. However, those reporting eating alone did not have statistically significant increased odds for weight loss.
Shahar et al, 2003 <sup>64</sup>	Subsample of 377 community dwelling elders > 64 y of age randomly selected from Negev Nutrition Study's population, obtained from proportionate geographic cluster sampling method in Israel.	Cross-sectional, in-home survey in unknown year. Meals: Frequency of meals eaten alone each wk. Outcomes: Dietary intake as measured by a 24-h recall.	Eating alone was significantly associated with lower energy and iron and zinc intakes. After adjusting for covariates, eating alone remained significantly associated with lower energy for men, but not for women.	Not examined.
Holmes et al, 2008 <sup>60</sup>	Subsample of 234 community-dwelling men > 64 y of age from multi-stage cluster sampling of low-income households in the United Kingdom.	Cross-sectional face-to-face and telephone survey in 2003–2005. Meals: Binary self-report of eating weekday meals alone. Outcomes: Food consumption (g/d) from multiple-pass method of 24-h dietary recalls.	Those eating alone had significantly higher intakes of white bread, fat spreads, non-diet soft drinks, and sodium, as well as significantly lower intakes of chips and fried and roast potatoes.	Not examined by variable of eating alone.
Quigley et al, 2008 <sup>63</sup>	Sample of 8,892 congregational meal participants > 59 y of age of OOANP.	Secondary data analysis of Oklahoma State and OOANP data. Meals: Binary response to eat alone most of the time. Outcomes: Nutritional risk as measured by the NSI checklist.	Respondents who identified with eating alone most of the time on the NSI checklist were more likely to be categorized as high nutritional risk (73%) vs low nutritional risk (49%) or moderate nutritional risk (46%).	Not examined.
Locher et al, 2009 <sup>62</sup>	Subsample of 128 homebound, community-dwelling elders (mean age, 79 y).	Cross-sectional survey by questionnaire and interview. Meals: Likert response to "Eating alone kept you from eating the foods or meals you wanted." Outcomes: Dietary quality as assessed from 3 dietary recalls, motivations for eating, barriers to eating.	Those who identified that eating alone was a barrier did not have a significantly different diet from those who did not identify this barrier.	Not examined.

BMI indicates body mass index; HEI, Healthy Eating Index; NCI, National Cancer Institute; NSI, Nutrition Screening Initiative; OOANP, Oklahoma Older Americans Act Nutrition Program; US, United States; YAQ, Youth/Adolescent Questionnaire.



parents. The meta-analytic review by Hammons and Fiese<sup>10</sup> in 2010 examined associations between family meals and dietary outcomes in 2 cross-sectional studies of children,<sup>21,22</sup> 4 studies of adolescents<sup>11,23-25</sup> (all cross-sectional), and 2 cross-sectional studies that included both children and adolescents.<sup>12,26</sup> Six of these studies were not in the previous reviews and several were from countries outside North America.<sup>21-26</sup> No assessments of study quality were presented, and only studies with data that could be used to calculate effect sizes were included. Seven additional cross-sectional studies of adolescents regarding associations between family meal frequency and dietary or weight outcomes that were not included in any of the previously published reviews are included in this review.<sup>16,27-32</sup> All of these studies included both boys and girls.

Compared with studies of dietary outcomes, fewer studies have assessed associations between family meal frequency and weight status among children and adolescents. The review by Hammons and Fiese<sup>10</sup> identified 2 studies of children<sup>33,34</sup> (1 with both cross-sectional and longitudinal analyses<sup>34</sup>), 5 studies of adolescents<sup>18,24,25,35,36</sup> (2 with both cross-sectional and longitudinal analyses<sup>18,36</sup>), and 1 study that included children and adolescents and had both cross-sectional and longitudinal analyses.<sup>37</sup> All of the studies with weight outcomes in the review included both girls and boys. In addition, 3 cross-sectional studies, 1 of children,<sup>31</sup> 1 of adolescents,<sup>32</sup> and 1 of children and adolescents<sup>30</sup> that were not included in the previously published review were identified and are included.

**Dietary outcomes.** The 4 previously published reviews<sup>7-10</sup> that assessed the findings of 13 studies of family meal frequency and dietary outcomes<sup>11-17,21-23,25,26,38</sup> concluded that there are clear, positive associations between family meal frequency and dietary quality among children and adolescents, even though there were methodological differences between studies, including the way family meal frequency was measured. Markers of healthier dietary intake and eating patterns

included higher consumption of fruits and vegetables; eating breakfast; higher intakes of micronutrients such as calcium, iron, and various vitamins; and lower levels of consumption of soda, higher-fat foods, unhealthy snacks and cakes, fried foods, and fast food.

