



Evaluation of the Effect of the Older Americans Act Title III-C Nutrition Services Program on Participants' Longer-Term Health Care Utilization

Final Report

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As people age, they are more likely to face deteriorating health conditions and adverse health events. Adults age 65 and older are much more likely than those ages 45 to 64 to have two or more chronic conditions (Buttorff et al. 2017; Ward et al. 2014). Almost one-third of older adults fall each year, and more than half of these falls are recurrent (Bergen et al. 2016). Older adults also are at higher risk of limitations in activities of daily living, decline in cognitive functioning, social isolation, and depression (van der Vorst et al. 2016; Murman 2015; Sözeri-Varma 2012). The predicted increase in the share of the population age 65 or older over the next 10 years (Ortman et al. 2014; United States Census Bureau 2020), coupled with continued increases in health care costs (Keehan et al. 2020; Rama 2019) will have profound effects on the ability of federal and state agencies, local community-based service providers, and family caregivers to meet the health and social needs of older adults (Kelley et al. 2013; Feinberg and Spillman 2019).

Although many older adults—in particular, those who are frail, disabled, or homebound—receive assistance from caregivers and obtain support services from home- and community-based agencies, little is known about the effectiveness of these programs on the need for health care services. A recent national evaluation of the Older Americans Act (OAA) Title III-C Nutrition Services Program (NSP) showed that the program not only promotes older adults’ access to nutritious meals, but also facilitates social contact and reduces the likelihood of experiencing adverse health events. These positive program effects were generally more pronounced for lower-income individuals than higher-income individuals, and for individuals living alone than for those living with other family members. However, studies generally have not examined the program’s longer-term success in improving health, reducing the occurrence of adverse health events, and helping older adults maintain their independence in their homes and communities.

This report is the fifth of five reports on findings from a national evaluation of the Title III-C NSP. Mathematica conducted this evaluation for the Administration on Aging (AoA) within the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services (DHHS), which oversees the program. Other reports summarize findings from a process evaluation of program administration and service delivery; a cost analysis; an evaluation of effects on program participants’ food security, socialization, and diet quality; and an evaluation of effects on participants’ health outcomes. The prior reports that examined program impacts (effects) looked at outcomes over a one-year period. This report examines impacts over three years using additional data collected from NSP participants and nonparticipants.

Background

The goals of the NSP are to ensure that the health and social needs of older adults are adequately met and to rebalance the provision of long-term care away from institutionalization and toward home- and community-based services. A core component of the program, and the focus of this report, is the provision of group (congregate) meals. NSP congregate meal participants can receive a nutritious meal at a senior center or other congregate meal sites. Most sites serve lunch on one or more weekdays, and some sites offer breakfast or dinner or provide meals on weekends. Congregate meal sites offer an opportunity for older adults to socialize with peers and receive other services, such as nutrition education, screening, and counseling.

Organizations in the National Aging Network, an informal network of home- and community-based care providers, administer the NSP. AoA’s central and regional offices provide overall federal coordination;

however, the State Units on Aging (SUAs) and the Area Agencies on Aging (AAAs) both support key aspects of program operations. In turn, local service providers (LSPs) typically provide the direct nutrition services.

The NSP is authorized under Title III of the OAA. Through Title III, SUAs implement a system of coordinated, community-based services targeted to older adults and receive federal grants from AoA for providing congregate nutrition services (authorized under Part C-1), home-delivered nutrition services (authorized under Part C-2), meals (authorized under Part A), and support services (authorized under Part B). In fiscal year (FY) 2018, the most recent year in which counts of meals and individuals served are available, 74 million meals were served to 1.5 million people at congregate sites (ACL 2020). OAA Title III-C funding was \$311 million for congregate nutrition services in FY 2018 (ACL 2020).

Adults age 60 and older, and their spouses of any age, may participate in the NSP's congregate meal program. In addition, members of the following groups are eligible to receive congregate meals: disabled people younger than age 60 who reside in housing facilities occupied primarily by older adults where congregate meals are served; disabled people who reside at home with, and accompany, people age 60 and older to meal sites; and NSP service volunteers.

The NSP is not an entitlement program. It also does not have a means test, but the program specifically targets older adults with the greatest economic or social need, with special attention given to low-income older adults, minorities, those living in rural areas, those with limited English proficiency, and those at risk of institutional care. Payment for meals is not mandatory, but participants are encouraged to make a voluntary contribution toward the total cost of the meal.

