

REPORT

FINAL REPORT

Older Americans Act Nutrition Programs Evaluation: Meal Cost Analysis

September 25, 2015

Jessica Ziegler
Nicholas Redel
Linda Rosenberg
Barbara Carlson

Submitted to:

Center for Policy and Evaluation
Administration for Community Living
U.S. Department of Health and Human Services
1 Massachusetts Ave., NW
Washington, DC 20201

Project Officer: Susan Jenkins, Social Science Analyst
Contract Number: GS10F0050L/HHSP233201200606G

Submitted by:

Mathematica Policy Research
955 Massachusetts Avenue
Suite 801
Cambridge, MA 02139
Telephone: (617) 491-7900
Facsimile: (617) 491-8044
Project Director: Rhoda Cohen
Reference Number: 40121.321

This page left blank for double-sided copying.

CONTENTS

EXECUTIVE SUMMARY	V
I INTRODUCTION.....	1
A. Overview of the Title III-C Nutrition Services Program.....	1
B. AOA Nutrition Programs Evaluation meal cost analysis	2
1. Meal cost analysis sample	2
2. Data collection and analysis	3
3. Sample weighting.....	6
4. Limitations	6
C. Organization of the report.....	7
II AVERAGE COST OF A MEAL	9
A. Average cost of a meal.....	9
1. Paid labor costs.....	9
2. Purchased nonlabor resource costs	10
3. Value of donations	11
B. Changes in average meal costs over time	12
III AVERAGE COST OF A MEAL BY PROGRAM CHARACTERISTICS.....	15
A. Analysis of the average cost of a meal by program characteristics	15
1. Meal production method	15
2. Service area urbanicity	19
3. Geographic region.....	22
4. Program size	24
B. Regression analysis of meal costs	26
C. Changes in the average cost of a meal by program characteristics over time	28
IV CONCLUSION	29
REFERENCES.....	31
APPENDIX A SAMPLE DESIGN FOR THE SELECTION OF LOCAL SERVICE PROVIDERS, CONGREGATE MEAL SITES AND HOME-DELIVERY DISTRIBUTION SITES, AND HOME-DELIVERY DISTRIBUTION ROUTES FOR THE MEAL COST ANALYSIS.....	1
APPENDIX B ANALYSIS WEIGHTS FOR THE MEAL COST ANALYSIS	1
APPENDIX C DISTRIBUTION OF MEAL COSTS.....	1

TABLES

I.1	Cost analysis sample LSP meal program characteristics.....	3
I.2	Description of resource categories and collected costs.....	4
II.1	Average cost of a congregate meal and a home-delivered meal (weighted)	10
II.2	Comparison of average meal costs, 1995 and 2015 (in 2015 dollars)	12
III.1	Average cost of a congregate meal by meal production method (weighted).....	17
III.2	Average cost of a home-delivered meal by meal production method (weighted).....	18
III.3	Average cost of a congregate meal by LSP service area urbanicity (weighted)	20
III.4	Average cost of a home-delivered meal by LSP service area urbanicity (weighted)	21
III.5	Average cost of a congregate meal by geographic region (weighted)	22
III.6	Average cost of a home-delivered meal by geographic region (weighted).....	24
III.7	Average cost of a congregate meal by program size (weighted).....	25
III.8	Average cost of a home-delivered meal by program size (weighted).....	26
III.9	Regression analysis of congregate and home-delivered meal costs among sampled LSPs (unweighted)	28
C.1	Distribution of total meal costs, percentage of programs (unweighted).....	4

FIGURES

II.1	Breakdown of the average cost of a congregate and a home-delivered meal	11
C.1	Distribution of per-meal costs (unweighted).....	C.3

EXECUTIVE SUMMARY

The Nutrition Service Programs (NSP), administered by the Administration on Aging (AOA) within the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services (DHHS) under the Older Americans Act (OAA), represents a key component of America's strategy for ensuring that the health and social needs of older adults are adequately met. By promoting access to nutritious meals, facilitating social contact, supporting family caregivers, and helping older adults maintain their dignity in their homes and communities, the NSP fits squarely within the strategic goals of the AOA to rebalance long-term care provision away from institutionalization and toward home- and community-based services.

Every day, millions of older Americans receive a nutritious meal at a senior center or other congregate meal site as part of the NSP. Many others consume a home-delivered meal provided by the program. For many older adults, the NSP meal is the main meal of the day (Ponza et al. 1996). Beyond providing meals, NSP congregate meals provide an opportunity to socialize with peers and NSP home-delivered meals provide home-bound clients with an opportunity to interact with the person delivering the meal (which may be their only human contact of the day). The NSP also provides nutrition screening, assessment, education, and counseling to promote the health and wellbeing of older adults.

As part of its ongoing efforts to support NSP planning, improve program efficiency, and strengthen program effectiveness, ACL contracted with Mathematica Policy Research to conduct the AOA Nutrition Programs Evaluation. The three-part evaluation consists of (1) a process evaluation of program administration and service delivery, (2) a meal cost analysis, and (3) an evaluation of the impact of the program on client outcomes. This report describes the findings from the meal cost analysis. A separate report presents the process study findings (Mabli et al. forthcoming). Client outcomes data will be collected in 2015 and 2016 to assess program effectiveness, with reports expected in 2017 and 2018.

A. Meal cost analysis objectives

The primary objective of the AOA Nutrition Programs Evaluation meal cost analysis was to address two key research questions: (1) What are the average costs of a congregate and a home-delivered meal provided under the NSP?; and (2) Do these average costs vary by how meals are prepared or by other program characteristics? Answers to these questions enable NSP-funded programs to assess their own costs in the context of other similar sites and provide AOA with information about which approaches are most cost-effective and within which circumstances. Understanding that many NSP-funded meal programs rely heavily on donated resources to sustain their programs, such as volunteer labor and donated food, we collected data on the monetary value of these resources to include in our estimates of *total* per-meal costs (as opposed to *paid* costs, which do not include the value of donations).

B. Analysis findings

The following are key findings of the evaluation's meal cost analysis:

1. **Average cost of a meal.** It costs more, on average, to provide a home-delivered meal (\$11.06) than it does to provide a congregate meal (\$10.69). These total average costs

account for both the cost of purchased resources and the value of donated resources. The cost of purchased nonlabor resources (in particular, food purchases and payments to meal provision subcontractors or vendors) account for the largest proportion of the average cost of each type of meal (about 50 percent), followed by paid labor (28 to 35 percent), then volunteer labor (8 to 14 percent) and donated nonlabor resources (4 to 5 percent). The average paid cost of a congregate meal is \$9.30 and the average paid cost of home-delivered meal is \$9.00.

2. **Average cost of a meal by program characteristics.** It costs less, on average, to produce meals at a central kitchen, and it costs less, on average, for large programs and programs located in the South to prepare meals (see Table ES.1). Congregate meals served in urban areas cost less, on average, than those served in suburban and rural or frontier areas, whereas home-delivered meals delivered by Local Service Providers (LSPs) that operate in rural areas cost less than those delivered by LSPs that operate in suburban or urban areas.

Table ES.1. Average cost of a meal, overall and by program characteristics (weighted)

Program characteristics	Congregate meal	Home-delivered meal
Average per-meal cost	\$10.69	\$11.06
Average per-meal cost by program characteristics:		
Meal production method		
Central or off-site kitchen	10.54	10.14
On-site	10.87	12.00
Vendor or restaurant voucher	11.53	11.49
Service area urbanicity		
Urban	9.30	11.78
Suburban	10.59	11.81
Rural or frontier	10.52	10.86
Geographic region^a		
Northeast	11.03	9.48
South	9.14	8.22
Midwest	10.97	12.28
West	12.13	14.32
Program size^b		
Small	10.89	11.92
Large	8.15	9.16

Source: AOA Nutrition Programs Evaluation cost data collection instruments and LSP and Area Agency on Aging process study surveys.

^a Only LSPs from the contiguous United States participated in this study; no LSPs from Alaska or Hawaii participated.

^b Large congregate and home-delivered meal programs are those that serve or deliver 1,000 or more meals per week.

3. **Changes in meal costs over time.** Overall, findings from this analysis align with those of the last major analysis of NSP meal costs, conducted in 1995 by Ponza et al. (with findings reported in 1996), which also found that it cost more to produce a home-delivered meal than a congregate meal and that meals produced in a central or off-site kitchen, in the South, and by large programs were the least expensive, on average. Of particular note, however, is that comparison of findings across the two studies indicates that average meal costs are outpacing inflation, likely because food costs are increasing faster than inflation.

I. INTRODUCTION

The Nutrition Service Programs (NSP), administered by the Administration on Aging (AOA) within the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services (DHHS) under the Older Americans Act (OAA), represents a key component of America's strategy for ensuring that the health and social needs of older adults are adequately met. By promoting access to nutritious meals, facilitating social contact, supporting family caregivers, and helping older adults maintain their dignity in their homes and communities, the NSP fits squarely within the strategic goals of AOA to rebalance long-term care provision away from institutionalization and toward home- and community-based services.

Every day, millions of older Americans receive a nutritious meal at a senior center or other congregate meal site as part of the NSP. Many others consume a home-delivered meal provided by the program. For many older adults, the NSP meal is the main meal of the day (Ponza et al. 1996). The value of the NSP services to participants goes far beyond the meals themselves, however. For participants in congregate meals, NSP meals provide an opportunity to socialize with peers. For many home-delivered meal recipients, the person delivering the meal (often a volunteer) may be the recipient's only human contact of the day. The NSP's key nutrition services in addition to nutritious meals include nutrition screening, assessment, education, and counseling to promote the health and wellbeing of older adults.

As part of its ongoing efforts to support NSP planning, improve program efficiency, and strengthen program effectiveness, ACL contracted with Mathematica Policy Research to conduct the AOA Nutrition Programs Evaluation. The three-part evaluation consists of (1) a process evaluation of program administration and service delivery, (2) a meal cost analysis, and (3) an evaluation of the impact of the program on client outcomes. This report describes the findings from the meal cost analysis. A separate report presents the process study findings (Mabli et al. forthcoming). Client outcomes data will be collected in 2015 and 2016 to assess program effectiveness, with reports expected in 2017 and 2018.

A. Overview of the Title III-C Nutrition Services Program

The NSP is authorized under Title III of the OAA.¹ Under Title III, State Units on Aging (SUAs) receive federal grants from ACL for provision of supportive services (authorized under Part B), congregate nutrition services (authorized under Part C-1), home-delivered nutrition services (authorized under Part C-2), evidence-based disease prevention and health promotion programs (authorized under Part D), and caregiver support (authorized under Part E).

Nutrition Service programmatic funds are allocated to states and territories according to a statutory formula based largely on states' or territories' shares of the population ages 60 and older. The program specifically targets older adults with the greatest economic or social need, with particular attention to disabled, low-income, and minority individuals, as well older adults

¹ Similar nutrition and supportive services for older American Indians, Alaska Natives, and Native Hawaiians are authorized separately under Title VI. This report focuses on the Title III NSP.

in rural communities, older adults with limited English proficiency, and older adults at risk of institutional care.