Three additional cross-sectional studies, not included in the above-mentioned reviews, on relatively small samples ( $n = 75-500$ ) found that family meal frequency was significantly and positively correlated with fruit intake but not fat consumption,<sup>27</sup> significantly and positively associated with diet quality scores,<sup>29</sup> and significantly and inversely associated with the consumption of sweets and sugar-sweetened beverages.<sup>28</sup> A prospective analysis (mean age, 12.8 years at baseline) found that having regular family meals in early adolescence was positively associated with mean daily intakes of vegetables and calcium-rich foods 5 years later, even after adjusting for race/ethnicity, socioeconomic status (SES), energy consumption, and time 1 outcomes.<sup>16</sup> Thus, findings from these 3 studies corroborate the findings from the previous reviews.

Because most of the research thus far has examined cross-sectional associations between family meal frequency and dietary outcomes, and a causal relationship cannot be determined from cross-sectional, or even longitudinal, observational study designs, more researchers have begun to inquire about the mechanisms of these associations. Specifically, research has begun to assess whether these associations are the result of the types of foods offered at family meals, other aspects of family meal-time environments, or more broadly, characteristics of families that coordinate shared meals.<sup>9</sup>

**Contextual issues for dietary outcomes: types of foods.** Recent research provides some evidence that family meals often include healthful foods, although there is variation among families and less healthful foods such as sugar-sweetened beverages and fast food are also being served.<sup>39</sup> For example, 1 study found that more vegetables and milk are served at family meals in homes

where fast food is served for family meals < 3 times per week.<sup>20</sup> These indicators suggest that although there is variation, family meals in many homes are likely to include healthful options and the types of food and beverages served at meals may explain associations between family meal frequency and better dietary quality among youth. Building on this premise, a pilot study that used a randomized-controlled design to promote family meal frequency and the quality of foods served at meals demonstrated promising results with regard to children's fruit and vegetable consumption and nutrient intake.<sup>40</sup>

**Contextual issues for dietary outcomes: meal source.** Often, the questions used to assess family meal frequency do not define the source of family meals (ie, where family meals are prepared), which may also influence dietary intake. Research indicates that most meals are prepared in the home<sup>41</sup>; however, the percentage of daily energy eaten away from home among youth increased from about one quarter to one third of intake from the mid-1970s to the mid-2000s.<sup>42,43</sup> Away-from-home dining can be a common activity for many families. Fulkerson and colleagues<sup>44</sup> reported that among families of youth ages 8–10 years, 48% ate a family dinner at a full-service restaurant, 28% purchased dinner from a fast-food establishment, and 24% picked up take-out food for a family meal at least weekly. A more recent study indicated that about one quarter of families of adolescents had fast food at family dinner  $\geq 2$  times per week.<sup>39</sup> Food choices and subsequent diet quality may differ by the type of food source or restaurant, but research has consistently demonstrated that foods in both full-service restaurants and fast food establishments are higher in fat and calories.<sup>43,45,46</sup>

One study that focused on frequency of purchasing family meals from fast-food establishments reported on associations with dietary outcomes in a population-based sample of 902 parents and adolescents (see adult parents below for findings for parents) in Minneapolis and St Paul, MN.<sup>20</sup> Parents were asked to report how often they purchased food from a fast-food restaurant for a family

meal eaten at the restaurant or at home in the past week, and adolescents responded to measures of fruit and vegetable intake, dairy intake, salty snack consumption, and overall fast-food restaurant use. Results, accounting for racial/ethnic differences in the frequency of purchasing food for family meals at fast-food restaurants, showed that purchase frequency was positively associated with overall fast-food restaurant use and intake of salty snack foods. Thus, the source of family meals is also important in relation to dietary outcomes.

*Contextual issues for dietary outcomes: television.* Even within the home setting, the context of family meals among children and adolescents has an impact on associations with dietary outcomes. Several studies have shown that eating family meals while watching television is associated with less healthful intakes. Specifically, consumption of fruits and vegetables,<sup>17,21,47-49</sup> whole grains and calcium-rich foods,<sup>17</sup> and milk<sup>21</sup> were lower when family meals were consumed when watching television, whereas consumption of pizzas, snack foods, and soda was higher. That said, in at least 1 analysis, adolescents were found to eat better at family meals with the television on than when they ate alone.<sup>17</sup> These studies indicate that family meals may promote healthier dietary intakes, but their impact could be more substantial if they did not include television viewing. No published research to date has explored the impact of electronic media, other than television, on dietary intake.