Study objectives

One of the objectives of the evaluation was to determine the impact of NSP meals and nutrition services on overall wellness and well-being by comparing outcomes for NSP participants and nonparticipants. The research team surveyed a cross-section of NSP participants from October 2015 to April 2016 who had been participating in the program for varying lengths of time. Study participants included older adults who recently had begun receiving program meals and those who had participated for many years. Using a combination of data from this survey and Medicare claims data, the most recent evaluation report (Mabli et al. 2018) measured the effect of receiving congregate meals on health care utilization in the nine months before the study survey and one year following the survey.

This report presents findings from an analysis that included two additional years of follow-up. The analysis uses a combination of survey data and matched Medicare administrative records to measure participants' patterns of health care utilization, including hospital admissions and readmissions, emergency department care, doctor visits, home health episodes, and admissions to long-term care facilities (nursing homes) and skilled nursing facilities. The report defines outcomes relative to the date an individual completed the survey. One set of outcomes measures health care utilization and Medicare costs in each of three one-year periods following the date of the survey, and another set measures characteristics associated with utilization in the three-year period following the survey.¹

¹ For example, if the study participant completed the outcomes survey on December 15, 2015, the one-year set of outcomes measured the occurrence of events from December 16, 2015 through December 15, 2016; December 16,

Specific research questions include the following:






1. What are the health characteristics and health care utilization profiles of congregate meal participants?
2. What is the effect of congregate meal participation on the likelihood of being admitted to a hospital, visiting an emergency department, having a primary care physician visit, experiencing a home health episode, and being admitted to a skilled nursing facility or a nursing home over a three-year period? For older adults who experience these events, what is the effect of the program on the number of times they occur? What is the effect of the program on total Medicare expenditures?
3. What characteristics are associated with experiencing these health events? These factors might include individual characteristics related to demographics, economic conditions, and household circumstances; geographic, community, and health characteristics; and the types of services offered by LSPs that provide congregate meals to program participants.

Study findings

The majority of congregate meal participants were older than 75, were female, were high school graduates, and lived alone at the time of the survey interview (Exhibit ES.1). Almost three-quarters of congregate meal participants had at least one chronic condition, and 23 percent reported having fallen during the past three months (Exhibit ES.2). About one-fifth reported being in fair or poor health at the time they completed the survey, and more than one-third reported functional impairments and needed help performing one or more activities critical to remain in their homes (not shown). Emergency department visits not resulting in an inpatient stay were common, with 29 percent of participants having at least one such visit in the nine-month period before the survey; about 5 percent had an emergency department visit that led to a hospital admission. Some participants (6 percent) experienced a home health episode, and few (2 percent) had an admission to a skilled nursing facility. Three-quarters of participants visited a primary care physician. More than 9 out of 10 participants (91 percent) had at least some Medicare expenses during the nine months before the survey (not shown). The annual average of Medicare expenses among all participants, including those with no Medicare expenditures, was \$631.

2016 through December 15, 2017; and December 16, 2017 through December 15, 2018. The three-year set measured outcomes from December 16, 2015 through December 15, 2018.










Exhibit ES.1. Selected characteristics of congregate meal participants

Individual characteristics		Congregate meal participants
	Average age	77.3 years
	Female	67%
	High school graduate or equivalent	76%
	Married/living with partner	24%
	Living alone	60%

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants. Characteristics were measured for the nine months prior to the outcomes survey.

Exhibit ES.2. Health and health care utilization of congregate meal participants

Individual health history at interview		Congregate meal participants
	One or more falls in the past 3 months	23%
	One or more chronic conditions	74%
	Hospitalizations	8%
	ED visits leading to hospitalizations	5%
	Outpatient ED visits	29%
	Primary care physician visits	76%
	Home health events	6%
	Skilled nursing facility admissions	2%
	Average Medicare expenses	\$631