Overall federal coordination of Title III of the NSP is provided by AOA's central and regional offices, but SUAs and their regional Area Agencies on Aging (AAAs) both oversee key aspects of program operations. In turn, the direct nutritional services are usually provided by Local Service Providers (LSPs). In addition, many other governmental and nonprofit groups are also involved in serving older adults under the program. In some instances, the AAAs themselves act as LSPs, providing meals directly to older adults. Together, these organizations make up the Aging Services Network, which is one of the nation's largest providers of home- and community-based services for older adults and their caregivers.

LSPs provide congregate meals and supportive services to older adults at various types of sites, such as senior centers, religious facilities, schools, public or low-income housing, and residential care facilities. Home-delivered meals are provided from congregate meals sites, affiliated central kitchens, or nonaffiliated food service organizations, to homebound clients. Meals provided by LSPs must comply with the most recent *Dietary Guidelines for Americans* and provide a minimum of one-third of the dietary reference intakes established by the Food and Nutrition Board of the Institute of Medicine of the National Academy of Sciences. In addition to meals, LSPs also provide nutrition screening, nutrition education, and nutrition assessment and counseling, if appropriate.²

In fiscal year (FY) 2013, OAA Title III-C funding was \$416 million for congregate nutrition services and \$205 million for home-delivered nutrition services (Administration for Community Living 2014). In that year, 83 million meals were served to 1.6 million people at congregate sites, and 136 million meals were delivered to 830,000 homebound older adults (Administration for Community Living 2015).

B. AOA Nutrition Programs Evaluation meal cost analysis

The primary objective of the AOA Nutrition Programs Evaluation meal cost analysis was to address two key research questions: (1) What are the average costs of a congregate and a home-delivered meal provided under the NSP?; and (2) Do these average costs vary by how meals are prepared or by other program characteristics? Answers to these questions enable NSP-funded programs to assess their own costs in the context of other similar sites and provide AOA with information about which approaches are most cost-effective and within which circumstances.

1. Meal cost analysis sample

The AOA Nutrition Programs Evaluation meal cost analysis analyzed data on program costs from 103 LSPs, all of which had been selected to participate in the evaluation's process study (Mabli et al. forthcoming). Since LSPs represent the program level at which the costs most directly associated with preparing and serving meals are incurred, we collected meal cost data from LSPs and analyzed costs from their perspective. Some of the selected LSPs provide meals at 40 or more congregate meal sites and/or provide home-delivered meals from numerous distribution sites. To minimize respondent burden for LSPs with numerous meal sites, we

² Additional LSP requirements are in Section 339 of the OAA.

focused data collection on one congregate meal site and one home-delivery meal distribution site from each LSP. Similarly, when a selected home-delivered meal distribution site operated numerous routes, we focused the cost data collection on one of the site's routes. Detailed information about the meal cost analysis sample, including how LSPs, congregate meal and home-delivered meal distribution sites, and home-delivery routes were selected, is in Appendix A.

Table I.1 summarizes the characteristics of the congregate and home-delivered meal programs operated by the 103 LSPs in the cost study sample; 9 of these LSPs operated congregate meal programs only, 5 operated home-delivered meal programs only, and 89 operated both congregate and home-delivered meal programs. A total of 98 sample LSPs operated congregate meal programs, and a total of 94 operated home-delivered meal programs.

Table I.1. Cost analysis sample LSP meal program characteristics

Program characteristic	Congregate meal program		Home-delivered meal program	
	N	Percent	N	Percent
Meal production method^a				
Central or other off-site kitchen	50	51	46	49
On-site	52	53	41	44
Vendor contract or restaurant vouchers	49	50	43	46
Service area urbanicity^a				
Urban	46	47	43	46
Suburban	39	40	37	39
Rural or frontier	65	66	72	77
Program size^b				
Small	59	60	42	45
Large	39	40	52	55
Geographic region^c				
Northeast	18	18	17	18
South	29	30	29	31
Midwest	34	35	31	33
West	17	17	17	18
Sample size	98		94	

Source: AOA Nutrition Programs Evaluation cost data collection instruments and LSP and AAA process study surveys.

^a Data on meal production methods and urbanicity were collected on the evaluation's process study survey of LSPs and AAAs. Some LSPs prepare meals using multiple methods and serve urban, suburban, and rural or frontier areas; thus, they could provide multiple responses to these survey questions. Response counts for these characteristics therefore sum to more than the total number of LSPs in the sample that provide congregate meals (98) and the number that provide home-delivered meals (94), and percentages exceed 100 percent.

^b Large congregate and home-delivery meal programs are those that serve 1,000 or more meals per week.

^c Only LSPs from the contiguous United States participated in this study; no LSPs from Alaska or Hawaii participated.

2. Data collection and analysis

We used the ingredient, or resource cost, method to guide our data collection (Ohls and Rosenberg 1999; Ponza et al. 1996). This approach involves identifying a standard set of resources used to prepare, serve, and deliver meals, collecting data from LSPs on the costs of each resource, and then calculating, or "building up," estimates of the cost of congregate and

home-delivered meals. Many LSPs rely heavily on donated resources to sustain their programs, including volunteers who prepare, serve, and deliver meals; food that is donated; meal facilities provided at no cost (or “in-kind”) from community partners; and gasoline donated by meal delivery volunteers. Therefore, we also collected data on the monetary value of these resources—as estimated by LSPs—to include in our meal cost estimates. We differentiate these *total* per-meal costs (the sum of the cost of purchased items and the value of donated resources) from *paid* per-meal costs throughout the report. Finally, in order to calculate per-meal costs, we also needed to collect information on the number of congregate and home-delivered meals served or delivered by the LSP and the selected meal sites and routes in an average week. Table I.2 describes the various resource categories for which we collected cost data.

Table I.2. Description of resource categories and collected costs

Resource	Description
Paid labor	<ul style="list-style-type: none"> Salaries and value of fringe benefits for (a) the centralized administrative personnel from the LSP who oversee and otherwise support the meal program; (b) personnel who oversee, plan, and prepare meals at the selected congregate and home-delivered meal sites or central kitchens, and the staff who serve the congregate meals; and (c) staff who deliver meals from off-site kitchens to meal sites and from meal sites to homes. The number of hours that each paid staff person works on the congregate and home-delivered meal programs or spends delivering meals along a selected route during a typical week.
Purchased nonlabor resources	
Food	<ul style="list-style-type: none"> Cost of food purchased by LSPs to prepare meals.
Vendor payments	<ul style="list-style-type: none"> Payments to outside vendors or caterers to prepare, and sometimes to serve or deliver, meals. Includes purchases of vouchers for clients to exchange for congregate meals at local restaurants.
Supplies	<ul style="list-style-type: none"> Cost of nonfood meal supplies, including disposable cutlery, plates, and napkins for congregate meals, disposable delivery containers for home-delivered meals, and cleaning supplies.
Facilities	<ul style="list-style-type: none"> Space-related costs, such as rent, mortgages, leases, and utilities (heat, hot water, electricity) for each of the LSP’s facilities used to operate the meal program. Amount that the LSP spends on routine maintenance for owned buildings.
Equipment	<ul style="list-style-type: none"> Present-day replacement value of capital equipment owned by the LSP and used to prepare and serve meals or otherwise operate the program; examples include (a) production equipment (stoves and other kitchen appliances and tools), (b) packaging equipment (shrink-wrap machines and reusable home-delivered meal packaging), (c) transport equipment (other than vehicles; typically meal delivery carts, refrigerated or otherwise); (d) serving equipment (reusable cutlery, plates, cups, and bowls).
Meal delivery (vehicles, gasoline, and insurance)	<ul style="list-style-type: none"> Present-day replacement value of vehicles owned by the LSPs and a percentage breakdown of the vehicles’ use by purpose. Cost of gasoline used by the LSP to operate the vehicles. Amount spent by the LSP for car insurance.
Insurance	<ul style="list-style-type: none"> Amount spent by the LSP on non-car insurance for the meal program (such as renters’ insurance).
Other	<ul style="list-style-type: none"> The costs, not captured elsewhere, of other materials, facilities, and equipment crucial to the meal program.

Resource	Description
Volunteer labor	<ul style="list-style-type: none"> Value of the salary that would be paid to each volunteer if the work performed by the volunteer was performed by paid staff, as estimated by LSPs. This includes volunteers who (a) provide centralized administrative support; (b) oversee, plan, and prepare meals at the selected congregate and home-delivered meal sites, and who serve the congregate meals; and (c) deliver meals from off-site kitchens to meal sites and from meal sites to homes. The number of hours that each volunteer works for the congregate and home-delivered meal programs or spends delivering meals along a selected route during a typical week.
Donated nonlabor resources	
Food	<ul style="list-style-type: none"> Value of donated food received by and used for the meal program, as estimated by LSPs.
Facilities	<ul style="list-style-type: none"> Value of donated space or utilities used by the meal program; that is, an estimate of the cost of similar space should the LSP have to rent it or utilities should the LSP have to pay for them, as estimated by LSPs.
Gasoline	<ul style="list-style-type: none"> Value of gasoline donated by volunteers to deliver meals from off-site kitchens to meal sites or from meal sites to homes, as estimated by LSPs.

We collected data on program costs from LSPs between December 2014 and March 2015. Labor costs (staff time, wages, and fringe benefits) were collected at the LSP level for staff responsible for overseeing or administering each LSP's meal program. We collected data on the staff responsible for preparing, serving, and delivering meals at the selected congregate meal site, home-delivery distribution site, and selected meal delivery route levels. Because LSPs do not always allocate nonlabor resource costs to individual sites (such as the costs of food ingredients and vendor payments, equipment, and vehicles), these costs were collected at the LSP level.³

Research team analysts conducted an introductory telephone call with an identified cost data contact at each LSP. Analysts provided contacts with an overview of the meal cost analysis objectives and confirmed information about program meal sites during these calls. They also collected information about how and where meals were produced and served in order to tailor data collection instruments (editable .pdf worksheets) before they were sent to LSPs for completion. Instructions for the cost data collection worksheets directed respondents to report cost information only on activities directly related to the cost of congregate and home-delivered meals. Therefore, we did not collect information on enrolling participants or on providing services such as nutrition screening, assessment, education, or counseling. LSPs emailed completed worksheets to the study team for analysis. Analysts followed up with LSPs to obtain missing data and to clarify issues as necessary.

We estimated each LSP's average per-component cost by summing the products of resources used and their prices and dividing by the number of meals produced and distributed. We summed these average component costs to estimate the total average cost of providing each type of meal at each LSP. We then estimated weighted average per-meal cost across all LSPs with congregate and home-delivered meals. For congregate meals, for example, we divided each weighted per-meal component cost by the total number of LSPs that provided congregate meals;

³ We collected data on the present-day replacement value of LSPs' equipment and vehicles. We divided the reported values by estimated useful life (in years) to get an annual cost estimate (and then by 52 to get a weekly cost estimate and by number of weekly meals to get a per-meal estimate). We used useful-life estimates suggested by the U.S. Bureau of Economic Analysis [http://www.bea.gov/scb/account_articles/national/0597niw/tablea.htm].

we then summed these component costs to get the average per-meal cost of a congregate meal, weighted.

We also cross-tabulated these weighted averages by various program characteristics, including meal production method, size, urbanicity, and geographic region, and assessed whether identified differences in the per-meal costs of individual cost components were statistically significant (at the 0.05 confidence level).⁴ Finally, we used multivariate analysis to assess the separate contributions that agency characteristics and services make to unit meal cost among the sampled LSPs, controlling for the effects of all the other factors.

