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## Sodium-Reduction Strategies for Meals Prepared for Older Adults

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### Abstract

This article describes lessons learned from implementing sodium-reduction strategies in programs that provide meals to older adults in 2 New York counties, with one county replicating the approaches of the other. The implemented sodium-reduction strategies were product substitutions, recipe modifications, and cooking from scratch. Both counties were able to achieve modest sodium reductions in prepared meals. Lessons learned to implement sodium reduction strategies include the following: (1) identifying partners with shared experience and common goals; (2) engaging experts; (3) understanding the complexity of the meals system for older adults; (4) conducting sodium nutrient analysis; (5) making gradual and voluntary reductions to sodium content; and (6) working toward sustainable sodium reduction.

### Keywords

nutrition; older adults; sodium; sodium reduction

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More than 2.5 million older US adults receive prepared meals in congregate centers or through home-delivered meals programs.<sup>1,2</sup> Recent studies show that 1 meal from these sources contains, on average, 1400 mg of sodium,<sup>3</sup> which is nearly the *Dietary Guidelines for Americans*' daily recommended amount of 1500 mg for people 51 years or older.<sup>4</sup> The Older Americans Act requires that meals served through congregate and home-delivered meals programs comply with the most recent *Dietary Guidelines for Americans*.<sup>5</sup> Consuming too much sodium has been shown to increase blood pressure, which increases the risk for stroke, coronary heart disease, heart failure, and renal disease.<sup>6</sup> Older adults may have difficulty limiting their sodium intake in part because they rely on these prepared meals. There is an opportunity to work with programs that provide meals for this segment of the adult population to address the amount of sodium in offered meals.

Community-based sodium reduction is an emerging public health strategy. Until recently, public health approaches to reduce sodium intake, such as consumer awareness campaigns and product labeling, focused primarily on changing individual behavior.<sup>6,7</sup> However, less than a quarter of sodium intake is estimated to be in the control of individual consumers in terms of salting at the table or during cooking; the majority of sodium consumed is found in packaged and prepared foods and cannot be removed once it has been added.<sup>6,8,9</sup> In its 2010 report on sodium, the Institute of Medicine recommended that "food retailers, governments, businesses, institutions, and other large-scale organizations that purchase or distribute food should establish sodium specifications for the foods they purchase and the food operations they oversee."<sup>6(p. 290)</sup> In addition, approaches have been recommended specifically for government or institutional settings.<sup>10,11</sup> The typically high sodium content in congregate, institutional, and home-delivered meals make these programs an opportune place to implement sodium-reduction strategies.

This article describes lessons learned from implementing sodium-reduction strategies with programs that provide meals to older adult populations (ie, people 60 years or older) through the work of 2 New York counties—with the unique situation of one county (Broome) replicating the efforts of the other county (Schenectady). The purpose of this article is not to compare and contrast the 2 counties but to provide an account of their approach, share preliminary results, and offer overarching lessons learned.

## Background

In September 2010, the Centers for Disease Control and Prevention awarded funding to 6 communities through the Sodium Reduction in Communities Program; the goals of this program are to promote and implement sodium-reduction strategies, conduct evaluations of these efforts, and expand the evidence base on sodium-reduction strategies.<sup>12</sup> The funded communities are implementing sodium-reduction strategies in a variety of setting such as schools, independent restaurants, grocery stores, hospitals, and public and private worksites. Of the 6 funded communities, 2 are focusing on meals prepared for older adults. Schenectady County Public Health Services (Schenectady CPHS) and Broome County Health Department (Broome CHD) are implementing this Centers for Disease Control and Prevention–funded program in their respective counties. Both counties are working under the leadership and fiscal oversight of the New York State Department of Health

(NYSDOH). The planned data collection activities to evaluate this project were determined to be exempt by the NYSDOH Institutional Review Board.

## Schenectady County, New York

Between 2010 and 2012, Schenectady CPHS, in collaboration with Cornell Cooperative Extension Schenectady County, has been working to reduce sodium content in meals offered to older adults in 3 settings: (1) home-delivered meals; (2) congregate meal sites (ie, physical locations that offer meals such as a senior center); and (3) a county-operated nursing home. Each week, nearly 500 older adults receive their meals regularly (ie, 3 meals per week) through 1 of these 3 settings. The project goal is to reduce the average sodium content in meals served by 30% over a 3-year period (~10% each project year).