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

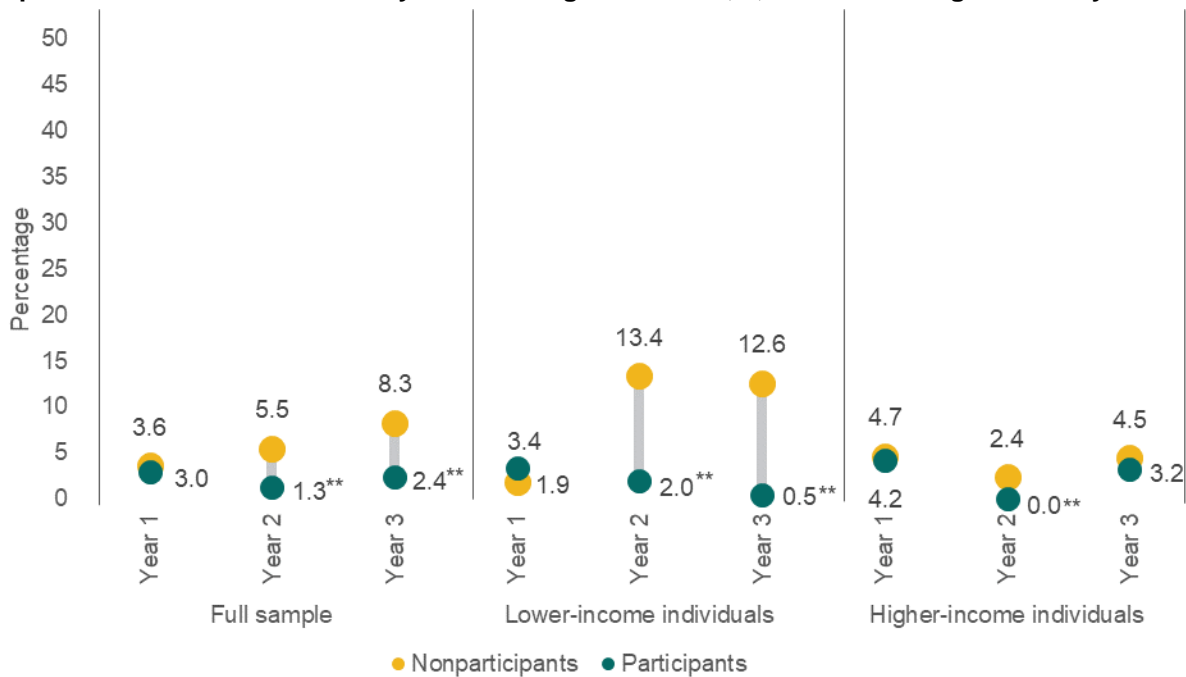
Notes: Estimates are based on an unweighted sample size of 316 congregate meal participants. Health conditions and utilization for the nine months prior to the outcomes survey.

ED = Emergency Department.

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Overall, there were few statistically significant effects of congregate meal participation on health care utilization. One effect that was observed involved hospital readmissions. In two of the three time frames the analysis examined—two and three years after the survey—participants were less likely than nonparticipants to have a hospital readmission within 30 days of discharge (Exhibit ES.3). About 1 percent of participants had a readmission in Year 2, compared with 6 percent of nonparticipants; in Year 3, these percentages were 2 and 8 percent, respectively. This pattern was not observed in Year 1.

Exhibit ES.3. Percentages of congregate meal participants and nonparticipants who experienced a hospital readmission within 30 days of discharge in Years 1, 2, and 3 following the survey



Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants. Percentages were regression-adjusted for observed differences between participants and nonparticipants.

**Difference between participants and nonparticipants is statistically different from zero at the 0.05 level, two-tailed test.

*Difference between participants and nonparticipants is statistically different from zero at the 0.10 level, two-tailed test.

There were several effects of congregate meal participation on health care utilization for lower-income individuals and fewer for higher-income individuals. In both Year 2 and Year 3, lower-income participants were less likely than their nonparticipant counterparts to have a hospital readmission within 30 days of discharge (Exhibit ES.3). The difference between the two groups was 11 percentage points in Year 2 (2 versus 13 percent) and 12 percentage points in Year 3 (1 versus 13 percent). Therefore, among low-income individuals, hospital readmissions are 7 to 25 times higher for nonparticipants than for participants. Among higher-income individuals, participants were less likely than nonparticipants to have a hospital readmission in Year 2, but the magnitude was smaller than for lower income participants.

In addition, among lower-income individuals, congregate meal participants were less likely than nonparticipants to have an admission to a long-term care facility within three years of the interview (13

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versus 22 percent, Exhibit ES.4). Within one year of the survey, lower-income participants were less likely than nonparticipants to have an emergency department visit that led to an admission (14 versus 24 percent, not shown). In contrast, participants were more likely than nonparticipants to be admitted to a skilled nursing facility in Year 2 (23 versus 13 percent, not shown). No effects were found for hospital admissions, emergency department visits that did not lead to a hospital admission (outpatient emergency department visit), or home health episodes.