We also examined changes in the costs of congregate and home-delivered meals over time. Using the Consumer Price Index Inflation Calculator, developed and disseminated by the U.S. Bureau of Labor Statistics, we adjusted the 1995 average costs per congregate and per home-delivered meal cost reported by the last national study of NSP meal costs (Ponza et al. 1996). Ponza et al. used methods similar to those applied in this research and therefore their results provide a good basis from which to assess changes in costs over time.

3. Sample weighting

We constructed and applied analysis weights to the meal cost analysis data to allow the computation of unbiased estimates based on sample survey responses. Weights take into account both the probability of selection into the sample and the differential response patterns that may exist in the respondent sample. We describe the construction and application of these weights in greater detail in Appendix B.

4. Limitations

This report represents the most comprehensive analysis of NSP meal costs that has been conducted in 20 years. Nonetheless, when interpreting the report's findings, it is important to consider two limitations.

Sampling error. The data collected for the meal cost analysis are based on probability samples of LSPs, congregate meal and home-delivery distribution sites, and home-delivery routes, and not all sample members responded. As a result, the numerical estimates reported here are subject to sampling and nonsampling error (for example, due to nonresponse bias). Further, the sample sizes used for the analysis of average meal costs and costs by program characteristics are relatively small, which increases the variance of estimates and makes them less precise. Precision is further reduced by design effects due to the complex sample design, primarily driven by an unequal weighting effect. Given this, a non-significant result could indicate either there is no true difference or that there is insufficient power to detect differences. Any reported statistically significant differences could indicate that there is a real and detectable difference between the subgroup means for the specified cost component; however, due to the large number

⁴ We assessed the statistical significance of differences in means across all sub-groups within each program characteristic. As such, indicators of statistical significance in report tables appear beside variable (cost component) labels rather than on individual values.

of statistical tests being conducted (without adjustment for multiple comparisons) the significant difference could also have occurred by chance.

Item nonresponse. Because the cost data collection worksheets were self-administered, respondents were able to skip questions as well as to respond “don’t know.” As a result, item nonresponse bias is possible for any estimate presented in this report.

Item nonresponse is not a serious concern for most worksheet items, however. While all LSPs directly incur at least some labor and food and/or vendor costs to implement their programs, they do not necessarily directly incur the other types of costs for which we collected data. We assessed nonresponse for each item to determine whether the item could have been skipped because an LSP did not incur a particular cost, given known information about the LSP and its meal production method(s). The following items contained skips that could not be explained: gasoline, purchased or provided in-kind (missing from three LSPs); equipment costs (missing from three LSPs); and facilities, purchased or provided in-kind (missing from one LSP). Fifteen LSPs indicated that they operated all or some of their nutrition program in facilities that were provided in-kind, but reported that they could not estimate the monetary value of these donations. The sample of LSPs was not large enough to permit reliable imputation of estimates of these missing values. Therefore, estimates of these cost components presented throughout the report might be biased downward and should be interpreted accordingly.

Data on service area urbanicity and meal production methods used to conduct the program characteristics analysis were collected via the process study surveys of LSPs and AAAs (when an AAA directly provides meal services, in effect functioning as an LSP). When an LSP or an AAA did not report a value, we used other known information about the LSP or AAA. Specifically, we used the LSP’s address and information about its service area to infer urbanicity, and we used meal production information reported during cost data collection exchanges between LSPs and analysts to infer meal production method information.

C. Organization of the report

The remaining chapters of this report discuss the findings from the meal cost analysis. Chapter II presents detailed tables on the average costs of congregate and home-delivered meals, and provides an analysis of how these costs have changed over time. Chapter III reports findings from the analysis of how meal costs vary by program characteristics and from the regression analysis. Finally, in Chapter IV, we summarize the findings.

The appendices provide supporting material and additional tables and figures. Appendix A and Appendix B provide supporting information about our sample selection and analysis methods. Appendix C provides information about the distribution of the per-meal costs of congregate and home-delivered meals across the sample LSPs.

This page left blank for double-sided copying.

II. AVERAGE COST OF A MEAL

A main goal of the meal costs analysis was to estimate the average cost of a congregate and a home-delivered meal provided under the NSP. In this chapter, we present the average total, paid, and per-component estimates of these costs. We also analyze how these costs have changed over time.

A. Average cost of a meal

The total average cost of a congregate meal and a home-delivered meal, including the value of volunteer labor and donated nonlabor resources, is \$10.69 and \$11.06, respectively (Table II.1).⁵ While the total average per-meal cost is \$0.37 more for a home-delivered meal than for a congregate meal, the reverse is true for per-meal paid costs. The average per-meal paid cost of a congregate meal (\$9.30) is \$0.30 more than that of a home-delivered meal (\$9.00). Labor costs—the costs of paid labor and value of volunteer labor—appear to be largely responsible for the differences in total and paid costs between the two types of meals. A breakdown of these per-meal costs is provided below. Figure II.1 displays the percentage of the average per-meal cost of each meal type that is attributable to each of the major cost components outlined in Table II.1.

1. Paid labor costs

On average, paid labor costs account for \$3.69 (35 percent) of the total average cost of a congregate meal and \$3.05 (28 percent) of the total average cost of a home-delivered meal. The difference in paid labor costs between the two types of meals appears to be due to a \$0.50 difference in the average per-meal costs of central administration labor; paid central administration labor costs \$1.56 per congregate meal and \$1.06 per home-delivered meal, on average. One possible reason for this discrepancy is that central administrative staff oversee the provision not only of congregate meals, but also of numerous other services at congregate meal sites (such as nutrition screenings and assessments) that they consider as part of their overall congregate meal responsibilities.

Not surprisingly, average paid on-site labor costs are higher for congregate meals (\$1.87) than for home-delivered meals (\$1.18). On-site congregate meal staff spend time preparing, serving, and cleaning up after meals, whereas with home delivered meals staff might be responsible only for preparing and packaging the home-delivered meals (service and clean-up are not necessary, since home-delivered meals are not consumed on-site). Paid home-delivery labor costs \$0.57 per home-delivered meal, on average. The other paid-labor costs—off-site kitchen labor and site delivery labor—are similar for the two types of meals.

⁵ The total cost of a congregate and a home-delivered meal reported by sampled LSPs varied considerably. Appendix C summarizes information on the distribution of the unweighted cost of a meal reported by sample LSPs.

Table II.1. Average cost of a congregate meal and a home-delivered meal (weighted)

Cost component	Congregate meal	Home-delivered meal
Paid Cost		
Paid labor	\$3.69	\$3.05
Central or other off-site kitchen	0.08	0.10
On-site	1.87	1.18
Central administration	1.56	1.06
Delivery to sites	0.18	0.14
Delivery to homes	–	0.57
Purchased nonlabor resources	5.61	5.95
Food	1.28	1.14
Vendor payments	3.06	3.42
Nonfood meal supplies	0.20	0.22
Facilities	0.69	0.48
Equipment	0.15	0.14
Delivery to sites and homes (vehicles, gasoline, car insurance)	0.02	0.33
Insurance	0.09	0.08
Other resources	0.12	0.14
Total paid costs	9.30	9.00
Value of Donations		
Volunteer labor	0.90	1.57
Central or other off-site kitchen	0.03	0.00
On-site	0.85	0.54
Central administration	0.02	0.01
Delivery to homes	–	1.02
Donated nonlabor resources	0.49	0.49
Food	0.13	0.10
Facilities	0.36	0.38
Gasoline for delivery to sites and homes	0.00	0.01
Total value of donations	1.39	2.06
Total Cost		
Total cost (paid and donated)	10.69	11.06
Sample		
Unweighted sample size	98	94

Source: AOA Nutrition Programs Evaluation cost data collection instruments.

2. Purchased nonlabor resource costs

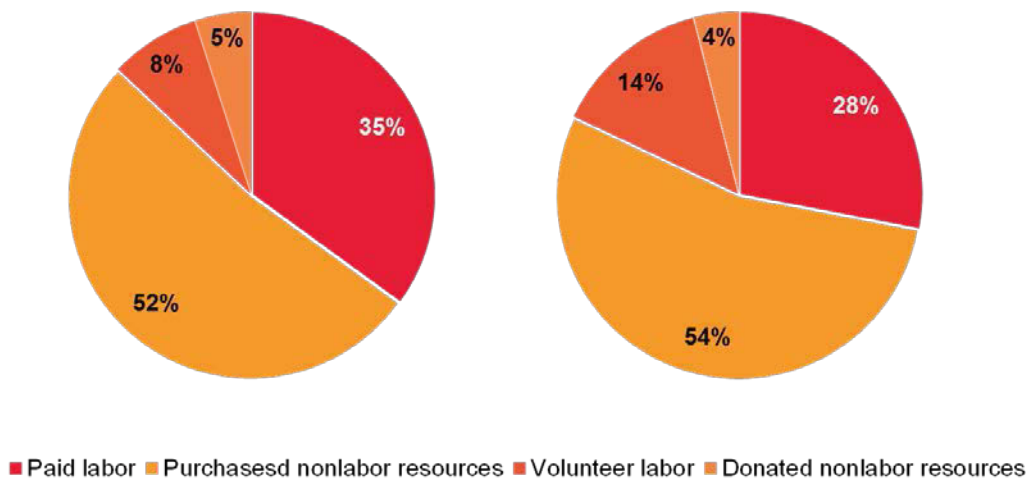
The cost of purchased nonlabor resources accounts for more than half the average cost of each type of meal; including \$5.61 (52 percent) of the cost of a congregate meal, and \$5.95 (54 percent) of the cost of a home-delivered meal. The costs of individual nonlabor meal components—such as food, vendor payments, nonfood meal supplies—account for similar proportions of total average congregate and home-delivered meal costs. One exception is the nonlabor costs of meal delivery to sites and homes. These costs account for slightly more of the cost of home-delivered meal (3 percent) than the cost of a congregate meal (1 percent).

Many LSPs contract with outside vendors or caterers to prepare, and sometimes to serve or deliver, meals (Mabli et al. forthcoming); these vendors might include large meal production companies or local restaurants. LSPs commonly pay vendors a flat per-meal cost to prepare and serve or deliver meals. Payments to such meal vendors represent the highest proportion of paid nonlabor costs for both congregate and home-delivered meals, and represent between one-quarter and one-third of the total cost of each type of meal (29 percent and 31 percent respectively).

3. Value of donations

The value of donations—volunteer labor and donated nonlabor resources (food, facilities, and gasoline for meal delivery)—accounts for \$1.39 (13 percent) of the total average cost of a congregate meal and \$2.06 (18 percent) of the cost of a home-delivered meal. Not surprisingly, the average per-meal value of donated home-delivery labor (\$1.02) is higher for home-delivered than congregate meals (\$0.00), while the per-meal value of donated on-site labor is higher for congregate meals (\$0.85) than it is for home-delivered meals (\$0.54). On-site volunteers likely help serve and clean up after congregate meals, but only help to package home-delivered meals for delivery.