*Weight outcomes.* Compared with the literature on family meal frequency and dietary outcomes, fewer studies have assessed weight outcomes. A review by Hammon and Fiese<sup>10</sup> assessed pooled estimates of risk across studies with each study as the unit of analysis. They indicated that half of the studies at the time of their review reported nonsignificant findings. They concluded that youth who shared at least 3 meals with family per week were about 12% less likely to be overweight than youth who had less frequent family meals. However,

as the authors noted, much of the analyses conducted were cross-sectional, and more longitudinal work is needed. Several studies in their review identified racial<sup>36</sup> or gender differences.<sup>18</sup> Of the 4 longitudinal studies included in their review, the 2 studies that assessed risk over time for body mass index (BMI) at or above the 95th percentile for age and gender<sup>34,36</sup> found that family meal frequency was a protective factor (although only in non-Hispanic white youth in 1 study<sup>36</sup>). The 2 studies that assessed risk over time for BMI at or above the 85th percentile had null findings.<sup>18,37</sup> The 3 studies of family meal frequency and weight status among youth that were not included in this prior review were all cross-sectional and are described in detail here.<sup>30-32</sup>

Wurbach and colleagues<sup>30</sup> assessed associations between the frequency of main meals (breakfast, lunch, and dinner) eaten together with all family members and overweight status (using age- and gender-adjusted BMI > 90th percentile) among 1,571 school-aged children in East Germany. Their analyses included covariates measuring the mother's and father's weight status, overall meal frequency, father's education, breakfast consumption, and parental employment. They did not find significant associations between family meal frequency and child weight status; however, their meal frequency categories were not specified.

Rollins and colleagues<sup>31</sup> used multinomial logistic regression to test the association between family meal frequency and weight status while assessing the moderating effects of household structure, education, poverty level, sex, and racial/ethnic group among 16,770 Hispanic, non-Hispanic white, and non-Hispanic black children ages 6–11 years. They found a significant inverse association between family meal frequency and obesity (BMI  $\geq$  95th percentile) only among non-Hispanic white children and only when children who ate family meals every day were compared with children who ate family meals a few days per week or less. They also found a moderating effect for sex among a subsample: family meal frequency was marginally protective against obesity among non-Hispanic

black boys but not girls. Contrary to previous research findings, they found that Hispanic boys from low-education households who reported high family meal frequency were marginally at an increased risk for obesity compared with girls in similar households. This study suggests a need for further exploration of differences across ethnic/racial and income groups with regard to the types of food and the context of family meals.

Goldfield and colleagues<sup>32</sup> assessed associations between family meal frequency and BMI among a convenience sample of 1,764 Canadian school children/adolescents (mean age, 14 years) from well-educated homes. The frequency of family meals was assessed differently from many studies in that family meals were specified to occur while sitting at the table at home and the response options included “never or a few times per year,” “once or several times a month,” “once or several times a week,” “once a day,” or “ $\geq$  2 times per day.” In addition, their outcome measure was BMI rather than age- and gender-adjusted BMI or weight status per se. Their analyses were stratified by gender, and covariates included age, parental education, and snack food eating. The authors found a significant and inverse association between family meal frequency and weight status among girls but not boys.

*Contextual issues for weight status: types of food and meal sources.* The studies of family meal frequency and weight status have similar contextual issues as those examining the relationship between family meal frequency and dietary outcomes; namely, the type and sources of food are important. A recent study that assessed the purchase frequency of away-from-home food sources for family dinner (fast food, other restaurant purchases, home delivery, and takeout foods) and associations with weight status and percent body fat found that the odds of overweight/obesity were considerably greater when adolescents reported at least 1 away-from-home dinner purchase in the past week.<sup>50</sup> Mean percent body fat was significantly greater with at least weekly purchases of family

dinner from fast-food restaurants and takeout sources. More research is needed to understand the potential mediating or moderating effects of meal source and types in the association between family meal frequency and weight outcomes.

*Limitations of studies with dietary and/or weight outcomes.* Although several of the studies that assessed associations with family meal frequency among youth included indicators of SES in the analyses,<sup>13,16-18,20</sup> some studies described in the previous reviews did not consider SES,<sup>12,14,15,23,26,37,38</sup> even though 1 of the earliest studies on family meals identified disparities in the frequency of family meals among youth from diverse SES backgrounds.<sup>13</sup> Thus, the impact of SES on associations between family meal frequency and dietary and weight outcomes is unknown in some of the studies. One study of dietary outcomes, not included in any of the previous reviews, conducted only Spearman correlations between family meal frequency and dietary outcomes (no covariates).<sup>27</sup> Of the more recent studies of weight outcomes, 1 tested for the moderating effects of SES-related variables,<sup>31</sup> and 2 included parental education in their models.<sup>30,32</sup> Of the studies that assessed weight outcomes, only about half used directly measured BMI,<sup>25,30,32-35</sup> whereas the other half relied on self- or parent-reported height and weight.<sup>18,24,31,36,37</sup> However, there is a balance between collecting directly measured BMI data and sample size. Generally, the larger studies used self-reported BMI data because often it is unfeasible to directly measure height and weight on such large samples, yet the large samples allow for more extensive analysis and inclusion of covariates. Moreover, research has shown high correlations between measured and self-reported height and weight.<sup>51</sup> Future research should include objectively measured height and weight whenever possible, and analyses should address potential SES differences.