Exhibit ES.4. Percentages of congregate meal participants and nonparticipants who were admitted to a long-term care facility in the three years following the survey, by income subgroup



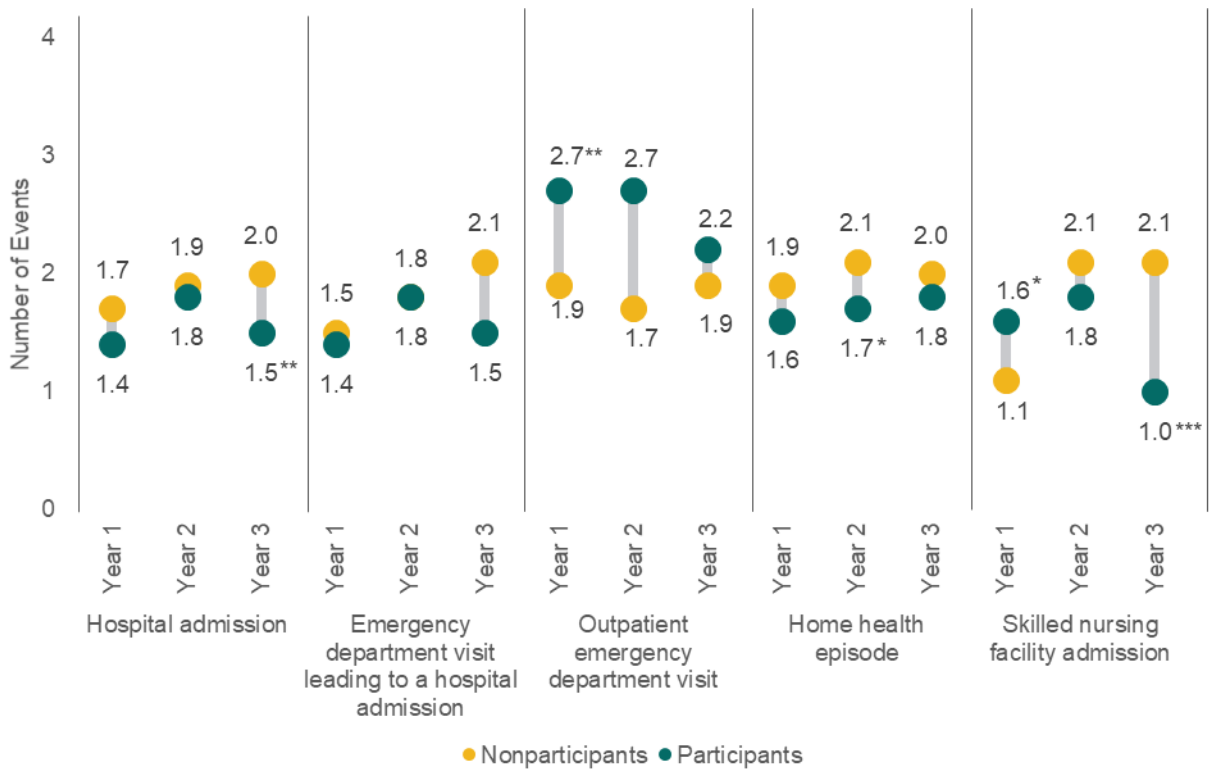
Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants. Percentages were regression-adjusted for observed differences between participants and nonparticipants.

*Difference between participants and nonparticipants is statistically different from zero at the 0.10 level, two-tailed test.

The only significant difference between participants and nonparticipants overall was observed for hospital readmissions within 30 days of discharge (Exhibit ES.3). However, there were some differences between participants and nonparticipants in the frequency of health events. As Exhibit ES.5 shows, among those admitted to a skilled nursing facility, participants had significantly more admissions than nonparticipants in Year 1 (1.6 vs 1.1) and fewer admissions in Year 3 (1.0 vs 2.1). Among those who experienced specific types of events, relative to nonparticipants, participants had 0.8 more emergency department visits that did not lead to an admission in Year 1, 0.5 fewer hospital admissions in Year 3, and 0.4 fewer home health episodes in Year 2.

Exhibit ES.5. Regression-adjusted numbers of events experienced by congregate meal participants and nonparticipants, among those who experienced specific health events in Years 1, 2, and 3 following the survey



Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***Difference between participants and nonparticipants is statistically different from zero at the 0.01 level, two-tailed test.

