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Nutritional Quality of Congregate and Home-Delivered Meals Offered in the Title III-C Nutrition Services Program: An Examination Utilizing the Healthy Eating Index Tool

Box 1. Data sources

- The study team collected three days of menu data from 92 randomly selected LSPs during a one-week period from October 2015 to January 2016.
- Telephone interviewers used the Automated Self-Administered 24-hour dietary recall system (ASA24) to collect detailed information on the foods provided in the midday meal offered or delivered to participants. If choices of entrees or sides were offered, information was collected only for the most popular options.
- For each food reported, ASA24 collected descriptive details needed for an accurate nutrient analysis, including characteristics of the food, such as the form (for example, fresh, frozen, or canned), preparation method (for example, roasted or fried; prepared from a recipe or commercially prepared), characteristics that affect nutrient content (for example, low-fat or fat-free, or reduced or low sodium), and portion size.
- The analysis included 240 menus for congregate meals and 234 menus for home-delivered meals.

BACKGROUND

The Administration on Aging (AoA) administers the Older Americans Act (OAA) Title III-C Nutrition Services Program (NSP). The goals of the NSP are to reduce hunger and food security, promote socialization, and promote the health and well-being of older adults by providing access to nutrition and other health promotion services. To rebalance long-term care provision away from institutionalization and toward home- and community-based services, the NSP promotes access to nutritious meals, facilitates social contacts, supports family caregivers, and provides meaningful volunteer opportunities, all in an effort to help older adults maintain their independence in their homes and communities.

The NSP provides meals and nutrition services to adults ages 60 and older, including nutrition education, screening, and counseling. These services aim to delay the onset of adverse health conditions that result from poor nutrition or sedentary behavior. Other OAA programming provides non-nutrition services such as transportation and case management. Meals and services are provided to older adults in congregate meal sites located in senior centers or other community settings. In addition, the NSP provides home-delivered meals and services to homebound older adults. The NSP does not have a financial means test; rather, it targets services to those with the greatest economic or social need. Participants are not charged for meals, but are encouraged to voluntarily contribute toward the total cost of the meal.

Local service providers (LSPs) who work under the auspices of State Units on Aging and Area Agencies on Aging provide congregate and home-delivered meals. Some LSPs offer both congregate and home-delivered meals, and some LSPs offer only one type of meal. The OAA requires that meals comply with federal nutrition quality standards. These standards require that LSPs provide meals that adhere to the current *Dietary Guidelines for Americans*, provide a minimum of one-third of the Dietary Reference Intakes (DRIs), meet state and local food safety and sanitation requirements, and are appealing to older adults (Administration for Community Living 2017). Because the NSP is state administered, each state unit is responsible for implementing the nutrition standards to meet the needs of the older adults that it serves. Some state units require developing menus that use nutrient analysis, a meal pattern, or a combination of both (Administration for Community Living 2017).

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Box 2. HEI-2010 components

Adequacy components (maximum score)

- Total fruit (5)
- Whole fruit (5)
- Total vegetables (5)
- Greens and beans (5)
- Whole grains (10)
- Dairy (10)
- Total protein foods (5)
- Seafood and plant proteins (5)
- Fatty acids (10)

Moderation components (maximum score)

- Refined grains (10)
- Sodium (10)
- Empty calories (20)

PURPOSE

This issue brief describes the nutritional quality of congregate and home-delivered meals offered through the NSP and examines how well the meals conform to the 2010 *Dietary Guidelines for Americans*, which were in effect at the time of the data collection. The data used in the analysis were collected as part of the Title III-C NSP Evaluation, which Mathematica Policy Research conducted under contract to the AoA (Box 1). The evaluation consisted of a process evaluation of program administration and service delivery (Mabli et al. 2015), a program cost analysis (Ziegler et al. 2015), and an evaluation of the effect of the program on participants' outcomes (Mabli et al. 2017).

The Healthy Eating Index-2010

The Healthy Eating Index (HEI)-2010 was used to assess the nutritional quality of congregate and home-delivered meals. The HEI-2010 is a tool that assesses conformance to key recommendations of the 2010 *Dietary Guidelines* (Guenther et al. 2013). The U.S. Department of Agriculture (USDA) and U.S. Department of Health and Human Services (HHS) use the HEI as a tool to monitor the quality of foods consumed by the U.S. population overall, as well as to monitor progress toward healthier eating habits among participants in food assistance programs (HHS and USDA, 2015a; Guenther et al. 2007). The HEI-2010 has been used to measure the nutritional quality of meals offered in the National School Lunch Program and School Breakfast Program (Gearan et al. forthcoming) and meals offered in fast food restaurants (Kirkpatrick et al. 2014).