*Summary of studies with dietary and/or weight outcomes.* The findings of the new studies included in this review corroborate the findings of the studies assessed in previous reviews

by demonstrating the significant and positive cross-sectional associations between family meal frequency and dietary outcomes among children and adolescents, even when family meal frequency was defined differently across studies. The 1 prospective study to date, among adolescents, had similar findings.<sup>16</sup> Clearly, the relationship between family meal frequency and weight status among youth is complicated, particularly as children age, and appears to be influenced by gender and race/ethnicity. More prospective studies that assess potential mechanisms such as how much is eaten and the types and sources of foods served at meals, while considering important demographic characteristics, are needed to fully understand these associations.

*Young and Middle Adulthood Literature.* Several studies (n = 9) examined the potential benefits of having shared meals, the practice of eating together with family or household members, for young and middle-aged adults. Eight of the 9 studies in adults reported on cross-sectional analyses,<sup>28,52-58</sup> and 1 other study reported on associations between having family meals during adolescence and outcomes in early young adulthood.<sup>19</sup> Associations of shared meal frequency with dietary outcomes were examined by 7 studies<sup>19,28,52,53,55,57,58</sup> and 3 studies assessed associations with weight status.<sup>54,56,58</sup> Most studies reported on analyses in samples of parents with dependent children<sup>28,52,53,55,56,58</sup>; only 3 studies reported on analyses conducted in more general population samples of adults living with other household members of various ages and relationships.<sup>19,54,57</sup> Although just 2 of these studies considered specific mealtimes (eg, breakfast, lunch, dinner)<sup>52,53</sup> and only 2 studies examined food sources or settings for shared meals,<sup>55,56</sup> an additional 2 studies among parents reported on associations between frequency of purchasing shared meals from restaurants and dietary or weight-related outcomes.<sup>20,50</sup>

*Dietary outcomes.* Of the 7 studies that examined associations of shared meal frequency with dietary out-

comes in young or middle-aged adults, 5 cross-sectional studies<sup>28,52,55,57,58</sup> and 1 prospective study<sup>19</sup> found some beneficial evidence. Shared meal frequency was associated with an overall healthy eating score; higher intakes of fruit and vegetables, milk products, whole grains, fiber, and some key nutrients; lower intakes of snacks and soft drinks; and less frequent fast-food restaurant use. Evidence suggesting there were nutrition benefits associated with shared meals was found among males and females; however, not all markers were consistently observed for both genders or across studies. Results from 2 studies that specifically examined associations between frequency of eating together at breakfast and dietary outcomes were mixed: 1 study found that meal frequency was associated with multiple markers of better dietary intake,<sup>52</sup> whereas the other study showed no association.<sup>53</sup> Furthermore, with regard to mealtime context, results from a small number of studies suggested that associations of shared meals with markers of better dietary intake may be specific to meals prepared at home.<sup>20,55</sup>

*Contextual issues for dietary outcomes: types of food and meal sources.* As mentioned above, 1 study focused on the frequency of purchasing shared meals from restaurants, which reported on associations with dietary outcomes in a population-based sample of 902 parents of adolescents participating in Project EAT-I in Minneapolis and St Paul, Minnesota.<sup>20</sup> Parents reported how often they purchased food from a fast-food restaurant for a family meal eaten at the restaurant or at home in the past week and responded to brief measures of fruit and vegetable intake, dairy intake, salty snack consumption, and overall fast-food restaurant use. The sample of primarily female and married caregivers indicated that purchasing meals at fast-food restaurants was common; 60% of the parents reported purchasing food for at least 1 family meal in the past week, including 9% that purchased  $\geq 3$  meals. Results, accounting for racial/ethnic differences in the frequency of purchasing food for family meals at fast-food restaurants, showed that purchase

frequency was positively associated with overall fast-food restaurant use and intake of salty snack foods, and negatively associated with vegetable intake. Compared with parents who never purchased food for a family meal at a fast-food restaurant, those who purchased  $\geq 3$  family meals in the past week reported eating food from a fast-food restaurant an overall average of 2.5 additional times per week.