**Difference between participants and nonparticipants is statistically different from zero at the 0.05 level, two-tailed test.

*Difference between participants and nonparticipants is statistically different from zero at the 0.10 level, two-tailed test.

The research team also examined characteristics of congregate meal participants associated with experiencing health events in the three years following the survey. The likelihood of experiencing any type of adverse health event (a hospital admission, a hospital readmission within 30 days, an emergency department visit leading to a hospital admission, a home health event, a skilled nursing facility admission, and admission to a long-term care facility) was higher among veterans and those who had had a fall during the three months prior to the survey. Having a high school education; being non-Hispanic Black or a non-Hispanic individual who reported a race other than White or Black; and receiving meals and services from an LSP that offered health promotion activities were all associated with being less likely to have an adverse health event.

There were also several significant associations between participants’ characteristics and specific types of adverse health events during the three years following the survey. Those who recently had a fall were more likely than those who had not had a fall to be admitted to a hospital, be readmitted to a hospital within 30 days of discharge, have a home health episode, be admitted to a skilled nursing facility, and be

admitted to a long-term care facility. Similarly, older adults with less income were more likely to be admitted to skilled nursing and long-term care facilities than those with more income.

Conclusions

This report examined the effect of the NSP on overall wellness and well-being based on outcomes related to health and avoidance of institutionalization. It extended findings from a previous report that examined effects over a one-year period by incorporating data collected over two additional years of follow-up. Implications for continued program development and additional research include the following:

1. The descriptive findings showed that many NSP participants were in fair or poor health, had functional impairments that limited daily activities, and had at least one chronic condition. These and other indicators of health and economic need, as well as the extent to which participants experienced adverse health outcomes, underscore the vulnerability of the population of older adults the program serves. Continuing to monitor participants' characteristics and circumstances will enable LSPs to continue to target meals and services to older adults in greatest need.
2. The lower likelihood of hospital readmission among participants, relative to nonparticipants, particularly among those with lower income, might reflect the way in which the NSP serves as a primary access point for many home- and community-based services to help older adults meet their health and nutrition needs. Those returning home after a hospital stay may require a variety of long-term in-home and community-based supports that may not be available to nonparticipants for extended periods of time after discharge. In addition, lower rates of hospital readmission among lower-income individuals may reflect the targeting of NSP programs to those with the greatest need, which could be due to staff and resource constraints or eligibility for complementary services. Learning more about the services LSPs offer to older adults who were recently discharged from the hospital will help identify effective strategies for continuing to reduce readmission rates among congregate meal participants.
3. The lower rate of admission to a long-term care facility among lower-income participants compared with lower-income nonparticipants that was sustained across the three-year study period suggests that the program is achieving its goal of improving older adults' ability to age in place and delay or avoid institutionalization, particularly among older adults who have the greatest economic need. More research is needed to understand the differences in program effectiveness by income and the mechanisms through which the meals and services provided by LSPs ultimately influence participants' risk of institutionalization.
4. The findings from this analysis contribute to the well-documented danger of falls among older adults and their attendant detriment to health and well-being. The consistency and strength of these findings for the congregate meal participant population underscore the need to learn more about what the National Aging Network is doing to expand, enrich, and target its falls prevention programs at meal sites.
5. Veterans were more likely than non-veterans to experience any adverse health event and, specifically, a home-health episode. These findings suggest that even after accounting for characteristics of veterans (disability, income, and so on) veteran status remains strongly associated with longer-term health care utilization. More research is needed to understand the types of services available to veterans at congregate meal sites and whether veterans endure specific mental health issues that interfere with their ability to use NSP services to improve their health.

6. The likelihood of experiencing an adverse health event was lower among participants who received meals from LSPs that offered health promotion activities, relative to those served by LSPs that did not offer these activities. More information is needed about the structure of these activities and the resources required to offer them across all meal sites. By collecting information from two key groups—LSPs, to learn more about the types of health promotion activities they offer, and participants, to learn more about which activities they have found to be most useful—the National Aging Network can identify the specific types of health promotion activities that are most effective in improving participants' lives.