Figure II.1. Breakdown of the average cost of a congregate and a home-delivered meal



B. Changes in average meal costs over time

The average per-meal costs of congregate and home-delivered meals are increasing at a rate that is outpacing inflation. Ponza et al. (1996) reported that the total average cost of a congregate meal in 1995 was \$5.17, and the average cost of a home-delivered meal was \$5.31.⁶ Adjusting for inflation, we would expect the total average cost of a congregate meal to be \$8.09 and the average cost of a home-delivered meal to be \$8.28 in 2015 dollars. These estimates are \$2.60 less for a congregate meal and \$2.78 less for a home-delivered meal than reported for this meal costs analysis (Table II.2).⁷

Table II.2. Comparison of average meal costs, 1995 and 2015 (in 2015 dollars)

Cost	2015	1995 ^a
Congregate meal	\$10.69	\$8.09
Paid labor	3.69	2.79
Purchased nonlabor resources		
Food and vendor	4.34	2.72
Other resources	1.27	1.47
Volunteer labor	0.90	0.67
Donated nonlabor resources	0.49	0.44
Home-delivered meal	\$11.06	\$8.28
Paid labor	3.05	3.06
Purchased nonlabor resources		
Food and vendor	4.56	2.68
Other resources	1.39	1.40
Volunteer labor	1.57	0.73
Donated nonlabor resources	0.49	0.41

Source: AOA Nutrition Programs Evaluation cost data collection instruments; Ponza et al. (1996).

^a Cost data from Ponza et al. (1996) have been adjusted to 2015 dollars. Ponza et al. (1996) collected data in 1995 on the costs of 170 congregate meal programs and 156 home-delivered meal programs. Findings were reported in 1996.

Increases in the costs of paid food and vendor services appear to be primarily responsible for causing per-meal costs to increase faster than inflation. According to Volpe (2013), since 2006, “the all-items CPI has risen 14 percent, while the all-food CPI is up close to 20 percent.” Indeed, reported food and vendor costs today are \$1.62 more for congregate meals and \$1.88 more for home-delivered meals than in 1995.⁸ Also of note is that the cost of paid central administration labor increased between the two studies (not shown): it increased \$0.83 per congregate meal and \$0.40 per home-delivered meal. Finally, LSPs appear to be relying increasingly on volunteers to assist with meal production, service, and delivery, particularly for their home-delivered meal

⁶ Data for the Ponza et al. (1996) study were collected and analyzed in 1995 and reported in 1996.

⁷ The meal costs analysis conducted by Ponza et al. (1996) applied methods similar to those used to compute average costs for this report. To adjust the 1995 per-meal costs reported by Ponza et al. (1996) to 2015 dollar amounts, we used the Consumer Price Index inflation calculator tool developed by the U.S. Bureau of Labor Statistics.

⁸ Ponza et al. (1996) reported food and vendor costs together. We summed the food and vendor costs reported in this report for comparison to the 1995 costs.

programs. LSPs reported the value of volunteer labor at \$0.23 higher (inflation-adjusted) for congregate meals than in 1995 and \$0.84 higher for home-delivered meals.

Despite the cost increases noted above, each of the four main meal cost components accounts for the same proportion of the average cost of a congregate meal today as it did in 1995. In 1995, paid labor costs accounted for 35 percent, paid nonlabor resources for 52 percent, volunteer labor for 8 percent, and donated nonlabor resources for 5 percent of the average cost of a congregate meal (Ponza et al. 1996)—the same percentages that each accounts for today. These proportions have changed slightly over time for home-delivered meals. In 1995, paid labor accounted for 37 percent (compared to 28 percent today), paid nonlabor resources for 49 percent (compared to 54 percent), volunteer labor for 9 percent (compared to 14 percent), and donated nonlabor resources for 5 percent (compared to 4 percent) of the total average cost of a home-delivered meal (Ponza et al. 1996).

This page left blank for double-sided copying.

III. AVERAGE COST OF A MEAL BY PROGRAM CHARACTERISTICS

Estimating the average costs of congregate and home-delivered meals by various program characteristics enable NSP-funded programs to assess their own costs in the context of other similar sites, and to provide AOA with information about which approaches are most cost-effective and within which circumstances. Specifically, we examined the degree to which costs varied by meal production method, LSP service area urbanicity, geographic region, and program size. We also conducted a regression analysis on the meal costs analysis LSP sample to examine the effects of each of these characteristics on meal costs, controlling for the other factors.

As is noted in Chapter I, the data collected for the meal cost analysis are based on samples of LSPs, congregate meal and home-delivery distribution sites, and home-delivery routes. Therefore, the numerical estimates reported here are subject to possible error resulting from random statistical variation and reduced precision due to small sample sizes. We constructed and applied sample weights to allow for the computation of unbiased estimates based on sample survey responses.

A. Analysis of the average cost of a meal by program characteristics

On average, congregate and home-delivered meals provided by LSPs that produce at least some meals in central or off-site kitchens, operate large programs, or are located in the South cost less than those provided by LSPs that use other production methods, operate small programs, or are located in other regions of the country. One area of difference between congregate and home-delivered meals is that congregate meals served in urban areas cost less, on average, than those served in suburban and rural or frontier areas, whereas home-delivered meals delivered by LSPs that operate in rural areas cost less than those delivered by LSPs that operate in suburban or urban areas.

The average costs of paid (and, to some extent, donated) labor, purchased food, and vendor payments appear to be the primary drivers of variations in average costs across program characteristics. Generally speaking, higher average costs for each of these components result in higher paid and total average costs. The rest of this section describes, in greater detail, differences between the costs of each type of meal by program characteristic and by cost component.

1. Meal production method

LSPs produce congregate and home-delivered meals in various ways: at a central or off-site kitchen (hereafter *central kitchen*), on-site at a congregate meal or home-delivery distribution site, and by purchasing pre-prepared meals from vendors. In addition, some LSPs provide clients with pre-paid vouchers to exchange for congregate meals at a local restaurant. Many LSPs prepare congregate and home-delivered meals in more than one way (Mabli et al. forthcoming). In fact, about half (47 percent) of the meal cost analysis LSPs that provide congregate meals reported using multiple meal production methods to produce the meals, and about one-third (32 percent) that provide home-delivered meals reported using multiple methods to produce the meals.

Tables III.1 and III.2 display the average costs of congregate and home-delivered meals provided by LSPs that reported using each method to prepare *at least some* of their meals. In

other words, the “central or off-site kitchen” column of Table III.1 reports the total average cost of a congregate meal served by LSPs that produce *at least some* of their congregate meals at a central kitchen.

Congregate meals served by LSPs that prepare at least some of their congregate meals at central kitchens cost less (\$10.54), on average, than congregate meals served by LSPs that prepare at least some of their meals on-site (\$10.87) and those served by LSPs that purchase at least some of their meals from a vendor or through restaurant vouchers (\$11.53) (including the value of donated labor and resources). The differences in the total average costs of these meals are relatively small. Congregate meals served by LSPs that prepare at least some of them at central kitchens cost only \$0.33 less, on average, than those served by LSPs that prepare at least some of their meals on-site, and \$0.99 less than those served by LSPs that purchase at least some meals from a vendor or through restaurant vouchers.

Differences in the average costs of purchased food, vendor payments, and paid labor appear to be responsible for the differences in total average costs across the three congregate meal production methods. For instance, and not surprisingly, LSPs that purchase at least some congregate meals from vendors or through restaurant vouchers reported the lowest average purchased food costs (\$0.31) and highest average vendor payments (\$4.68). LSPs that purchase at least some congregate meals from vendors or through restaurant vouchers also reported the highest total average paid labor costs (\$3.68), apparently driven in large part by relatively high average paid central administration labor costs. One might expect paid central administration labor costs to be relatively low for LSPs that purchase meals from vendors or through restaurant vouchers, since LSP administrative staff do not directly oversee the production of these meals. However, it is plausible that LSPs that purchase at least some meals from vendors or through restaurant vouchers require administrative personnel time to manage these contracts (which would not be necessary for on-site or central kitchen meal production) in addition to other program administration responsibilities.

As with congregate meals, home-delivered meals provided by LSPs that produce at least some of them at a central kitchen cost less (\$10.14), on average, than home-delivered meals provided by LSPs that prepare at least some of them on-site at a congregate meal site (\$12.00) or that purchase at least some of them from a vendor (\$11.49). Also, as with congregate meals, differences in the average costs of purchased food, vendor payments, and paid labor appear to be largely responsible for the differences in total average meal costs across the production methods for home-delivered meals.

Table III.1. Average cost of a congregate meal by meal production method (weighted)

Cost component	Central or off-site kitchen	On-site kitchen	Vendor or restaurant	All CM programs
Paid Cost				
Paid labor	\$3.31	\$3.33	\$3.68	\$3.69
Central or other off-site kitchen	0.17	0.08	0.04	0.08
On-site*	1.22	2.16	1.63	1.87
Central administration	1.62	1.06	2.00	1.56
Delivery to sites*	0.30	0.03	0.01	0.18
Purchased nonlabor resources	5.57	6.10	6.23	5.61
Food*	1.40	2.10	0.31	1.28
Vendor payments*	2.59	2.59	4.68	3.06
Nonfood meal supplies*	0.24	0.26	0.12	0.20
Facilities	0.94	0.57	0.94	0.69
Equipment*	0.14	0.24	0.05	0.15
Delivery to sites (vehicles, gasoline, car insurance)	0.04	0.02	0.02	0.02
Insurance	0.08	0.13	0.08	0.09
Other nonlabor costs*	0.14	0.19	0.03	0.12
Total paid costs	8.88	9.43	9.91	9.30
Value of Donations				
Volunteer labor	1.09	0.86	1.18	0.90
Central or other off-site kitchen	0.07	0.00	0.05	0.03
On-site	1.02	0.85	1.09	0.85
Central administration	0.00	0.01	0.04	0.02
Donated nonlabor resources	0.57	0.58	0.44	0.49
Food*	0.14	0.11	0.16	0.13
Facilities	0.43	0.47	0.27	0.36
Gasoline for delivery to sites	0.00	0.00	0.01	0.00
Total value of donations	1.66	1.44	1.62	1.39
Total Cost				
Total cost (paid and donated)	10.54	10.87	11.53	10.69
Sample				
Unweighted sample size	50	52	49	98

Source: AOA Nutrition Programs Evaluation cost data collection instruments and LSP and AAA process study surveys.

Notes: Data on meal production methods was collected on the evaluation's process study survey of LSPs and AAAs. Some LSPs prepare meals using multiple methods; thus, they could provide multiple responses to these survey questions. Response counts for these characteristics therefore sum to more than the total number of LSPs in the sample that provide congregate meals (98). When an LSP did not report a value for this survey item, we used other known information about the LSP—collected via other survey items and as part of cost data collection—to infer a response.

*Indicates that differences between the average costs of the component are statistically significant at the .05 level.