### Sodium-reduction strategies

To implement sodium-reduction strategies, Schenectady CPHS sought first to understand the complex meals system and then to identify key organizations and decision makers. The meals infrastructure in the county is a collaboration of government and private entities (see Table 1 for more details) that the project team (ie, county and partner staff working on the sodium intervention) engaged through multiple meetings. These entities shared a commitment to improving the food offered to older adults and remained actively engaged in the development of the sodium-reduction strategies and their implementation as described later.

Early in the process, the project team engaged in strategy sessions to identify key decision makers in the community, discuss potential ways to proceed, and search the literature for recommended approaches.<sup>13</sup> The team then met with the food service manager responsible for food ordering and meal preparation at the county-operated nursing home, where all meals are prepared for the nursing home residents, as well as recipients of congregate and home-delivered meals, to jointly develop a plan for reducing sodium. Through frequent contact and continued conversation, the food service manager agreed to investigate the availability of lower-sodium products and to sample them. As an approach to identify which meals to target, it was decided that the meals with the highest amount of sodium and meals with similar ingredients would be the top priorities. This approach was selected because a few critical alterations had the potential to produce the most change. Results of the investigation and product sampling were shared with the project team. Three strategies were undertaken after obtaining approvals from the multiple authorities within the meals system:

1. *Product substitutions.* While substituting an entire entrée was often not possible because of limited availability of prepackaged lower-sodium entrees, individual products were changed by using a lower-sodium version of the same product or exchanging a higher-sodium product for a different lower-sodium product. Changes were made by identifying and modifying one common product. For example, sauces and soups that included chicken or beef stock or canned tomatoes—items that are higher in sodium and appear in multiple dishes—were substituted by using a lower-sodium version. Other product substitutions included using fresh

vegetables instead of canned vegetables; if canned vegetables had to be used because of cost concerns, no-salt or lower-sodium varieties were substituted.

2. *Recipe modifications.* Modifications were made to recipes by removing or reducing higher-sodium ingredients from recipes. Common recipe modification included using no-salt herb or spice mixtures in recipes; reducing the amount of salt called for in a recipe (eg, using 1 teaspoon of salt rather than 2 teaspoons of salt); reducing the amount of cheese or bacon called for in a recipe; or using ground beef instead of ground sausage.
3. *Scratch cooking.* Instead of using prepared or packaged items for a “heat and serve” approach, more menu items were made from scratch (ie, creating meals by combining individual ingredients) whenever possible. Scratch cooking allowed staff to have more control over the sodium content of meals. For example, sodium could be reduced when making gravy and mashed potatoes from scratch by using fresh ingredients and seasonings rather than using higher-sodium canned gravy and preseasoned dehydrated potato mix.

Of the 3 strategies, product substitutions were the easiest to implement. Recipe modifications and scratch cooking were more difficult to implement because they required more time; food preparation staff needed to be trained on recipe modification techniques and hands-on scratch cooking. To date, no new equipment or physical changes to the work space were needed in the kitchen to accommodate the implemented sodium-reduction strategies. The food service manager held weekly production meetings with the kitchen staff to discuss how to further modify recipes and food preparation techniques, monitor progress, and troubleshoot barriers. Project staff also kept in close contact with the food service manager to monitor progress and document the implementation process.

### **Progress to date**

Schenectady CPHS conducted periodic menu analyses to assess the amount of sodium contained in meals. A comprehensive data system was not in place to determine the sodium content of meals, which meant that the project team needed to create one. The project team analyzed the sodium content of all food items by using menu spreadsheets; menu spreadsheets contained sodium content of items obtained from proprietary food databases and by researching Universal Product Codes for ingredients on public access databases.

The project team treated each year as a unique data collection period because the food service manager left at the end of year 1; this departure was not related to the project. The menu changed significantly under the new food service manager starting in year 2. For example, the 5-week seasonal (spring/summer, fall/winter) rotating menu implemented in year 1 was changed to a 4-week base menu, with seasonal substitutions in year 2. Under the direction of the new food service manager, higher-sodium items such as sausage and biscuits were reintroduced to the menu and lower-sodium items such as broiled fish were removed. To account for these menu differences, sodium content was analyzed for year 1 (comparing months 1 and 12) and year 2 (comparing months 13 and 24).