I. Introduction

As people age, they are more likely to face deteriorating health conditions and experience adverse health events. Adults ages 65 and older are much more likely than those ages 45 to 64 to have two or more chronic conditions (81 versus 50 percent, Buttorff et al. 2017; 61 versus 32 percent, Ward et al. 2014). Nearly 30 percent of older adults fall each year, and more than half of these falls are recurrent (Bergen et al. 2016). Older adults also are at higher risk of limitations in activities of daily living, decline in cognitive functioning, social isolation, and depression (van der Vorst et al. 2016; Murman 2015; Sözeri-Varma 2012). U.S. Census predictions indicate that 21 percent of the population will be 65 or older by 2030, compared with 17 percent in 2020 (Ortman et al. 2014; United States Census Bureau 2020, Table 2;). This shift in the demographic composition of the population coupled with continued increases in health care costs (Keehan et al. 2020; Rama 2019) will have profound effects on the ability of federal and state agencies, local community-based service providers, and family caregivers to meet the health and social needs of older adults (Kelley et al. 2013; Feinberg and Spillman 2019).

Although many older adults—in particular, those who are frail, disabled, or homebound—receive assistance from caregivers and obtain support services from home- and community-based agencies, little is known about the effectiveness of these programs on the need for health care services. A recent national evaluation of the Title III-C Nutrition Services Program (NSP) showed that the program not only promotes older adults’ access to nutritious meals, but also facilitates social contact and reduces the likelihood of experiencing adverse health events over the course of one year. These positive program effects were generally more pronounced for lower-income individuals than higher-income individuals, and for individuals living alone than for those living with other family members. However, studies generally have not examined the program’s longer-term success in improving health, reducing the occurrences of adverse health events, and helping older adults maintain their independence in their homes and communities.

This report is the fifth of five reports on findings from a national evaluation of the Title III-C NSP. Mathematica conducted this evaluation for the Administration on Aging (AoA) within the Administration for Community Living (ACL) of the U.S. Department of Health and Human Services (DHHS), which oversees the program. Other reports summarize findings from a process evaluation of program administration and service delivery (Mabli et al. 2015); a cost analysis (Ziegler et al. 2015); an evaluation of effects on program participants’ food security, socialization, and diet quality (Mabli et al. 2017); and an evaluation of effects on participants’ health outcomes (Mabli et al. 2018). The prior reports that examined program impacts (effects) looked at outcomes over a one-year period. This report examines impacts over three years using additional data collected from NSP participants and nonparticipants. The remainder of this chapter provides an overview of the NSP, summarizes the research objectives of the evaluation, and describes the organization of the report.

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

The NSP is authorized under Title III of the Older Americans Act (OAA). Through Title III, State Units on Aging (SUAs) implement a system of coordinated, community-based services targeted to older adults and receive federal grants from AoA to provide congregate nutrition services (authorized under Part C-1), home-delivered nutrition services (authorized under Part C-2), meals (authorized under Part A), and support services (authorized under Part B). The goals of the NSP are to ensure that the health and social

needs of older adults are adequately met and to rebalance the provision of long-term care away from institutionalization and toward home- and community-based services.

A core component of the program and the focus of this report is the provision of group (congregate) meals. NSP congregate meal participants can receive a nutritious meal at a senior center or other congregate meal sites. Most sites serve lunch on one or more weekdays, and some sites offer breakfast or dinner or provide meals on weekends (Mabli et al. 2015). Congregate meal sites offer older adults an opportunity to socialize with peers and receive other services, such as nutrition education, screening, and counseling. These services help older adults identify their general and specific needs related to maintaining their health and managing individual nutrition-related diseases, such as heart disease, hypertension, and diabetes. Participants may also receive non-nutrition services, including transportation, case management services, and referrals to Medicare and health promotion and disease prevention programs. In fiscal year (FY) 2018, the most recent year in which counts of meals and individuals served are available, 74 million meals were served to 1.5 million people at congregate sites (ACL 2020). In FY 2018, OAA Title III-C funding was \$311 million for congregate nutrition services (ACL 2020).

Adults age 60 and older, and their spouses of any age, may participate in the NSP's congregate meal program. In addition, members of the following groups are eligible to receive congregate meals: disabled people younger than age 60 who reside in housing facilities occupied primarily by older adults where congregate meals are served; disabled people who reside at home with, and accompany, people age 60 and older to meal sites; and NSP service volunteers.

The NSP is not an entitlement program. It also does not have a means test, but the program specifically targets older adults with the greatest economic or social need, with special attention given to low-income older adults, minorities, those living in rural areas, those with limited English proficiency, and those at risk of institutional care. Payment for meals is not mandatory, but participants are encouraged to make a voluntary contribution toward the total cost of the meal.