The HEI-2010 is a scoring metric comprising 12 components, each reflecting a key aspect of nutritional quality, and a total score that measures overall nutritional quality. The standards used to assign HEI-2010 component scores are expressed on a density basis (that is, amounts per 1,000 calories or a percentage of calories) rather than absolute amounts of foods. The use of such standards reflects the recommendation that people should strive to meet food group and nutrient guidelines while maintaining calorie balance, rather than meeting these guidelines simply by consuming large quantities of food.

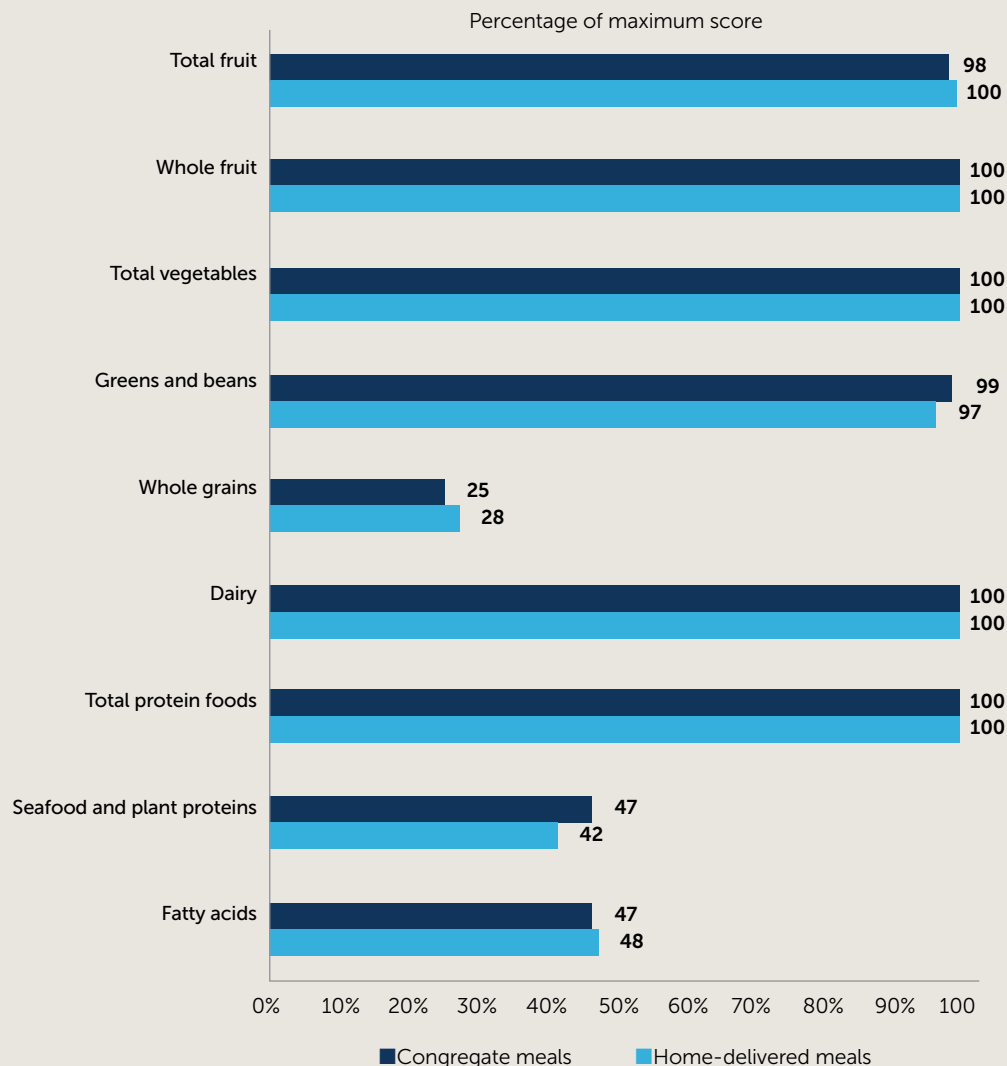
The index includes nine adequacy components, which assess intakes of dietary components that people are recommended to consume, and three moderation components, which assess intakes of dietary components that people are recommended to limit (Box 2). Scores for individual components range from 5 to 20 (Guenther et al. 2013). In all cases, a higher score indicates better nutritional quality—higher concentrations for the adequacy components and lower concentrations for the moderation components. The total HEI-2010 score is obtained by summing scores across the 12 components, with a maximum score of 100.