*Contextual issues for dietary outcomes: gender differences.* Study findings with regard to an association between shared meal frequency and dietary outcomes also suggest there may be differences across gender. One 2008–2009 survey, conducted in a population-based sample of 2,052 young adults (mean age, 25.3 years) participating in Project EAT-III, asked respondents to report how often they had eaten a meal together with all or most other household members in the past week.<sup>57</sup> Associations between meal frequency and dietary outcomes were examined using data collected with a food frequency questionnaire and accounted for several potential confounding factors, including age, race/ethnicity, employment status, parental status, living situations, and family meal frequency in adolescence. The results showed that the frequency of shared meals was associated with higher intake of fruit among males and females, but most observed benefits were found only for females. Among females, shared meal frequency was also associated with higher intakes of vegetables, milk products, fiber, calcium, iron, and potassium. Thus, particularly for young adults, findings to date suggest that contextual issues specific to gender may modify relationships between shared meals and dietary outcomes and should be carefully investigated in future research.

*Weight outcomes.* Of the 3 studies that examined shared meal frequency and weight status, 2 found some evidence of a protective association.<sup>54,56</sup> These 2 studies reported that shared meal frequency was associated with lower BMI, but further highlighted the likely importance of contextual factors and gender differences, as

discussed below. Two additional studies, which did not assess overall frequency of shared meals, conversely reported associations between purchasing shared meals from restaurants and higher BMI.<sup>20,50</sup>

For example, a 2009 telephone survey, in a nationally representative sample of adults, asked respondents who were not living alone ( $n = 882$ ; mean age, 49.2 years) to report how often in a typical week they ate a meal together with family members living in the same household.<sup>54</sup> Associations between meal frequency and weight status were examined while accounting for gender, age, race/ethnicity, marital status, educational attainment, employment status, and the presence of children  $< 18$  years of age in the household. In the overall sample, meal frequency was unrelated to BMI, overweight status, or obese status. However, further exploration of an interaction between meal frequency and the presence of children in the household showed that meal frequency was associated with lower BMI among households with children and unrelated to BMI in households without children. Thus, the presence of children in the home may be an important modifying factor in associations between shared meals and weight status among adults, because it is possible that parents feel it is their responsibility to serve more healthful foods at meals with children.

The other study to observe an association between shared meal frequency and weight status in adults was conducted in a convenience sample of families visiting a large, Eastern United States university with prospective students.<sup>56</sup> There were 86 fathers (mean age, 53.4 years) and 92 mothers (mean age, 49.6 years) who reported how often during a typical week they ate a meal together with their whole household family at home and, separately, how often they ate a meal together outside the home or at a restaurant. Associations between meal frequency and weight status were examined for home and away-from-home settings while accounting for age, race/ethnicity, marital status, educational attainment, and SES. Among fathers, frequency of family meals at home was inversely related to BMI, whereas frequency of family meals in away-from-home settings

was positively related to BMI. Among mothers, no association between frequency of family meals and weight status was found for either setting. Thus, similar to dietary outcomes, the modifying effects of gender may be important in the association between shared meals and weight status for adults, although these findings could be specific to this sample of parents of college-seeking youth.

*Limitations of studies with dietary and/or weight outcomes.* Common limitations of the studies reviewed here relate to the cross-sectional nature of existing research, lack of investigations in adults without dependent children, and the complexity of assessing mealtime contexts. Additional longitudinal studies are needed to provide information about the temporal nature of associations between increasing the frequency of shared meals and changes in dietary intake and weight status over time. Because many educated women delay having children until their later twenties or beyond,<sup>59</sup> and many others do not live with their children all the time, it will be important for additional studies to examine patterns of shared meals among young and middle-aged adults in households without children. Also, future studies should examine the significance of eating meals with other individuals who do not reside in the same household. It is possible that individuals who do not report eating together with their family or other household members instead often share meals with colleagues, friends, or a partner living outside their household. The implications of eating together for dietary intake may differ according to the living situations of individuals, because it is likely that meals shared with others not residing in the same household are more often purchased at restaurants or cafeterias compared with meals prepared at home.

*Summary of studies with dietary and/or weight outcomes.* Most existing studies suggest that eating together with family or other household members in adulthood is associated with markers of better dietary intake, although findings are not as consistently positive as they are for youth,



and more gender differences were identified. Less evidence supports an association between frequency of shared meals and weight status among adults than for dietary outcomes. It is difficult to draw conclusions given the small number of published reports using varied study designs and demographically different samples. However, the results suggest that the potential benefits of eating together with family or household members in adulthood are likely specific to shared meals involving food prepared at home.