Individuals become aware of NSP programs services through several channels. Many are referred by health professionals, health service agencies, and family and friends. Other common referral sources for congregate meals include information and assistance systems, such as the OAA national referral system, and hospital, health care facility, and discharge planners (Mabli et al. 2015).

In addition to supporting older adults with their nutritional needs, NSP agencies strive to understand and address the numerous non-nutritional needs of program participants that affect overall wellness and well-being, including social activities, health promotion and disease prevention, transportation to and from meal sites, case management, and chores and housekeeping services. The majority of local service providers (LSPs) have a formal process for assessing the non-nutritional needs of congregate participants, which includes examining the participants' paths to the meals program and the needs existing agencies are addressing. Many LSPs also refer clients to other programs such as Medicare Parts A and B, Medicare Part D, Medicaid waiver programs, and evidence-based health promotion and disease prevention programs.

B. Evaluation objectives and research questions

One of the objectives of the evaluation was to determine the impact of NSP meals and nutrition services on overall wellness and well-being by comparing outcomes for NSP participants and nonparticipants. The most recent evaluation report (Mabli et al. 2018) addressed this objective by measuring the effect of

receiving congregate meals on health care utilization in the nine months before the study survey and one year following the survey, based on Medicare claims data.²

This report presents findings from an analysis that included two additional years of follow-up. The analysis uses a combination of survey data and matched Medicare administrative records to measure participants' patterns of health care utilization, including hospital admissions and readmissions, emergency department care, doctor visits, home health episodes, and admissions to nursing homes and skilled nursing facilities.

Specific research questions include the following:

1. What are the health characteristics and health care utilization profiles of congregate meal participants?
2. What is the effect of congregate meal participation on the likelihood of being admitted to a hospital, visiting an emergency department, having a primary care physician visit, experiencing a home health episode, and being admitted to a skilled nursing facility or a nursing home over a three-year period? For older adults who experience these events, what is the effect of the program on the number of times they occur? What is the effect of the program on total Medicare expenditures?
3. What characteristics are associated with experiencing these health events? These factors might include individual characteristics related to demographics, economic conditions, and household circumstances; geographic, community, and health characteristics; and the types of services offered by LSPs that provide congregate meals to program participants.

C. Organization of the report

The remaining chapters of this report describe the methodology used in the analysis and present findings. Chapter II provides an overview of the study design and the data and methodology used in the analysis. Chapter III describes congregate meal participants' demographic characteristics, health care utilization, and Medicare expenditures and presents estimates of the effect of participating in congregate meal programs on health care utilization outcomes. Chapter IV examines the factors that meal site staff and program administrators can use to help target congregate meal participants who might be at greatest risk of experiencing an adverse health event. Chapter V summarizes findings to inform policy and discusses implications for future research. Appendices A and B supplement the Chapter III and IV exhibits, respectively, by presenting auxiliary tables.

² Although Mabli et al. (2018) also examined health care utilization for home-delivered meal participants, only the receipt of congregate meals was shown to reduce the likelihood of experiencing adverse health events in the short-run. The current report examines congregate meals only to assess whether these findings remain significant over a longer observation period.

II. Methodology

This report presents findings based primarily on information the research team obtained from a comprehensive survey and linked Medicare administrative data collected from samples of NSP participants and a matched comparison group of program-eligible nonparticipants. This chapter describes these and other data sources used in the analysis; defines the outcome measures examined in the report; and presents the analytic methods used to address the evaluation's research objectives.³

A. Research design

The evaluation used a multistage clustered sample design to obtain information from congregate meal participants and nonparticipants. The stages of sampling were:

1. Area Agencies on Aging (AAAs)
2. LSPs within AAAs
3. Congregate meal sites within LSPs
4. Congregate meal participants within each congregate meal site

In addition, the research team obtained a matched sample of congregate meal nonparticipants by comparing participants' Medicare administrative records with all Medicare administrative records in the geographic areas in which participants lived. The team identified potential nonparticipants as those who had the closest match to participants on a set of demographic, economic, and health characteristics and health care utilization measures. These individuals were then screened to assess whether they were homebound and were not currently participating in congregate meal programs. The research team asked individuals who passed the screener and consented to be part of the evaluation to complete the survey and included them in the analysis sample.⁴

B. Sources of data

The research team linked the outcomes survey data to several data sources: Medicare administrative data, an LSP survey, the American Community Survey, and food retailer information from the U.S. Department of Agriculture (USDA). Details on each source are provided below.