For each project year, Schenectady's goal was to reduce by 10% the average sodium content in meals served. Schenectady reported a 9.76% reduction in year 1 and a 14.17% reduction in year 2. Although sodium-reduction strategies continued to be implemented in year 2, the newly introduced menu in year 2 actually resulted in higher average sodium content per meal, thus offsetting the reductions achieved in year 1. The results from the first 2 years of the project are summarized here and presented in Table 2:

*Year 1:* All 105 meals on the menu were analyzed, and 49 (47%) were affected by the sodium-reduction strategies. Before the sodium-reduction intervention began, the average amount of sodium per meal was 1270 mg. At the end of first year of the intervention, sodium was reduced by 124 mg per meal (9.76%), for an average sodium content of 1146 mg per meal.

*Year 2:* Under the new menu in place for year 2, all 84 meals on the menu were analyzed and 46 (55%) were affected by the sodium-reduction strategies. At the start of the second year, the average sodium content was 1379 mg per meal. At the end of second year of the intervention, sodium was reduced by 195 mg per meal (14.17%), for an average sodium content of 1184 mg per meal.

### **Next steps for Schenectady County**

To advance the goals for sodium reduction in meals served to older adults, Schenectady's project team will continue to work with partners to ensure that sodium-reduction strategies are sustained even as food service management and staff turn over. Project staff will closely monitor progress in year 3 to determine which changes have been formally adopted by food service management as well as to explore with the food service manager whether product substitution, recipe modifications, and scratch cooking can be expanded while sustaining current product substitution and recipe modification practices. The project team intends to closely examine the remaining menu items that have been untouched by the sodium-reduction intervention to determine which future reductions are possible. The project team recognizes the importance of sustainable changes and will work with partners to formalize sodium reduction into written agency procedures and contracts.

### **Broome County, New York**

When Broome CHD began its planning and implementation of sodium-reduction strategies for older adult meals in 2011, it started an ongoing consultation with Schenectady CPHS to understand latter's successful strategies and lessons learned on the basis of latter's experience that began 12 months prior to Broome's. In addition, NYSDOH also provided expert guidance and facilitated cross-site learning by hosting multiple joint telephone calls during the initial stages of Broome's project period.

Since the beginning of the intervention in 2011, Broome CHD has been working with Broome County Office for Aging (OFA) and Broome County Central Foods and Nutrition Services (Central Foods) to reduce the average sodium content of meals served to older adults at congregate meal sites and through the home-delivered meals program by 10% over 2 years (5% per each project year). Each week, approximately 840 older adults receive their

meals regularly (ie, on average 2 meals per week) through congregate meal sites or the home-delivered meals program.

### **Sodium-reduction strategies**

Using a similar approach as Schenectady CPHS, the project team (ie, county and partner staff working on the sodium intervention) identified the key decision makers in the meals program infrastructure. In contrast to Schenectady, Broome's infrastructure consists of government entities (see Table 1). Central Foods is a department of the Broome County government that provides food management and production services for county-operated facilities and programs. The OFA contracts with Central Foods to prepare the meals. Despite infrastructure differences, Broome followed Schenectady's example by taking time to build a foundation of shared purpose and commitment to the project goal of reducing sodium in the meals served to older adults.

In the initial phase of the project, both Broome CHD and the OFA worked together to strategize and develop a plan for reducing sodium. Part of this plan was to leverage Broome CHD's earlier experience contacting vendors to request lower-sodium versions of ingredients commonly used in county's school meals. Broome County OFA nutrition staff followed this example and worked with vendors to request lower-sodium products. The OFA had prior experience of changing meals using a taste-testing approach to increase fruits, vegetables, whole grains, and overall fiber content. It used this approach to identify substitutions, reformulated products, and recipe modifications acceptable to older adults.

Similar to Schenectady, 3 strategies were used to reduce sodium: product substitutions; recipe modifications; and scratch cooking. Examples in Broome were very similar to those described for Schenectady. Broome also focused on product substitutions and recipe modifications more than scratch cooking. To date, no new kitchen equipment or changes to the work space were necessary to accommodate the implemented sodium-reduction strategies.