For each LSP, the research team computed mean HEI-2010 scores for congregate and home-delivered meals based on the average of three days of menus within a one-week period. The team used the population ratio method to estimate HEI scores. This method involves calculating mean amounts of calories, nutrients, and food groups across all LSPs, and then calculating the ratios of the means with calories in the denominator, and comparing ratios with HEI standards for scoring. The population ratio method is recommended instead of an individual-level approach because it may reduce bias when data do not reflect usual or long-term offerings (Freedman et al. 2008).

FINDINGS

HEI-2010 component scores indicate that both congregate and home-delivered meals are highly consistent with 2010 *Dietary Guidelines* recommendations for six of the nine adequacy components. On average, both types of meals achieved perfect or nearly perfect scores (97 to 100 percent of the possible maximum) for total fruit, whole fruit, total vegetables, greens and beans, dairy, and total protein foods (Figure 1). Average scores were considerably lower for the other three adequacy components. For the seafood and plant proteins and fatty acids components, average scores for both types of meals were less than 50 percent (42 to 48 percent) of the possible maximum. Average scores for whole grains were substantially lower—equivalent to 25 to 28 percent of the possible maximum. The lower scores for these three components indicate that congregate and home-delivered meals were low in these dietary components, relative to 2010 *Dietary Guidelines* recommendations.

FIGURE 1:
HEI-2010 adequacy
components: Average
scores expressed
as a percentage of
possible maximum
scores



Source: Administration on Aging Title III-C Nutrition Services Program menu survey, 2015–2016, weighted data.
 Note: Higher scores for adequacy components reflect higher concentrations in meals, and thus, higher nutritional quality.

Because recommendations focus on limiting intakes of refined grains, sodium, and empty calories, higher scores for these components reflect lower concentrations in meals. For two of the three moderation components—refined grains and empty calories¹—average scores for both congregate and home-delivered meals were equivalent to 75 percent or more of the possible maximum (Figure 2). Average scores were slightly higher for refined grains (80 to 83 percent of the possible maximum) than for empty calories (75 to 79 percent). These scores indicate that, on average, neither congregate nor home-delivered meals provided concentrated sources of refined grains or empty calories, but both types of meals had higher concentrations of

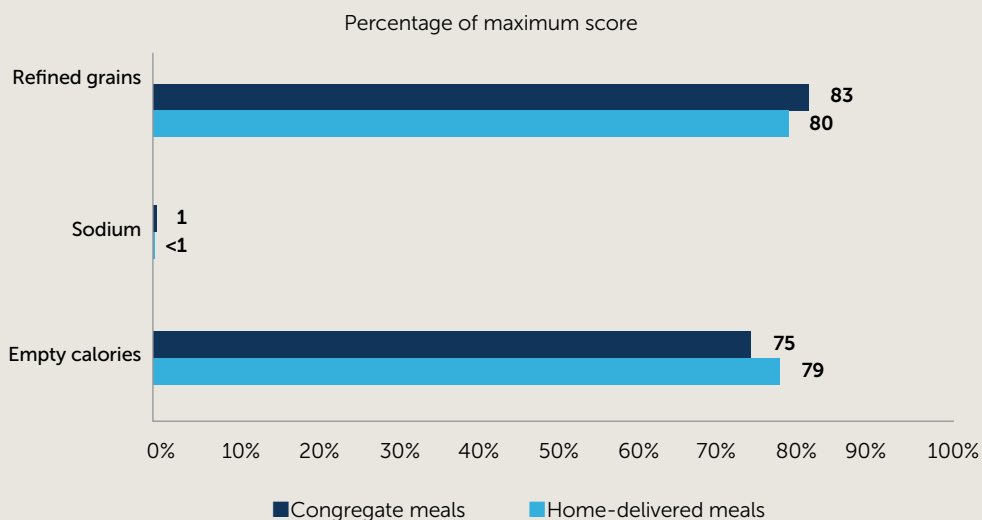
these dietary components than recommended in the 2010 *Dietary Guidelines*.

For both congregate and home-delivered meals, HEI-2010 scores were very low for sodium (less than or equal to 1 percent of the possible maximum). This finding indicates that both types of meals were very high in sodium, relative to the 2010 *Dietary Guidelines* recommendations. Foods that contributed substantial amounts of sodium included processed meats such as ham and sausage, and mixed dishes such as chicken teriyaki, beef stroganoff, chili, and gumbo.

For the HEI-2010 overall, average total scores for both congregate and home-delivered meals were

¹ Calories from solid fats, including the fat from animal foods in the dairy and total protein foods components, and added sugars.