CM = congregate meal

Table III.2. Average cost of a home-delivered meal by meal production method (weighted)

Cost component	Central or off-site kitchen	On-site kitchen	Vendor or restaurant	All HDM programs
Paid Cost				
Paid labor	2.63	4.07	2.61	\$3.05
Central or other off-site kitchen	0.21	0.26	0.13	0.10
On-site*	0.84	2.09	0.58	1.18
Central administration	0.93	0.97	1.13	1.06
Delivery to sites*	0.28	0.20	0.15	0.14
Delivery to homes	0.37	0.55	0.62	0.57
Purchased nonlabor resources	5.44	5.39	6.85	5.95
Food*	1.62	2.19	0.16	1.14
Vendor payments*	2.35	1.33	5.81	3.42
Nonfood meal supplies*	0.23	0.34	0.14	0.22
Facilities*	0.49	0.52	0.38	0.48
Equipment*	0.15	0.27	0.03	0.14
Delivery to sites and homes (vehicles, gasoline, car insurance)*	0.41	0.36	0.19	0.33
Insurance	0.07	0.18	0.06	0.08
Other nonlabor costs*	0.12	0.20	0.08	0.14
Total paid costs	8.07	9.46	9.46	9.00
Value of Donations				
Volunteer labor	1.58	1.76	1.75	1.57
Central or other off-site kitchen	0.00	0.00	0.00	0.00
On-site*	0.46	0.84	0.55	0.54
Central administration	0.00	0.01	0.01	0.01
Delivery to homes	1.12	0.91	1.19	1.02
Donated nonlabor resources	0.49	0.78	0.28	0.49
Food	0.08	0.14	0.05	0.10
Facilities	0.40	0.62	0.22	0.38
Gasoline for delivery to sites and homes	0.01	0.02	0.01	0.01
Total value of donations	2.07	2.54	2.03	2.06
Total Cost				
Total cost (paid and donated)	10.14	12.00	11.49	11.06
Sample				
Unweighted sample size	46	41	43	94

Source: AOA Nutrition Programs Evaluation cost data collection instruments and LSP and AAA process study surveys.

Notes: Data on meal production methods was collected on the evaluation's process study survey of LSPs and AAAs. Some LSPs prepare meals using multiple methods; thus, they could provide multiple responses to these survey questions. Response counts for these characteristics therefore sum to more than the total number of LSPs in the sample that provide home-delivered meals (94). When an LSP did not report a value for this survey item, we used other known information about the LSP—collected via other survey items and as part of cost data collection—to infer a response.

*Indicates that differences between the average costs of the component are statistically significant at the .05 level.

HDM = home-delivered meal

2. Service area urbanicity

Many LSPs serve areas that include a combination of urban, suburban, and rural or frontier cities, towns, and regions (Mabli et al. forthcoming). Thus, Tables III.3 and III.4 report the average costs of congregate and home-delivered meals, respectively, served or delivered by LSPs whose service areas include, but are not limited to, urban, suburban, and rural or frontier sub-areas.

The total average cost of a congregate meal provided by LSPs with service areas that include urban areas (\$9.30) is, on average, lower than that of a congregate meal served by LSPs that serve suburban (\$10.59) or rural or frontier areas (\$10.52). This lower cost appears to be driven primarily by vendor payments that are relatively low, possibly because (1) urban-serving LSPs rely less on vendors than do LSPs that serve suburban and rural or frontier areas for congregate meals, or (2) vendor-purchased congregate meals cost less (on average) in urban areas (or some combination of the two).

Home-delivered meals provided by LSPs that deliver at least some meals in rural areas cost less (\$10.86), on average, than those provided by LSPs that serve at least some meals in urban (\$11.78) or suburban (\$11.81) areas. While the differences in these average costs are relatively small between home-delivered meals provided by LSPs that serve at least some meals in each type of area (less than \$1.00 separates the most and least expensive), there is considerable variation in some of their component costs, notably, average paid and donated labor costs and average vendor payments.

Table III.3. Average cost of a congregate meal by LSP service area urbanicity (weighted)

Cost component	Urban	Suburban	Rural or frontier	All CM programs
Paid Cost				
Paid labor	\$3.31	\$3.57	\$3.72	\$3.69
Central or other off-site kitchen	0.12	0.18	0.05	0.08
On-site	1.37	1.80	1.83	1.87
Central administration	1.48	1.28	1.62	1.56
Delivery to sites	0.34	0.31	0.22	0.18
Purchased nonlabor resources	4.83	5.68	5.63	5.61
Food	1.31	1.01	1.44	1.28
Vendor payments*	2.02	3.83	3.09	3.06
Nonfood meal supplies	0.11	0.19	0.20	0.20
Facilities	1.13	0.43	0.48	0.69
Equipment	0.06	0.07	0.17	0.15
Delivery to sites (vehicles, gasoline, car insurance)*	0.02	0.03	0.03	0.02
Insurance	0.05	0.03	0.09	0.09
Other nonlabor costs	0.13	0.09	0.13	0.12
Total paid costs	8.14	9.25	9.35	9.30
Value of Donations				
Volunteer labor	0.80	1.06	0.64	0.90
Central or other off-site kitchen	0.00	0.09	0.00	0.03
On-site*	0.79	0.91	0.64	0.85
Central administration	0.01	0.06	0.00	0.02
Donated nonlabor resources	0.36	0.28	0.53	0.49
Food*	0.16	0.03	0.10	0.13
Facilities*	0.20	0.25	0.43	0.36
Gasoline for delivery to sites	0.00	0.00	0.00	0.00
Total value of donations	1.16	1.34	1.17	1.39
Total Cost				
Total cost (paid and donated)	9.30	10.59	10.52	10.69
Sample				
Unweighted sample size	46	39	65	98

Source: AOA Nutrition Programs Evaluation cost data collection instruments and LSP and AAA process study surveys.

Notes: Data on urbanicity was collected on the evaluation's process study survey of LSPs and AAAs. Some LSPs' service areas include a combination of urban, suburban, and rural or frontier sub-areas; as such, LSPs could provide multiple responses for this survey question. Response counts for urbanicity therefore sum to more than the number of LSPs in the sample that provide congregate (98) meals. When an LSP did not report a value for this survey item, we used other known information about the LSP—collected via other survey items and as part of cost data collection—to infer a response.

*Indicates that differences between the average costs of the component are statistically significant at the .05 level.

CM = congregate meal

Table III.4. Average cost of a home-delivered meal by LSP service area urbanicity (weighted)

Cost component	Urban	Suburban	Rural or frontier	All HDM programs
Paid Cost				
Paid labor	\$3.27	\$2.46	\$3.08	\$3.05
Central or other off-site kitchen	0.25	0.01	0.11	0.10
On-site*	0.89	0.73	1.35	1.18
Central administration*	1.42	1.15	0.89	1.06
Delivery to sites	0.29	0.10	0.15	0.14
Delivery to homes	0.42	0.47	0.58	0.57
Purchased nonlabor resources	6.46	6.67	5.76	5.95
Food*	1.34	0.69	1.17	1.14
Vendor payments*	3.39	4.50	3.35	3.42
Nonfood meal supplies	0.23	0.21	0.21	0.22
Facilities	0.80	0.55	0.34	0.48
Equipment*	0.05	0.04	0.13	0.14
Delivery to sites and homes (vehicles, gasoline, car insurance)*	0.41	0.44	0.36	0.33
Insurance	0.09	0.09	0.07	0.08
Other nonlabor costs	0.15	0.15	0.13	0.14
Total paid costs	9.73	9.13	8.84	9.00
Value of Donation				
Volunteer labor	1.69	2.48	1.49	1.57
Central or other off-site kitchen	0.00	0.00	0.00	0.00
On-site	0.43	0.93	0.66	0.54
Central administration	0.00	0.02	0.01	0.01
Delivery to homes*	1.26	1.53	0.82	1.02
Donated nonlabor resources	0.36	0.20	0.53	0.49
Food*	0.10	0.03	0.07	0.10
Facilities*	0.25	0.16	0.45	0.38
Gasoline for delivery to sites and homes	0.01	0.01	0.01	0.01
Total value of donations	2.05	2.68	2.02	2.06
Total Cost				
Total cost (paid and donated)	11.78	11.81	10.86	11.06
Sample				
Unweighted sample size	43	37	72	94

Source: AOA Nutrition Programs Evaluation cost data collection instruments and LSP and AAA process study surveys.

Notes: Data on urbanicity was collected on the evaluation's process study survey of LSPs and AAAs. Some LSPs' service areas include a combination of urban, suburban, and rural or frontier sub-areas; as such, LSPs could provide multiple responses for this survey question. Response counts for urbanicity therefore sum to more than the number of LSPs in the sample that provide home-delivered meals (94). When an LSP did not report a value for this survey item, we used other known information about the LSP—collected via other survey items and as part of cost data collection—to infer a response.

*Indicates that differences between the average costs of the component are statistically significant at the .05 level.

HDM = home-delivered meal

3. Geographic region

Congregate meals provided by LSPs in the South cost less (\$9.14), on average, than congregate meals provided by LSPs in the Northeast (\$11.03), Midwest (\$10.97), or West (\$12.13) (Table III.5). Although LSPs in the South have the highest average paid labor costs per congregate meal, they have the lowest average paid costs of facilities, delivery to sites, and insurance. LSPs in the Northeast and Midwest have similar total average costs per-meal (paid and donated), but considerable variation in the average costs of individual meal components. LSPs in the Northeast have higher average per-meal labor and facilities costs, whereas LSPs in the Midwest have higher average food, vendor, and equipment costs. LSPs in the West have the highest average per-meal paid costs. This is almost exclusively a result of relatively high average vendor payments, which were at least \$1.12 more, on average, for LSPs in the West than for LSPs in any other region.

Table III.5. Average cost of a congregate meal by geographic region (weighted)

Cost component	Northeast	South	Midwest	West	All CM programs
Paid Cost					
Paid labor	\$3.78	\$4.20	\$3.18	\$3.44	\$3.69
Central or other off-site kitchen	0.02	0.12	0.00	0.22	0.08
On-site	1.86	2.06	1.62	2.03	1.87
Central administration	1.50	1.92	1.54	1.08	1.56
Delivery to sites	0.40	0.10	0.02	0.11	0.18
Purchased nonlabor resources	5.43	4.55	5.96	7.08	5.61
Food	0.64	1.06	1.69	1.71	1.28
Vendor payments	2.61	2.79	2.88	4.00	3.06
Nonfood meal supplies*	0.11	0.14	0.26	0.31	0.20
Facilities	1.83	0.39	0.44	0.52	0.69
Equipment	0.08	0.08	0.28	0.18	0.15
Delivery to sites (vehicles, gasoline, car insurance)	0.03	0.01	0.04	0.02	0.02
Insurance*	0.08	0.02	0.24	0.06	0.09
Other nonlabor costs*	0.05	0.06	0.13	0.28	0.12
Total paid costs	9.21	8.75	9.14	10.52	9.30
Value of Donations					
Volunteer labor	1.29	0.16	1.11	0.98	0.90
Central or other off-site kitchen	0.00	0.00	0.00	0.20	0.03
On-site*	1.29	0.16	1.03	0.76	0.85
Central administration	0.00	0.00	0.08	0.00	0.02
Delivery to sites	0.00	0.00	0.00	0.02	0.00
Donated nonlabor resources	0.53	0.23	0.72	0.63	0.49
Food	0.24	0.07	0.23	0.02	0.13
Facilities	0.29	0.16	0.48	0.61	0.36
Gasoline for delivery to sites	0.00	0.00	0.01	0.00	0.00
Total value of donations	1.82	0.39	1.83	1.61	1.39
Total Cost					
Total cost (paid and donated)	11.03	9.14	10.97	12.13	10.69

Cost component	Northeast	South	Midwest	West	All CM programs
Sample					
Unweighted sample size	18	29	34	17	98

Source: AOA Nutrition Programs Evaluation cost data collection instruments.