A notable difference in the food service infrastructure between Schenectady and Broome is that Broome County OFA and Central Foods worked directly with several vendors to identify and procure lower-sodium products. Central Foods is part of the county government and must follow county codes and regulations, including the requirement to use the municipal bid process. Lower-sodium products may end up being "off bid," which often means a higher per item cost. A new bid process is conducted every 4 months, adding complexity and creating a potential impact on the ease and costs of implementing and sustaining changes.

To sustain change, Broome is creating greater demand for lower-sodium products by urging vendors to include these items on their bid lists. For example, Broome CHD and the OFA are now working with the Broome-Tioga Boards of Cooperative Education Services, an entity responsible for planning and purchasing food for 15 New York State school districts. While products requested for schools and meals for older adults do vary, the vendor representative is likely the same person and this understanding of which products exist can help in the ordering process. Also, the Broome-Tioga Boards of Cooperative Education

Services has a small “recipe group” of nutritionists and food service managers who develop new recipes, evaluate new food products, and conduct taste tests. The OFA consulting dietitian is partnering with this group to identify products that both the school and older adult nutrition programs can incorporate into their menus, with the hope of increasing demand for lower-sodium products so that they are more readily available from vendors.

### Progress to date

To document the amount of sodium change during the first year of the project, average sodium content per meal for the standing menu was compared at the start and end of year 1. Sodium content was obtained from the food and nutrient CBord database, which is a food service software program specifically designed for food service personnel to conduct production, cost, and nutrient analyses. Separate analyses were conducted for congregate meals and home-delivered meals because the menus differed. Broome achieved its goal of a 5% sodium reduction in year 1 by reporting a 16% reduction. The results are summarized here and presented in Table 2:

*Year 1 congregate meals:* All 43 meals on the menu were analyzed, and 20 (47%) were affected by the sodium-reduction strategies. Before the sodium-reduction intervention began, the average sodium content per congregate meal was 1517 mg. At the end of the first year of the intervention, sodium content was reduced by 251 mg (16%) per meal, for an average sodium content of 1266 mg per congregate meal.

*Year 1 home-delivered meals:* All 86 meals on the menu were analyzed, and 20 (23%) were affected by the sodium-reduction strategies. Before the sodium-reduction intervention began, the average sodium content per home-delivered meal was 1163 mg. At the end of the first year of the intervention, sodium content was reduced by 188 mg (16%) per meal, for a new average sodium content of 975 mg per home-delivered meal.

### Next steps for Broome County

Broome CHD intends to ensure that the year 1 changes are maintained while planning for additional changes to lower sodium. Specifically, the project team intends to determine which of the menu items unaffected by sodium reduction in year 1 will be targeted in year 2. The project team will assess whether scratch cooking can be expanded while sustaining current product substitution and recipe modification practices. To heighten consumer awareness of the sodium content of foods, the OFA is also adding sodium content values to the total calories included on the weekly menu nutrition fact sheets. Finally, the project team is working with partners to formalize sodium reduction into written agency policies and procedures.

### Limitations

It must be noted that both projects have limitations. First, these results are based on 2 years of work from Schenectady and 1 year of work from Broome. Both counties have 1 more year of implementation and assessment. New lessons can arise and intervention strategies may be refined as the projects continue into their final year. Second, there is a need for more rigorous evaluation methods with data sources beyond nutrient analyses (eg, food



production records; actual consumption; key informant interviews) to better understand the impact of the implemented menu changes. Third, it is not possible to separate the contributions of each sodium-reduction strategy. Product substitutions, recipe modifications, and scratch cooking were all implemented at the same time and as a bundle. Fourth, cost data will be important to have for any future analyses to better understand the cost implications of making kitchen-based sodium-reduction interventions.

## Implementation Lessons Learned From Both Counties

The following are implementation lessons learned from the sodium-reduction efforts in these 2 counties:

*Identify partners with shared experience and common goals.* Both counties were able to immediately commence their work by building on existing partnerships and having partners with similar food and nutrition goals. Schenectady CPHS chose to work with Cornell Cooperative Extension Schenectady County and the county-operated nursing home because of their expertise in nutrition and their work with older adults. Likewise, Broome CHD partnered with Central Foods and the OFA, organizations with similar goals and a history of successful collaboration within the county.