FIGURE 2:
HEI-2010 moderation
components: Average
scores expressed as a
percentage of possible
maximum scores



Source: Administration on Aging Title III-C Nutrition Services Program menu survey, 2015–2016, weighted data.
 Note: Higher scores for moderation components reflect lower concentrations in meals, and thus, higher nutritional quality.

equivalent to 68 percent of the maximum score (or 68 of a possible 100 points; Figure 3). To provide additional insight on the contributions program meals can make to participants’ overall diet quality, total HEI-2010 scores for congregate and home-delivered meals can be compared to the total scores for participants that consumed these meals. The total HEI-2010 scores for both types of meals (68 percent of the maximum score) are higher than the total HEI-2010 score for daily intakes of congregate (65.5 percent of the maximum score) or home-delivered (61.4 percent) meal participants (Mabli et al. 2017). This suggests that NSP meals make important contributions to the nutritional quality of NSP participants’ daily intakes and, on balance, are of higher nutritional quality than the meals and snacks NSP participants consume outside of the program.

Regional differences

To gain some perspective on the extent to which average HEI-2010 scores can vary based on geographic location, the research team examined scores for LSPs in the four U.S. Census regions (U.S. Census Bureau 2017). Because of small sample sizes of LSPs for the individual regions, findings are suggestive only and should be considered exploratory.

Overall, average HEI-2010 scores for the four regions did not differ substantially (by more than 5 percentage points) from the average scores reported for all LSPs combined (Figures 1–3 and the “All” columns in Table 1). However, there were some notable exceptions, in which component scores for particular regions varied by 10 percentage points or more, relative to the national average. For example, in the Northeast, both congregate and home-

The total HEI-2010 score measures the overall nutritional quality of meals. Total scores were **68%** of the maximum score for both congregate and home-delivered meals.



TABLE 1: HEI-2010 scores by U.S. Census region: Average scores expressed as a percentage of possible maximum scores

HEI-2010 component	Northeast region		Midwest region		South region		West region		All	
	Congregate meals	Home-delivered meals	Congregate meals	Home-delivered meals	Congregate meals	Home-delivered meals	Congregate meals	Home-delivered meals	Congregate meals	Home-delivered meals
Adequacy components (higher score indicates higher concentration in meals)										
Total fruit	95.6	99.2	93.1	84.7	93.9	92.3	93.6	98.9	98.3	99.5
Whole fruit	99.6	98.3	100.0	100.0	99.5	99.2	99.1	100.0	100.0	100.0
Total vegetables	100.0	99.6	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Greens and beans	91.5	83.2	73.2	70.1	99.8	99.4	95.4	90.6	98.8	96.6
Whole grains	24.3	32.4	21.9	31.6	20.4	20.2	32.2	27.5	25.3	27.8
Dairy	100.0	99.7	100.0	100.0	99.4	99.8	99.7	96.1	100.0	100.0
Total protein foods	99.8	97.2	100.0	100.0	100.0	100.0	99.9	100.0	100.0	100.0
Seafood and plant proteins	66.7	77.0	48.7	48.0	30.6	34.4	38.6	16.4	46.8	41.9
Fatty acids	47.3	57.5	45.5	45.8	40.3	41.8	55.1	49.6	46.8	47.8
Moderation components (higher score indicates lower concentration in meals)										
Refined grains	76.6	83.6	82.7	77.2	84.1	76.9	85.8	78.6	82.5	79.8
Sodium	3.6	13.1	2.5	0.5	0.7	3.0	13.4	8.7	0.5	0.1
Empty calories	77.7	76.5	74.6	78.9	69.5	72.3	75.1	84.5	75.2	78.9
Total score	68.4	71.6	65.9	66.4	64.6	64.9	70.0	68.2	67.8	68.2
Unweighted number of menus	51	45	78	72	72	75	39	42	240	234

Source: Administration on Aging Title III-C Nutrition Services Program menu survey, 2015–2016, weighted data.

delivered meals had substantially higher average scores for seafood and plant proteins (67 versus 47 percent for congregate meals and 77 versus 42 percent for home-delivered meals). In addition, among home-delivered meals, the average score for greens and beans was substantially lower (83 versus 97 percent) and the average score for fatty acids was substantially higher (58 versus 47 percent).

In the Midwest, average scores for greens and beans were also substantially lower than the national average (73 versus 99 percent for congregate meals and 70 versus 97 percent for home-delivered meals). In addition, among home-delivered meals, the average score for total fruit was substantially lower (85 versus 100 percent). In the South, the average score for seafood and plant proteins among congregate meals was substantially lower than the national average (31 versus 47 percent). Finally, in the West, average scores for seafood and plant proteins were substantially lower than the national average (39 versus 47 percent for congregate meals and 16 versus 42 percent for home-delivered meals).