### Late Adulthood

**Literature.** In the literature on children, adolescents, and young and middle-aged adults, the effect of commensal mealtimes is measured by family meal frequency; however, in the literature on late adulthood or older adults, the impact of commensal eating is often measured by the frequency of meals eaten alone or a binary outcome variable of whether most meals are eaten alone. In late adulthood samples, 7 studies have analyzed the relationship between eating alone and dietary<sup>60-65</sup> or weight outcomes.<sup>61,66</sup> However, samples of older adults were all community-dwelling and most did not assess with whom older adults were eating when not eating alone, or if they were partaking in congregate meals,<sup>60-62,64-66</sup> with the exception of 1 study that assessed congregate meal participants.<sup>63</sup> Like the studies examined for young and middle-aged adults, most studies were cross-sectional; however, 1 study used a retrospective cohort design<sup>66</sup> and another was an epidemiological follow-up survey.<sup>65</sup> All studies examined community-dwelling adults > 59 years of age, with 1 study specifically sampling men<sup>60</sup> and another sampling males and females who had been widowed for > 6 months.<sup>66</sup>

**Dietary outcomes.** Five of the 6 studies assessing dietary outcomes of eating alone reported some evidence of deleterious effects,<sup>60,61,63-65</sup> and 1 study reported no difference between those who did and did not report eating alone.<sup>62</sup> Eating alone was associated with increased likelihood of skipping meals, which was signifi-

cantly associated with lower intakes of nutrients and energy.<sup>61</sup> Another study found that eating alone was significantly associated with lower intakes of energy, calcium, zinc, and iron for men and women; however, when controlling for age, gastrointestinal problems, higher medication use, not eating snacks, income, and poor appetite, lower energy intake remained statistically significant only for men.<sup>64</sup> No other gender differences in dietary outcomes were noted in the studies of mixed gender samples. In their sample of only low-income men, Holmes and colleagues<sup>60</sup> found that those who ate alone had significantly higher intakes of sodium and energy-dense, nutrient-poor foods such as white bread, fat spreads, and non-diet soft drinks compared with those eating weekday meals with others. One study that used the Nutrition Screening Initiative checklist, which measures nutritional risk for diets low in nutrients,<sup>67</sup> found that participants who reported eating alone most of the time were more likely to be categorized into the nutritionally high-risk category compared with the moderate or low-risk categories.<sup>63</sup> In addition, eating alone most of the time was not related to SES, but was directly related to being older, living in a rural area, and living alone. Thus, the literature examining commensal meal patterns in late adulthood indicates that eating alone is likely associated with poorer nutritional health.

**Weight outcomes.** The 2 studies reporting associations between eating alone and weight outcomes among older adult samples provided mixed results. Using self-reported height and weight, 1 cross-sectional study found that those who ate alone were significantly more likely to skip meals, which was significantly and positively associated with BMI<sup>61</sup>; this warrants further longitudinal study to assess these associations with BMI over time. The other study used a retrospective cohort design and found that those experiencing widowhood were significantly more likely to report eating alone and had significantly higher odds of weight loss. However, upon further analysis with logistic regression, eating alone was not associated

with a significant increase in odds for weight loss when controlling for widowhood, age, years of widowhood, education, cognitive status, depression, physical functioning, subjective appetite evaluation, number of snacks eaten per day, frequency of eating homemade food, and baseline weight.<sup>66</sup> Questions about what should be included as a covariate often arise in discussions about shared meals and associations with outcomes and should be considered carefully. Thus, findings of associations between eating alone and weight outcomes among adults in later life are limited and warrant further study.

**Limitations of studies with dietary and/or weight outcomes.** Unlike studies of youth, half of the studies on late adulthood did not discuss whether adjustment for potential confounding variables occurred in the analyses,<sup>60,61</sup> or failed to specify which variables were considered as covariates.<sup>62</sup> Dietary intake assessment methods varied across studies ranging from food frequencies<sup>66</sup> to dietary recall interviews.<sup>60-62,64</sup> However, even when a high-quality assessment technique such as a 24-hour dietary recall interview was used to measure dietary intake, some studies only assessed diet for 1 day<sup>61,64</sup> and may not have adequately represented usual intake, especially intake of micronutrients.

**Summary of studies with dietary and/or weight outcomes.** Similar to studies of the benefits of family meals for young and middle-aged adults, the literature on late adulthood indicates that there may be important positive dietary outcomes associated with eating meals with other people. However, given the small number of studies, limitations in methodology, and variations in sample populations and study designs, it is difficult to say this unequivocally. In addition, no studies assessed with whom meals were being consumed (when not consumed alone). This context may have a larger role in dietary intake or weight status, because eating with family, friends, or neighbors in the home environment may be different from eating with others in a congregate meal setting or alone. Only 2 studies assessed weight outcomes, and further

research will be needed to clarify the potential for commensal meals to protect adults in late life from unhealthy weight gains or unintentional weight loss.