Notes: *Indicates that differences between the average costs of the component are statistically significant at the .05 level.

CM = congregate meal

Only LSPs from the contiguous United States participated in this study; no LSPs from Alaska or Hawaii participated.

As with congregate meals, home-delivered meals provided by LSPs in the South (\$8.22) cost less, on average, than those provided by LSPs in other regions (Table III.6). However, home-delivered meals provided by LSPs in the Northeast have the lowest average *paid* costs, a result primarily of lower average per-meal paid labor and paid facilities costs. Although LSPs in the South have higher average paid costs than LSPs in the Northeast, the value of their donated costs is much less than that of other regions, which reduces their total average costs compared to other areas of the country.

LSPs in the West have the highest total average costs for home-delivered meals (\$14.32). This is the result of relatively high average paid labor costs (over \$1.00 more per-meal than other sites) and relatively high average vendor payments (about \$1.44 more per-meal, on average, than other sites). When looking at the breakdown of paid labor costs, the relatively high average paid labor costs in the West seem due, at least in part, to relatively high average paid home-delivery labor costs. The average per-meal cost of home-delivery labor in the West is \$1.54, which is between \$0.58 and \$1.49 higher than the average per-meal cost of home-delivery labor in other regions.

Table III.6. Average cost of a home-delivered meal by geographic region (weighted)

Cost component	Northeast	South	Midwest	West	All HDM programs
Paid Cost					
Paid labor	\$1.92	\$2.64	\$3.64	\$4.76	\$3.05
Central or other off-site kitchen	0.01	0.06	0.27	0.00	0.10
On-site	0.85	0.94	1.72	1.38	1.18
Central administration	0.87	0.65	0.99	1.84	1.06
Delivery to sites	0.14	0.03	0.30	0.00	0.14
Delivery to homes	0.05	0.96	0.36	1.54	0.57
Purchased nonlabor resources	4.66	4.99	5.66	8.40	5.95
Food	0.68	0.91	1.49	1.42	1.14
Vendor payments	3.21	3.09	2.75	4.65	3.42
Nonfood meal supplies	0.17	0.11	0.28	0.37	0.22
Facilities	0.27	0.36	0.36	0.86	0.48
Equipment	0.07	0.08	0.26	0.18	0.14
Delivery to sites and homes (vehicles, gasoline, car insurance)*	0.16	0.36	0.14	0.56	0.33
Insurance	0.02	0.02	0.25	0.07	0.08
Other nonlabor costs	0.08	0.06	0.13	0.29	0.14
Total paid costs	6.58	7.63	9.30	13.16	9.00
Value of Donations					
Volunteer labor	2.36	0.35	2.26	0.50	1.57
Central or other off-site kitchen	0.00	0.00	0.00	0.00	0.00
On-site	0.74	0.00	1.04	0.04	0.54
Central administration	0.02	0.00	0.01	0.00	0.01
Delivery to homes	1.60	0.35	1.21	0.46	1.02
Donated nonlabor resources	0.54	0.24	0.72	0.66	0.49
Food	0.07	0.07	0.24	0.02	0.10
Facilities	0.47	0.16	0.45	0.62	0.38
Gasoline for delivery to sites and homes	0.00	0.01	0.03	0.02	0.01
Total value of donations	2.90	0.59	2.98	1.16	2.06
Total Cost					
Total cost (paid and donated)	9.48	8.22	12.28	14.32	11.06
Sample					
Unweighted sample size	17	29	31	17	94

Source: AOA Nutrition Programs Evaluation cost data collection instruments.

Notes: *Indicates that differences between the average costs of the component are statistically significant at the .05 level.

HDM = home-delivered meal

Only LSPs from the contiguous United States participated in this study; no LSPs from Alaska or Hawaii participated.

4. Program size

Congregate and home-delivered meals provided by large programs cost less, on average, than such meals provided by small programs (Tables III.7 and III.8). A large congregate meal program is defined as one that provides 1,000 or more congregate meals per week, and a large home-delivered meal program delivers 1,000 or more meals per week. A congregate meal

prepared by a large program costs \$8.15, total on average; this is \$2.74 less than the total average cost of such a meal prepared by a small program. Similarly, a home-delivered meal prepared by a large program costs \$9.16, on average; this is \$2.76 less than the total average cost of such a meal prepared by a small program. Although LSPs that operate large congregate and home-delivered meal programs typically require more staff for their operations, they are also preparing larger numbers of meals; this can help to achieve economies of scale.

Table III.7. Average cost of a congregate meal by program size (weighted)

Cost component	Small	Large	All CM programs
Paid Cost			
Paid labor	\$3.57	\$3.15	\$3.69
Central or other off-site kitchen	0.05	0.12	0.08
On-site	1.74	2.05	1.87
Central administration	1.73	0.61	1.56
Delivery to sites	0.05	0.37	0.18
Purchased nonlabor resources	5.93	3.80	5.61
Food	1.34	0.93	1.28
Vendor payments	3.23	2.08	3.06
Nonfood meal supplies	0.20	0.20	0.20
Facilities	0.77	0.30	0.69
Equipment	0.16	0.05	0.15
Delivery to sites (vehicles, gasoline, car insurance)	0.02	0.04	0.02
Insurance	0.09	0.04	0.09
Other nonlabor costs	0.12	0.16	0.12
Total paid costs	9.50	6.95	9.30
Value of Donations			
Volunteer labor	0.87	0.92	0.90
Central or other off-site kitchen	0.00	0.08	0.03
On-site	0.85	0.84	0.85
Central administration	0.02	0.00	0.02
Donated nonlabor resources	0.52	0.28	0.49
Food	0.14	0.05	0.13
Facilities	0.38	0.23	0.36
Gasoline for delivery to sites	0.00	0.00	0.00
Total value of donations	1.39	1.20	1.39
Total Cost			
Total cost (paid and donated)	10.89	8.15	10.69
Sample			
Unweighted sample size	59	39	98

Source: AOA Nutrition Programs Evaluation cost data collection instruments.

Notes: *Indicates that differences between the average costs of the component are statistically significant at the .05 level.

Large congregate meal programs are those that serve 1,000 or more meals a week.

CM = congregate meal

Table III.8. Average cost of a home-delivered meal by program size (weighted)

Cost component	Small	Large	All HDM programs
Paid Cost			
Paid labor	\$3.60	\$2.26	\$3.05
Central or other off-site kitchen	0.00	0.21	0.10
On-site	1.42	0.99	1.18
Central administration	1.20	0.59	1.06
Delivery to sites	0.00	0.22	0.14
Delivery to homes	0.98	0.25	0.57
Purchased nonlabor resources	6.33	4.92	5.95
Food	1.17	1.06	1.14
Vendor payments	3.55	3.01	3.42
Nonfood meal supplies	0.24	0.21	0.22
Facilities	0.56	0.24	0.48
Equipment	0.17	0.06	0.14
Delivery to sites and homes (vehicles, gasoline, car insurance)	0.38	0.21	0.33
Insurance	0.09	0.06	0.08
Other nonlabor costs	0.16	0.07	0.14
Total paid costs	9.93	7.18	9.00
Total Value of Donations			
Volunteer labor	1.46	1.64	1.57
Central or other off-site kitchen	0.00	0.00	0.00
On-site	0.66	0.45	0.54
Central administration	0.01	0.00	0.01
Delivery to homes	0.79	1.19	1.02
Donated nonlabor resources	0.53	0.34	0.49
Food	0.10	0.09	0.10
Facilities	0.42	0.23	0.38
Gasoline for delivery to sites and homes	0.01	0.02	0.01
Total value of donations	1.99	1.98	2.06
Total Cost			
Total cost (paid and donated)	11.92	9.16	11.06
Sample			
Unweighted sample size	42	52	94

Source: AOA Nutrition Programs Evaluation cost data collection instruments.

Notes: *Indicates that differences in the cost of the component are statistically significant at the .05 level; for the value of donated labor, only differences in the value of donated on-site labor are significant at the .05 level

Large home-delivered meal programs are those that deliver 1,000 or more meals a week.

HDM = home-delivered meal

B. Regression analysis of meal costs

We conducted a regression analysis to assess what, if any, statistically significant effects the program characteristics examined earlier had on average meal costs among LSPs in our sample

when considered jointly (Table III.9).⁹ In these regressions (one for congregate and one for home-delivered meals), we regressed average meal costs on one continuous variable—program size—and five binary variables:

1. Production method: vendor (1,0)
2. Service area urbanicity: urban (1,0)
Geographic region¹⁰:
 3. Northeast (1,0)
 4. West (1,0)
 5. Midwest (1,0)

Two variables—program size and geographic region—have a statistically significant effect on meal costs among LSPs in our sample. Program size has a statistically significant inverse effect on total average meal costs. As noted above, congregate and home-delivered meals prepared as part of larger programs have lower total average costs than those prepared as part of smaller programs. The regression coefficient for program size is significantly different from zero at 0.05 level in both regressions. Stated another way, the total average costs of congregate and home-delivered meals provided at the LSPs in our sample decrease as program size increases, as one might expect due to economies of scale. For geographic region, the total average cost of home-delivered meals provided by LSPs in the South is lower than the average cost reported by LSPs located in the West or Midwest; the regression coefficient for the West and Midwest is significantly different from zero at the 0.05 level.

⁹ Data on some cost components were collected at the LSP level and others at the meal site level. We constructed sample weights at the variable level, rather than the site level, for the primary purpose of generating weighted *across* LSP averages rather than *within* LSP estimates. As a result, we cannot compute weighted LSP level averages or run a weighted regression of the effect of program characteristics on meal costs. Nonetheless, to assess the statistical significance of the findings from our descriptive analysis of program characteristics and meal costs, the research team ran the regression unweighted. We used specialized software to account for the clustering effect of selecting LSPs within sampled AAAs and determined that the clustering effect on the variance is not large (there is an average of 1.4 LSPs per AAA). Further, including program size as a continuous variable in the model helps account for unequal selection probabilities due to the PPS sampling of LSPs that would have been reflected in the weight.

¹⁰ The binary variable for the South region was omitted from this model. Therefore, the results for the other three region variables should be interpreted as a comparison to the South region.

Table III.9. Regression analysis of congregate and home-delivered meal costs among sampled LSPs (unweighted)

Program characteristic	Congregate meal		Home-delivered meal	
	Regression coefficient	t-statistic	Regression coefficient	t-statistic
Meal production method				
Vendor contract or restaurant vouchers	1.21	1.28	1.41	1.43
Service area urbanicity				
Urban	-0.34	-0.40	-0.04	-0.04
Program size				
LSP meals per week (CM or HDM)	-0.00041*	-3.04	-0.00016*	-3.56
Geographic region				
Northeast	1.03	0.82	0.99	1.02
West	1.90	1.11	3.07*	2.29
Midwest	1.05	0.91	2.52*	2.00
Constant	9.75*	8.05	8.29*	10.43
R²	0.08		0.14	
Unweighted sample size	98		94	

*Significantly different from zero at the 0.05 level.