These variations had relatively little impact on total HEI-2010 scores, on average, because higher scores for some components tended to compensate for lower scores on others. Compared with average total scores for congregate and home-delivered meals overall, average scores for regions and types of meals varied by 3 percentage points or less.

CONCLUSIONS

Average HEI-2010 scores for congregate and home-delivered meals offered in the NSP indicate that both types of meals are highly consistent with 2010 *Dietary Guidelines* recommendations for total fruit, whole fruit, total vegetables, greens and beans, dairy, and total protein foods. The data also reveal room for improvement in both types of meals to better align them with the *Dietary Guidelines*. The need for better alignment is greatest for sodium. Average HEI-2010 scores for sodium were substantially lower than for any other component, indicating that the concentration of sodium in congregate and home-delivered meals (sodium content per 1,000 calories) is well above the concentration recommended in the *Dietary Guidelines*. Given the magnitude of the needed reduction in sodium, it will likely take incremental steps over an extended period for NSP meals to comply fully with the *Dietary Guidelines* recommendations for sodium. Practical strategies that LSPs can use to reduce

sodium content of meals include (1) omit added salt in food preparation; (2) limit use of cured or processed meats; (3) limit use of high-sodium products, such as brined foods (pickles, olives, and sauerkraut), soy sauce and other condiments, and prepared packaged foods, soups, mixes, sauces, and salad dressings, or use low-sodium alternatives; (4) offer fresh, frozen, or low-sodium canned vegetables rather than regular canned vegetables (HHS 2005). However, since LSPs are required to provide meals that are appealing to participants' taste preferences, it will be important to also balance current dietary guidelines with participants' taste preferences.

It is well documented that the U.S. food supply and the typical American diet are high in sodium and that excess sodium intake is strongly associated with high blood pressure, which can increase risk of heart attack and stroke (Institute of Medicine 2010). In response, policymakers have instituted policies aimed at reducing sodium content in federally funded meals. For example, nutrition standards for school meals that went into effect in 2012 included sequential goals and a 10-year timeline for aligning the sodium content of school meals with the *Dietary Guidelines*. This approach recognized the fact that food manufacturers would need time to reformulate products commonly offered in school meals and schools would need time to build students' acceptance of lower-sodium meals (USDA 2012). In addition, the Centers for Disease Control and Prevention is working on public health strategies to promote population-wide sodium reduction. The agency has identified resources that LSPs can use to reduce the sodium content of congregate and home-delivered meals, and is working with the Centers for Medicare & Medicaid Services to lead the Million Hearts initiative, with the goal of preventing 1 million heart attacks and strokes (Centers for Disease Control and Prevention 2014; Levings et al. 2014).

Improvements are also needed for whole grains, given that scores for this component were roughly one-quarter of the maximum possible score. Intakes of whole grains are also far below recommended levels for the U.S. population overall (HHS and USDA 2015). The *Dietary Guidelines* recommend that at least half of all grains should be whole grain. The *Dietary Guidelines* provide several strategies for meeting this goal, which can be used by LSPs to increase whole grains in meals: (1) offer 100 percent whole-grain foods for at least half of the grains included in meals, and

(2) offer foods with at least 50 percent of the total weight as whole-grain ingredients.

Average HEI-2010 scores also indicate that improved conformance with 2010 *Dietary Guidelines* recommendations requires that meals incorporate more seafood and plant proteins and fats that provide essential fatty acids and fewer foods that provide empty calories. Strategies that LSPs can use to address these dietary components include the following (several strategies address more than one component): (1) offer more seafood entrees (twice per week), (2) incorporate legumes, nuts, and seeds into mixed dishes to replace some of the meat or poultry; (3) use oils rather than solid fats in preparing foods; (4) limit baked and frozen desserts, as well as fruit drinks and other sugar-sweetened beverages; and (5) offer low-fat and skim dairy products (HHS 2005; HHS and USDA 2015).

Regional variation in average scores for selected HEI components suggests regional variation in the types of foods included in NSP meals. These variations were most noteworthy for seafood and plant proteins (scores were highest in the Northeast) and greens and beans (scores were lowest in the Midwest). These variations had relatively little impact on total HEI-2010 scores, on average, because higher scores for some components tended to compensate for lower scores on others. Compared with average total scores for congregate and home-delivered meals overall, average scores for regions and types of meals varied by 3 percentage points or less.

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