## DISCUSSION

The findings from this review provide clear evidence that family meals (among youth) and shared meals (among adults) are associated with better dietary intake and that these findings transcend the lifespan, although the strength of associations may vary by gender for adults. Although it is encouraging to see positive associations between family or shared meals and dietary outcomes across the lifespan, barriers to eating meals together (eg, busy families, contextual factors in low-SES households) exist, and it is important to remember that most children and adults do not meet recommended intake levels of healthful foods regardless of their participation in family meals.<sup>1,16</sup> Thus, programs promoting family meals must also promote healthful food offerings and consider what foods and beverages are consumed at other meals and snacks throughout the day. Such programs may struggle with promoting healthful foods because of barriers such as taste preferences for sweet or salty foods,<sup>68</sup> unwillingness to try new foods,<sup>40,44</sup> time for food preparation,<sup>44</sup> and poor access to affordably priced fruits and vegetables.<sup>69</sup>

The findings of the current review suggest several areas in which future research is needed (Table 2). A great deal of previous cross-sectional research has focused on associations between family meal frequency and dietary and weight-related outcomes among children and adolescents; thus, more prospective studies of the mechanisms contributing to more healthful dietary outcomes are needed, as well as a greater understanding of why the dietary benefits of family meals do not consistently extend to weight-related outcomes. Among adults, more research is needed to understand gender differences, the influences of where a meal is prepared, and having children in the home. The least amount is known

about the dietary and weight-related associations of shared meals among older adults. Thus, considerable high-quality research studies are needed to better understand what meals look like among older adults, where and with whom meals are consumed, and how these contextual mealtime factors, gender, and SES contribute to dietary and weight-related outcomes. Mixed-methods research may prove to be a useful platform to qualitatively explore the mealtime experience and context, which will inform quantitative research assessing potential mechanisms.

Programs promoting family or shared meals among families with children and educating youth and adults on their positive dietary benefits are warranted by research findings. In this regard, nutrition professionals are key players. Now is the time for the field to move forward with implementing and evaluating interventions and policies designed to build on existing efforts to increase the frequency and improve the quality of food served at family meals. Careful measurement and testing of possible mechanisms contributing to positive outcomes will be essential; thus, rigorous study designs such as randomized controlled trials are needed. Although substantial efforts have been implemented nationally to promote family meals (eg, Washington State, West Virginia, often in conjunction with university extension programs) and should be applauded, a thorough search indicates that only 1 program, Washington State, has published evaluations of their effectiveness in increasing family meal frequency,<sup>70</sup> and none have published evaluations of effectiveness with regard to increasing dietary quality or preventing excess weight gain. One published evaluation of an initiative designed to promote family meals<sup>40</sup> suggested that it may be particularly beneficial to address barriers such as lack of time or support for meals and parenting knowledge. This could be done through messages targeted to parents and teaching food preparation skills to school-age children and adolescents so they can help with family meal planning and preparation while learning a life skill. However, families are complex and

differ in many ways, and a broad, blanket promotion of family meals to increase dietary quality without thought and consideration of between-family differences is not likely to be successful. For example, a recent evaluation of trends in family meals among youth suggests that considerable efforts are needed to target lower-income families.<sup>71</sup> Broad messages regarding eating together may not be as effective for families in which adults are working multiple jobs and stress levels are high. Prospective research suggests that there is a possible persistence of benefits over time when good habits are established at a young age; thus, programs targeting youth are recommended.

The findings of associations between family or shared meals and weight outcomes across the lifespan are less consistent and more complicated than those observed for dietary outcomes. The mixed results may have a lot to do with demographic characteristics and contextual issues. Among youth, associations between family meal frequency and weight status are mixed and vary by demographic characteristics such as gender and race, with no clear pattern. With regard to age, more positive associations have been seen for children compared with adolescents. The present review indicates that there may be gender differences in associations between shared meals and weight status among adults, with weight-related benefits seen for men who eat family meals at home. Furthermore, the results of 1 study indicated that the presence of children in a household may moderate the association between adult weight status and family meal frequency<sup>54</sup>; it is possible that providing a meal for children is a motivator for adult members of a household to serve and model consumption of healthful foods at meals. Much less is known about with whom older adults eat meals compared with younger populations; thus, research is needed in this area to understand how the environment and context of shared meals are associated with weight outcomes among older adults. These findings suggest that there may be sensitive periods in one's life when family or shared meals have somewhat differential effects on weight.