*Engage experts.* Experts can provide insight on how to design and implement sodium-reduction strategies, provide guidance, and address common concerns. Throughout the project, both counties engaged experts familiar with food service, the food industry, and serving meals to older adults. Experts such as registered dietitians and food service managers aided in determining sodium content, identifying priorities for reduction, researching available lower-sodium ingredients, and developing lower-sodium recipes.

*Understand complexity of meals system.* To implement sodium-reduction work in these counties, it was critical to identify the key players and understand their responsibilities and authority. Especially important was identifying which entities had final approval on proposed menu changes and to determine whether all meals were prepared at a single location (which can streamline the implementation process). At a minimum, it was necessary to know which agency or entity was responsible for managing the meals program; developing and approving menus; maintaining physical location of food preparation site/kitchen; ordering food; providing the food; overseeing food preparation; preparing the food; and serving and/or delivering the food to off-site congregate locations or to home-delivered meals program recipients.

*Conduct sodium nutrient analysis.* Both counties recognized the importance of sodium nutrient analysis and made the commitment to monitor the sodium content of meals at regular intervals. Sodium nutrient analysis enabled project teams and food service partners to identify higher-sodium ingredients or products. Conducting nutrient analysis was also vital to track progress and provide feedback at regular intervals to all members of the team as the project evolved. However, calculating the sodium content of menu and meal items can be particularly arduous if manual fact checking is necessary. For example, since institutional foods are not required to have nutritional information listed on the package, multiple steps were necessary to secure sodium content information. Some items required locating and looking up product Universal Product Codes; for



others, food service personnel accessed proprietary and public product databases or contacted manufacturers directly to determine the sodium content.

*Make gradual, voluntary reductions to sodium content.* Both counties adopted a gradual, stepwise reduction approach to provide realistic intervals for monitoring taste and acceptance by older adults and providing feedback to Central Foods (10% each project year for Schenectady and 5% each project year for Broome). Both counties also adopted voluntary (rather than mandated or required) changes, which gave the partners greater flexibility and heightened commitment to the process. This exploratory, voluntary approach also provided a positive learning environment to see what changes could make a difference in acceptability.

*Work towards sustainable sodium reductions.* Voluntary reductions have an inherent vulnerability since changes may be tied to the support and commitment of individual champions. If these key implementers leave, changes may not be carried out by new staff, as was the case for Schenectady; the newly introduced menu under the new food service manager had higher average sodium content per meal than the menu under the previous food service manager. Project teams in both counties recognize the importance of sustainable changes and are actively encouraging partners to formalize their work into written agency procedures.

## Conclusion

Older adults may have difficulty limiting their sodium intake in part because other people prepare their meals. This is especially true for meals served at congregate meal sites, through home-delivered meal programs, or at nursing homes, which typically contain higher than recommended levels of sodium. As demonstrated by the efforts in Schenectady and Broome counties, reducing the sodium content in meals prepared for older adults is possible. Both counties achieved modest sodium reduction through product substitutions, recipe modifications, and scratch cooking.

Lessons learned from the work of Schenectady and Broome counties may help public health care practitioners interested in pursuing sodium reduction in their own communities. In the case of these 2 counties, the timing and rollout of the work lent itself to a natural replication scenario—Broome was able to learn from the “real-time” expertise of Schenectady County. Also, NYSDOH offered vital assistance to both counties related to evaluation, data collection, and strategizing about next steps. This example of a successful replication by Broome of Schenectady’s approach demonstrates the utility of sharing experiences and expertise across communities. These lessons may apply more broadly to nutrition programs that provide meals to other populations, such as children or incarcerated populations.

Successfully integrating voluntary, gradual sodium reduction in older adult meals programs may set the stage for more expansive changes in the future. While these counties have focused on food preparation practices, a next step to ensure sustainability of these changes could be to formalize the changes into food procurement standards. Both Schenectady and Broome counties are working with their designated agencies to determine how such

standards might be implemented. This type of formal change has the potential to expand and maintain healthier food options for older adults.