CM = congregate meal; HDM = home-delivered meal

C. Changes in the average cost of a meal by program characteristics over time

Findings on meal costs by program characteristics align closely with those reported by Ponza et al. (1996). While the program characteristic definitions the Ponza study used were slightly different, the basic categories were similar. For instance, in the Ponza study, LSPs reported only one meal production method and one service area urbanicity, but in this study, LSPs could report multiple meal production methods and service area urbanicities to account for the increased complexities of their operations.

Similar to our findings, Ponza et al. (1996) found that the least expensive congregate and home-delivered meals, on average, were those that were prepared at central kitchens, as part of large programs, or by LSPs located in the South. Ponza et al. (1996) also found that meals prepared by LSPs located in the West were the most expensive, and that congregate meals provided by LSPs with urban sites were less expensive than those provided by LSPs with rural sites. In contrast with the findings of this current study, Ponza et al. (1996) found that home-delivered meals prepared by LSPs that served urban areas cost less than those prepared by LSPs that served rural service areas.

IV. CONCLUSION

Overall, findings from the AOA Nutrition Programs Evaluation meal costs analysis align with those of the last major analysis of NSP meal costs, conducted in 1995 (Ponza et al. 1996). As was the case 20 years ago, today it costs slightly more, on average, to provide a home-delivered meal (\$11.06) than it does to provide a congregate meal (\$10.69). The costs of purchased nonlabor resources (in particular, food purchases and vendor payments) account for the largest proportion of the total average cost of each type of meal (about half). Further, each of the four main meal cost components—paid labor, purchased nonlabor (including food, vendor payments, facilities, and equipment), volunteer labor, and donated nonlabor resources—accounts for the same proportion of the total average cost of a congregate meal today as they did in 1995. These proportions have changed slightly over time for a home-delivered meal, but purchased nonlabor resources still comprise the highest proportion of the cost of home-delivered meal, followed by paid labor, and then volunteer labor and donated nonlabor resources.

Findings from this analysis also suggest that the program characteristics and approaches that were the most cost-effective 20 years ago are the same that produce the lowest-cost meals today. It costs less, on average, to prepare meals at a central kitchen, and it costs less for large programs or programs located in the South to prepare meals. In fact, we found that program size (for both congregate and home-delivered meals) or being located in the South (for home-delivered meals) have a statistically significant direct effect on program costs among the sample LSPs. We also found that congregate meals served by LSPs in urban areas cost less, on average, than those served in suburban and rural or frontier areas, whereas home-delivered meals delivered by LSPs that operate in rural areas cost less than those delivered by LSPs that operate in suburban or urban areas (that latter being a difference between this and the Ponza et al. (1996) report, which found that home-delivered meals delivered in urban areas cost less than those in rural areas). The costs of paid (and, to some extent, donated) labor, purchased food, and vendor payments are the primary drivers of the differences in total average costs by program characteristics. Generally speaking, relatively high average vendor payments result in relatively high average meal costs across programs with varied characteristics.

While the composition of total average meal costs and the cost-efficiency related to particular program characteristics have not changed much over time, producing meals for the NSP appears to have become more expensive overall. In fact, the total average cost of each type of meal is more than \$2.50 higher than we would have expected given inflation. It appears that this price increase is due in large part to food prices that are increasing faster than inflation (Volpe 2013). The costs of most other meal components have remained steady over time, with the exception of central administration labor costs, which appear to have increased for both congregate and home-delivered meals. Finally, LSPs appear to be relying increasingly on volunteers to assist with meal production, service, and delivery, particularly for their home-delivered meal programs. LSPs reported higher use of volunteer labor for this analysis than they did in 1995.

This page left blank for double-sided copying.

REFERENCES

- Administration for Community Living. "FY 2015 ACL Budget Table: Administration for Community Living, FY 2015 President's Budget." Washington, DC: U.S. Department of Health and Human Services, ACL, 2014. Available at [http://www.acl.gov/About_ACL/Budget/ACL-FY2015-budget-table.aspx]. Accessed June 24, 2015.
- Administration for Community Living. "Aging Integrated Database." Washington, DC: U.S. Department of Health and Human Services, ACL, 2015. Available at [<http://www.agid.acl.gov>]. Accessed June 24, 2015.
- Mabli, James, Nicholas Redel, Rhoda Cohen, Erin Panzarella, Mindy Hu, Barbara Carlson. "Process Evaluation of Older Americans Act Title III-C Elderly Nutrition Services Program." U.S. Department of Health and Human Services, Administration for Community Living, 2015 (forthcoming).
- Ohls, James C., and Linda Rosenberg. "A 'Building-Up' Approach to Measuring Program Costs." *Journal of Policy Analysis and Management*, vol. 18, no. 3, 1999, pp. 473–480.
- Ponza, Michael, James C. Ohls, Barbara E. Millen, Audrey M. McCool, Karen E. Needels, Linda Rosenberg, Dexter Chu, Catherine Daly, Paula A. Quatromoni. "Serving Elders at Risk: The Older Americans Act Nutrition Programs, National Evaluation of the Elderly Nutrition Program, 1993-1995," vols. I, II, and III. U.S. Department of Health and Human Services, Administration on Aging, 1996.
- U.S. Department of Labor, Bureau of Labor Statistics. CPI Inflation Calculator. Available at [http://www.bls.gov/data/inflation_calculator.htm].
- Volpe, Richard. "Price Inflation for Food Outpacing Many Other Spending Categories." U.S. Department of Agriculture, Economic Research Service, August 5, 2013.

This page left blank for double-sided copying.

APPENDIX A

**SAMPLE DESIGN FOR THE SELECTION OF LOCAL SERVICE PROVIDERS,
CONGREGATE MEAL SITES AND HOME-DELIVERY DISTRIBUTION SITES, AND
HOME-DELIVERY DISTRIBUTION ROUTES FOR THE MEAL COST ANALYSIS**

This page left blank for double-sided copying.

In this appendix, we describe the procedures that were used to select LSPs, congregate and home-delivered meal sites, and home-delivery routes for the evaluation of the AOA Nutrition Programs Evaluation meal cost analysis. The 230 LSPs that were sampled to participate in the survey for the evaluation's process study were the same as those used for the evaluation's meal cost analysis, including AAAs that operate as LSPs. Therefore, this appendix first describes how LSPs were sampled (from within sampled AAAs) for the evaluation's process study, then discusses how they were used in the program costs analysis.

The AOA Nutrition Programs Evaluation process study was designed to examine the strategies, activities, and resources of the program at each level of the National Aging Network: SUA, AAA, and LSP. The following describes how the evaluation selected its sample of 56 SUAs, 360 AAAs, and 230 LSPs.

1. Obtaining sampling frames from agencies and selecting samples for process study

SUAs. We included all 56 SUAs in the process study sample, including states and territories.

AAAs. We selected a random sample of 360 AAAs for the AAA surveys, with the six largest AAAs selected with certainty. Before selecting this sample, we needed to obtain a measure of size for each of the AAAs, operationalized as the number of unduplicated congregate and home-delivered meal clients each AAA serves. In collaboration with the National Association of States United for Aging and Disabilities, we fielded a brief web-based survey to all 56 SUAs to obtain the counts needed for sampling. Study staff reviewed the data and contacted the SUAs in the 48 continental states and the District of Columbia that did not respond to the mini-survey to obtain counts. We also contacted those whose counts were unusually high or low to verify accuracy.

LSPs. We selected a subsample of 120 AAAs, with probability proportional to size, to provide the information necessary to sample LSPs for the LSP surveys. These 120 were selected from the 340 AAAs that had not yet refused to participate in the AAA data collection at the time of LSP sampling. Only LSPs from the contiguous United States were selected to participate in this study; no LSPs from Alaska or Hawaii participated.

We informed each of the 120 selected AAAs by email that we would ask some of their LSPs to participate in the evaluation. On an attached spreadsheet, we asked each AAA to list all their LSPs,¹¹ the nutrition services that each LSP provides (both congregate and home-delivered meals, congregate meals only, or home-delivered meals only), the unduplicated number of

¹¹ In the request for LSP lists, we defined the minimum responsibilities of a local service provider as:

- Delivery of the meal (not necessarily the production or responsible for the production—that is, AAA could enter into a planning and service area-wide catering contract through which all providers receive meals).
- Provision of an opportunity for and the collection of voluntary contributions.
- Documentation and reporting of meals served.
- Food safety and sanitation during meal delivery. In the case of a restaurant/voucher based-program, the provider is the entity that has entered into an agreement with the restaurant or other meal producer for the provision of meals that meet the OAA dietary requirements and is responsible for issuing the voucher for service. A caterer with no responsibility beyond production of the meal is not considered a local service provider for the OAA Nutrition Services Program.

clients served in the congregate and the home-delivered meals program by each provider in May 2014, and the number of congregate meal sites in operation for each provider during May 2014.

We collected completed spreadsheets with LSP information from 115 of the 120 AAAs, totaling 1,169 LSPs. We then used the data on the number of clients served (through congregate meal sites and home-delivered meals) to sample 230 LSPs with probability proportional to size using a composite size measure. If an AAA had only one or two LSPs, we selected them all. Among the AAAs with three or more LSPs, we used simple random sampling to choose some to have 2 LSPs selected, some to have 3 LSPs selected, and one to have 4 LSPs selected to achieve our target of 230. Twenty-eight of the 230 selected LSPs were AAAs that also operated as LSPs.

2. Contacting LSPs for the meal cost analysis

As is noted in Chapter I, some LSPs provide meals at up to 40 or more congregate meal sites and/or home-delivered meals via numerous distribution sites. To minimize respondent burden associated with having to provide data on the staff at many meal sites, we selected and focused data collection on one congregate meal site and/or one home-delivery distribution site from each LSP. We contacted the 230 sampled LSPs to request meal site information for meal site sampling for the meal cost analysis. One was identified as a duplicate. Of the remaining 229, 142 provided the research team with a list of their congregate meal and home-delivery distribution sites and the number of weekly meals provided by each. Among the 142 LSPs that provided lists of sites. For each of these LSPs, we sampled one congregate meal site with probability proportional to the number of congregate meals served at the site and we sampled one home-delivery distribution site with probability proportional to the number of meals provided by each site.

We then contacted these 142 LSPs for meal cost data collection; 134 of these LSPs had completed the LSP survey (or AAA survey in the case of AAAs that operate as LSPs) and provided congregate and home-delivered meal site information for site level sampling. The remaining nine LSPs provided congregate meal and home-delivery distribution site information for site level sampling but did not complete the survey. One hundred six of the 142 LSPs responded to our request for program costs data, and 103 provided enough data to be included in the analysis of meal costs; 98 of which provided congregate meals and 94 of which provided home-delivered meals. Fifteen of the final 103 meal cost analysis LSPs were AAAs that operate as LSPs. For the three LSPs that did not complete the process study survey; we inferred program characteristics information for the analysis (see Chapter 1 for more information on imputation of these missing values).

3. Selecting home-delivery distribution routes from within selected home-delivered meal sites

When a selected home-delivery distribution site operated numerous home-delivery routes, to reduce respondent burden, we selected and focused our cost data collection on one of the routes. We asked each LSP that operated a home-delivery program for a list of the routes that deliver meals from the selected home-delivery distribution site. LSPs typically identified routes by either a driver's name or the geographic area within which the route delivers meals. We then used the List Randomizer function available on random.org along with simple random sampling to select

one route from the chosen home-delivery distribution site for inclusion in the program costs analysis, using the first one listed in random order.¹²

¹² See [<https://www.random.org/lists>].