**Table 2.** Suggestions for Future Research Concerning Family Meals, by Population**Children and Adolescents**

- Examine types, quality, and portions of foods served and eaten at shared meals and how much is eaten and whether these are mechanisms for associations between family meal frequency and better dietary intake in youth.
- Explore whether family characteristics such as positive communication and healthy dynamics are mechanisms for positive dietary associations with family meals.
- Investigate whether meal location has implications for nutritional quality and if it confounds associations between meal frequency and dietary and weight outcomes.
- Assess use of electronic media at mealtimes and its association with dietary and weight outcomes.
- Assess mechanisms of cultural/racial differences in associations between family meal frequency and weight outcomes (prospective studies in particular).
- Carry out prospective investigations of associations between family meal frequency and weight outcomes with valid and reliable measures of socioeconomic status and objectively measured body mass index.
- Conduct research investigating dietary and weight-related outcomes of eating with others, not just family members.
- Conduct intergenerational studies to examine associations between family meal experiences as a child and later as a parent to see what gets transmitted, and mitigating factors.

**Adults**

- Distinguish effects of shared meals eaten at home vs those eaten outside of the home.
- Assess mechanisms that differentiate positive dietary outcomes of shared meals for women compared with men.
- Examine associations of the modifying effects of the presence of children in the home and adult gender on associations between family meal frequency and weight outcomes among adults.
- Conduct longitudinal, prospective investigations of associations between shared meals and dietary and weight-related outcomes.
- Examine dietary and weight-related outcomes associated with eating with others, not just family members.

**Older Adults**

- Include thorough descriptions of meal patterns and whether and with whom they are shared and how these impact dietary and weight-related outcomes.
- Assess associations between shared meal frequency and dietary and weight-related outcomes using valid and reliable measurement of dietary intake and consideration of important covariates (eg, living alone, cognitive status, age, widowhood, meal skipping) with large samples.
- Distinguish effects of meals eaten at home vs those eaten outside of the home.
- Conduct longitudinal, prospective investigations of associations between shared meals and dietary and weight-related outcomes.
- Examine dietary and weight-related outcomes associated with eating with others, not just family members.

The context of family or shared meals also appears to be important in relation to weight status. For youth and adults, the associations between meal frequency and weight status appear to be influenced by the source of meals and the types of food served at meals, and eating while watching television has been shown to be detrimental to weight among youth. Research has shown that many families eat meals outside the home,<sup>43</sup> and eat-

ing foods prepared outside the home is associated with higher BMI and overweight status among adolescents<sup>20,50</sup> and adults,<sup>20</sup> whereas meal skipping and associated higher BMI may be more of an issue with older adults.<sup>61</sup> The findings from this review identified some key contextual factors that will be important to assess in future research for this line of research to fully develop into effective health promotion programs. Further-

more, when more research has been conducted in these areas, a meta-analytic assessment will be warranted.

Methodological issues that appear to influence the study findings presented in this review across age groups include poor measurement of dietary intake and self-reported BMI, although most of the recent studies had validated measures of dietary intake and directly assessed height and weight (vs using self-report). Of



greater concern is the wide variability among studies as to the inclusion of potential confounding variables in analyses, particularly for dietary intake and the variability in how meal-time frequency was measured. Careful consideration of covariates is needed in future research to fully inform causal pathways between family meal frequency and dietary and weight outcomes. For example, if one investigates whether eating together leads to healthier food being served, which leads to better dietary intake, it may not be appropriate to control for the type of food served at meals. Moreover, this review's exclusion of studies assessing residential dining among older adults because of their failure to assess shared meal frequency, and the limited information about eating companions for older adults precluded detailed recommendations for health programming for this population. Despite the methodological issues raised here, positive associations between family or shared meals and dietary outcomes were consistent across the lifespan; however, these issues may contribute substantially to the inconsistent findings for weight outcomes. In contrast to adults, reporter bias may be more of an issue for studies in youth, because often parents report for children and perceptions may be different when obtained by a proxy.<sup>72,73</sup> Future research using psychometrically sound and consistent measures of eating together, objective measurements of body composition and nutrition biomarkers, and analyses that fully account for potential confounding factors are needed to build understanding of mechanisms leading to the benefits associated with eating together (ie, improved dietary intake, reduced prevalence of overweight) at each developmental stage. Other contextual factors of relevance to understanding mechanisms of benefit such as the location of meals, media use at meals, the nature of relationships with meal companions, and food preparation and shopping habits have not been consistently considered in existing research, and thus need to be addressed by future studies as well to better inform intervention work.

This review summarized the research literature on associations be-

tween family and shared meal frequency and dietary outcomes as well as weight status across the lifespan, to draw attention to knowledge gaps and provide guidance for future studies. The evidence is clear regarding the dietary benefits of family or shared meals for youth and adults, and findings suggest benefits for older adults, although more research is needed to confirm the limited research findings associated with this population. Associations between family or shared meals and weight outcomes are more complex; thus, capitalizing on the positive dietary benefits of family and shared meals, while addressing the types and sources of foods served at meals as well as portion sizes, may have a significant impact on obesity prevention and reduction.

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