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TABLE 1

## Key Features of Schenectady County and Broome County Sodium-Reduction Efforts

	Schenectady County	Broome County
Total population	155 058 (2011 estimate) <sup>14</sup>	199 031 (2011 estimate) <sup>15</sup>
Sodium-reduction goal	30% over 3 y (2010–2013)	10% over 2 y (2011–2013)
Settings for sodium reduction with older adults	<ul style="list-style-type: none"> <li>• Home-delivered meals</li> <li>• Congregate meals</li> <li>• County-operated nursing home</li> </ul>	<ul style="list-style-type: none"> <li>• Home-delivered meals</li> <li>• Congregate meals</li> </ul>
No. meals prepared each week	4960 meals (lunch and dinner only) <ul style="list-style-type: none"> <li>• 1750 home-delivered meals (2 meals each day, hot lunch and a cold sack meal, 7 d per week)</li> <li>• 410 congregate (1 meal each day for 3 or 5 d per week, depending on congregate site)</li> <li>• 2800 nursing home meals (2 meals each day for 7 d per week; breakfast offered, but this is not addressed by sodium reduction)</li> </ul>	5400 meals (lunch and dinner only) <ul style="list-style-type: none"> <li>• 3500 home-delivered meals (5 d per week for 2 meals each day, hot lunch and a cold dinner sack meal; 1 meal per day offered on Saturday and Sunday, but this is not addressed by sodium reduction)</li> <li>• 1900 congregate meals (5 d per week for 1 meal each day; choice between either a hot lunch or a meal from the sandwich/salad bar)</li> </ul>
No. older adults who receive meals regularly through the program	~490 Regularly = 3 or more meals per week	~840 Regularly = on average 2 or more meals per week
No. older adults who receive at least 1 provided meal in a year	~1200	~4600
No. meal preparation sites	1	1
Contractual arrangement of older adult meals program	<ul style="list-style-type: none"> <li>• Schenectady County Senior and Long-Term Care Services contracts with Catholic Charities Senior Services of Schenectady to deliver meals to homebound older adults and to offer meals at congregate meal sites.</li> <li>• Catholic Charities, in turn, contracts with the county-operated Glendale Nursing Home to prepare the meals at its on-site kitchen. Meals are prepared by county employees.</li> <li>• Glendale Nursing Home contracts with a national food service company that employs an on-site food service manager who plans the menu and oversees meal production.</li> <li>• The food service company purchases food from one national food distributor.</li> </ul>	<ul style="list-style-type: none"> <li>• Broome County OFA contracts with Central Foods to prepare the meals. Central Foods is a department of the Broome County government and provides food management and production services for county-operated facilities and programs.</li> <li>• OFA nutrition staff (ie, consulting dietitian, the Health and Wellness coordinator, and the nutrition coordinator) develop the menus.</li> <li>• Central Foods staff members approve the menus for production and prepare the meals. Central Foods orders food from 3 food distributors.</li> <li>• Food service personnel, who are employees of the county, serve the food at these centers or deliver the home-delivered meals with the assistance of volunteers.</li> </ul>

Abbreviations: Central Foods, Broome County Central Foods and Nutrition Services; OFA, Office for Aging.

**TABLE 2**  
Sodium-Reduction Results Achieved in Schenectady County and Broome County

	Average Sodium Content per Meal at Start of Year, mg	Average Sodium Content per Meal at End of Year, mg	Average Amount of Sodium Removed per Meal, mg	Sodium Reduction per Meal Across All Meals	Intended Project Goal Target	Meals Affected by Sodium Reduction
Schenectady County						
Year 1 <sup>ab</sup>	1270	1146	124	9.76%	10%	47% (49/105 meals)
Year 2 <sup>ab</sup>	1379	1184	195	14.17%	10%	55% (46/84 meals)
Broome County						
Year 1 congregare meals <sup>c</sup>	1517	1226	251	16.54%	5%	47% (20/43 meals)
Year 1 home-delivered meals <sup>c</sup>	1163	975	188	16.17%	5%	23% (20/86 meals)

<sup>a</sup> Same meals offered to all settings (congregate, home-delivered, and nursing home).

<sup>b</sup> The menu in year 1 and year 2 was changed significantly. The 5-week, seasonal (spring/summer, fall/winter) rotating menu implemented in year 1 was changed to a 4-week base menu, with seasonal substitutions in year 2. Also, higher-sodium items that had been previously removed from the menu were reintroduced to the standing menu. These changes to the menu in year 2 resulted in higher average sodium content per meal than in year 1, effectively offsetting the reductions achieved in year 1.

<sup>c</sup> Different meals offered for the congregate and home-delivered meals program.