APPENDIX B

ANALYSIS WEIGHTS FOR THE MEAL COST ANALYSIS

This page left blank for double-sided copying.

In this appendix, we describe the procedures that were used to construct and apply analysis weights to the program costs analysis data. The purpose of analysis weights is to allow for the computation of unbiased estimates based on sample survey responses. Weights take into account both the probability of selection into the sample and the differential response patterns that may exist in the respondent sample. Weights were constructed for the samples of LSPs and the subsamples of their congregate meal and home-delivery distribution sites for the program costs analysis.

LSPs. For a probability sample of 230 LSPs, the sampling weights, conditional on the selected AAAs, ranged from 1 to 89, and summed to 1225 (with an unequal weighting design effect of 4.533).

Among the 230 LSPs, one was found to be a duplicate and removed from the cost study weighting process at the outset. We then adjusted for nonresponse to the cost study in two steps: (1) first for whether the LSP provided a list of its congregate meal sites and home delivered meal distribution sites (142 out of 229); and (2) then for whether the LSP provided cost data for itself and for its selected meal sites (103 out of 142). When adjusting for the 87 LSPs that did not provide a list of its sites using response propensity models, we first entered the following variables into a chi-square interaction detection (CHAID) software as well as a stepwise logistic regression model to determine which main effects and two-order interactions were significant predictors of the provision of the site lists: census region, number of congregate meals served, and number of home-delivered meals served, each divided into four categories (a zero category plus tertiles of non-zero values for the two continuous variables). The final model, run using a normalized sampling weight, included some categories from each of these variables, and included one two-order interaction between census region and congregate meals served. We multiplied the inverse of the resulting propensity score and the LSP sampling weight for the 142 LSPs who provided site lists.

Among the 142 LSPs that provided site lists, we had additional information to include in the response propensity models for the second adjustment, which accounts for those 39 LSPs that provided site lists but did not provide cost data. In addition to census region, congregate meals, and home-delivered meals, we now had the number of congregate meal sites and the number of home-delivered meal distribution sites, which we divided into four categories. For congregate meals sites, the categories were: (a) 0 or 1; (b) 2 to 4; (c) 5 to 10; and (d) 11 or more. For home-delivered sites, the categories were: (a) 0; (b) 1; (c) 2 to 5; and (d) 6 or more. The final model, run using a normalized version of the weight adjusting for the provision of the site list, included at least one category from each of these variables -- except for the number of home-delivered meal sites -- and one two-order interaction between number of congregate meals and number of home-delivered meals served. We multiplied the inverse of the resulting propensity score and the weight adjusting for the provision of the site list for the 103 LSPs who provided cost data, and then applied a ratio adjustment of 0.988 to all the weights so that the sum of the weights was equal to the sum of the sampling weights for all eligible LSPs (1224.10). We then ran this weight through a trimming program and identified one outlier weight to be trimmed. But these LSP cost study weights do not yet account for the selection and response probabilities for the AAAs that provided the list of LSPs from which the sample of 230 was selected.

The sampling weight for the 360 originally sampled AAAs, accounting for their selection probabilities, was 1 for the sample selected with certainty (the six largest AAAs), and was 1.723 for each of the 354 AAAs selected from the remaining 610. As described in the sampling section, we subsampled 120 AAAs from 340 sampled and participating AAAs. After adjusting the initial AAA sampling weight for the 20 AAAs that refused to participate in this part of the study (using logistic regression response propensity modeling), we applied the inverse of the subsampling probability of the 120 AAAs to this refusal-adjusted weight. We then further adjusted for the 5 subsampled AAAs who never provided their lists of LSPs using yet another propensity model. This cumulative AAA weight summed to 606. After applying this cumulative AAA weight to the LSP cost study weight, the final cumulative LSP cost study weight summed to 3,542.24 and ranged from 1.31 to 259.92. We then applied a ratio adjustment of 1.060 to ensure the final cumulative LSP cost study weight summed to 3,755.11, the same total as for the LSP weights in the process study. The range of this weight was 1.39 to 275.54, with a weighting design effect of 2.343. This LSP level weight was applied to data collected at the LSP level, which included information about paid and the value of volunteer central administrative staff salaries and all information about all nonlabor resources (paid and donated).

Congregate meal and home-delivery distribution sites. We collected some site-specific labor costs from the congregate meal site or the home-delivered meal distribution site that was selected with probability proportional to size within the LSP. For estimates involving these costs, a weight accounting for their selection probabilities is necessary. (No nonresponse adjustments were necessary at the site level among participating LSPs.) To construct the congregate meal site cost study weight, we multiplied the final LSP cost study weight by the sampling weight for the congregate meal site (the inverse of its probability of selection, incorporating its size measure). This weight, which exists for 98 of the 103 LSPs that provided congregate meals, ranged from 8.46 to 1405.39 and summed to 12,250.29. Similarly, to construct the home-delivered meal distribution site cost study weight, we multiplied the final LSP cost study weight by the sampling weight for the home-delivered meal site.¹³ This weight, which exists for 94 of the 103 LSPs that provided home-delivered meals, ranged from 1.39 to 1405.39 and summed to 9563.36. These meal site level weights were applied to data collected at the site level, which included information about paid and the value of volunteer site staff salaries.

¹³ We calculated but did not ultimately use in our analysis weights that accounted for the random selection of one home-delivered meal site delivery route.

APPENDIX C

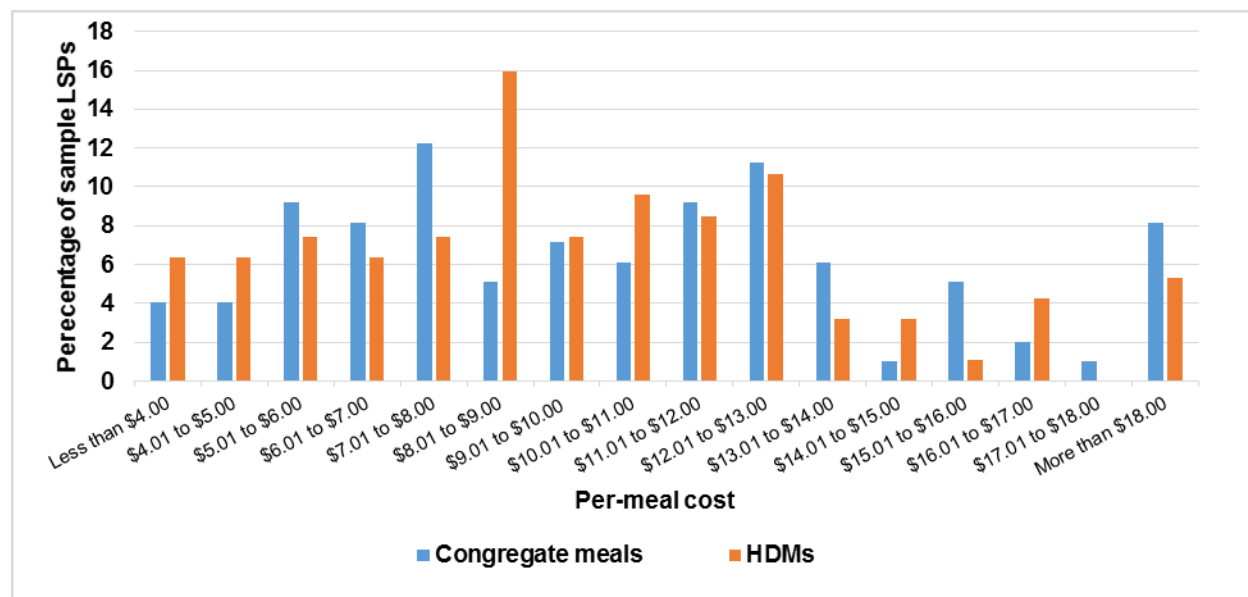
DISTRIBUTION OF MEAL COSTS

This page left blank for double-sided copying.

As described in Appendix B, the purpose of analysis weights is to allow for the computation of unbiased estimates based on responses from the study population. Weights take into account both the probability of selection into the sample and the differential response patterns that may exist in the respondent sample. Data on some cost components were collected at the LSP level and others at the meal site level. The weight applied to each sampled and responding LSP is used to create LSP level estimates that represent all LSPs in the population. Similarly, the weight applied to each sampled congregate meal and home-delivery meal distribution site is used to create estimates that represent all such sites in the population. As such, we constructed sample weights for the primary purpose of generating weighted *across* LSP per-meal averages rather than *within* LSP per-meal estimates and we cannot create and compare weighted means at the LSP level. Nonetheless, we thought it important to estimate and report the distribution of the total cost of a congregate meal and the total cost of a home-delivered meal across the LSPs in our sample. We present these estimates in this appendix, using unweighted LSP level per-meal costs.

Unweighted per-meal costs vary considerably across the 103 sample LSPs, 98 of which provide congregate meals and 94 of which provide home-delivered meals (Figure C.1 and Table C.1), from less than \$4.00 to more than \$18.00. There were outliers at both extremes for both types of meals. The minimum congregate per meal cost reported in our sample was \$3.04 and the maximum was \$26.59, and the minimum home-delivered per meal cost reported in our sample was \$2.76 and the maximum was \$31.73. Among our sample, the unweighted median cost of a congregate meal (\$10.14) is lower than the unweighted average cost of a congregate meal (\$10.40), and the unweighted median cost of a home-delivered meal (\$9.87) is higher than the unweighted average cost of a home-delivered meal (\$8.91). This demonstrates the effect of the less expensive congregate meal outliers and the more expensive home-delivered meal outliers. These unweighted averages and medians should not be construed as generalizable to the population.

Figure C.1. Distribution of per-meal costs (unweighted)



Source: AOA Nutrition Programs Evaluation cost data collection instruments.

Table C.1. Distribution of total meal costs, percentage of programs (unweighted)

Cost per meal	Congregate meals	Home-delivered meals
Less than \$4.00	4.08	6.38
\$4.01 to \$5.00	4.08	6.38
\$5.01 to \$6.00	9.18	7.45
\$6.01 to \$7.00	8.16	6.38
\$7.01 to \$8.00	12.24	7.45
\$8.01 to \$9.00	5.10	15.96
\$9.01 to \$10.00	7.14	7.45
\$10.01 to \$11.00	6.12	9.57
\$11.01 to \$12.00	9.18	8.51
\$12.01 to \$13.00	11.22	10.64
\$13.01 to \$14.00	6.12	3.19
\$14.01 to \$15.00	1.02	3.19
\$15.01 to \$16.00	5.10	1.06
\$16.01 to \$17.00	2.04	4.26
\$17.01 to \$18.00	1.02	0.00
More than \$18.00	8.16	5.32
Average Cost	\$10.40	\$9.87
Median Cost	\$10.14	\$8.91
Sample Size	98	94

Source: AOA Nutrition Programs Evaluation cost data collection instruments.

www.mathematica-mpr.com

**Improving public well-being by conducting high quality,
objective research and data collection**

PRINCETON, NJ ■ ANN ARBOR, MI ■ CAMBRIDGE, MA ■ CHICAGO, IL ■ OAKLAND, CA ■ WASHINGTON, D

MATHEMATICA
Policy Research

Mathematica® is a registered trademark
of Mathematica Policy Research, Inc.