1. Outcomes survey

The outcomes survey collected data on a comprehensive set of topics, including demographic characteristics, food security, health and well-being, NSP participation history, and participants' impressions of the program and services. A random sample of NSP participants and a matched comparison group of program-eligible nonparticipants completed the survey.

The research team collected data between October 2015 and April 2016 through in-person computer-assisted interviews. From late October 2015 through early January 2016, field interviewers collected information from congregate meal participants. Data collection in each congregate meal site spanned five

³ Additional details about data collection, weight construction, outcome measures, and analysis measures are available in Mabli et al. (2018).

⁴ Details about participant and nonparticipant data collection are available in Mabli et al. (2017).

days. Field interviewers randomly selected participants to take part in the study on one day and, over the next four days, administered the survey to participants who agreed to participate in the study. From late January 2016 through early April 2016, field interviewers returned to the same geographic areas to interview a matched comparison group of program-eligible nonparticipants.

The research team used the American Association for Public Opinion Research's (2016) *Standard Definitions*, ninth edition, to calculate response rates. The survey response rate was 76.1 percent for congregate meal participants. The survey completion rate for congregate meal nonparticipants who were recruited from the telephone screener was 79.1 percent.

2. Medicare administrative data

The research team used Medicare claims and enrollment data obtained through the Centers for Medicare and Medicaid Services Research Data Assistance Center to construct outcome measures and define Medicare beneficiary characteristics. These data included hierarchical condition category (HCC) scores, which capture the risk of subsequent health care expenditures based on prior claims information; the original reason for an individual's Medicare eligibility, which measures whether the beneficiary originally qualified for Medicare due to age, disability, or end-stage renal disease; whether the individual had dual enrollment in Medicare and Medicaid, which could indicate low socioeconomic status; and whether the individual had any chronic health conditions. The team obtained the following files for 2015 through the first quarter of 2019: Medicare claims data (inpatient, outpatient, carrier, home health, and skilled nursing facility files); the Medicare long-term care Minimum Data Set with comprehensive assessment information on residents of long-term care facilities; and the Medicare enrollment database.

This analysis includes all participants and nonparticipants who were matched to the 2015–2017 Medicare data (Mabli et al. 2018). Some participants chose not to provide a full or partial Social Security number, which prevented the research team from matching them successfully to the Medicare administrative data. Overall, 11 percent of the participants and nonparticipants who completed the outcomes survey were not matched to the Medicare data and, thus, were not included in the analysis. Because Medicare claims, which identify specific events such as a hospital stay or emergency department visit, are not available for beneficiaries enrolled in managed care plans such as Medicare Advantage, the research team limited the analysis to those who were enrolled in fee-for-service (FFS) Medicare (known as Original Medicare).

3. LSP survey

The LSP survey included two parts: a web survey and a separate editable PDF form that respondents completed and returned electronically. The web survey contained the majority of the questions, including those that a respondent could likely answer without referring to other data sources, such as organizational structure. The editable PDF (referred to as a “fax-back” form) included fewer items and was largely focused on questions that required respondents to look up data from sources such as financial reports on program expenditures.

The research team merged data from the LSP survey to data from the outcomes survey to obtain information about whether participants attended LSPs that offered health promotion activities, nutrition counseling, nutrition screening, and social activities. For nonparticipants, the team assigned the values of variables for the LSPs that served the participant to whom the nonparticipant was matched.

4. Neighborhood contextual data from the American Community Survey

The research team used data from the American Community Survey to obtain local-area population characteristics. To obtain characteristics for small-census geographies, such as census tracts, the Census Bureau aggregates data over five years. The research team drew on the 2010–2014 American Community Survey summary file to obtain tract-level measures of population, the percentage of families with income below 200 percent of the federal poverty threshold, the percentage of the total population that is non-white, the percentage of the total population that is Hispanic, and the percentage of housing units without access to a vehicle.

5. Urbanicity and geographic food access

The research team determined whether an individual lived in an urban or rural area by overlaying the map of respondents' residential locations with a U.S. Census Bureau geographic boundaries file and identifying the census tract in which each respondent lived.⁵ A binary indicator of urban/rural status was created using the census tract identification number. Using the ERS food environment atlas (ERS 2016), the research team obtained a variable that indicates whether the population-weighted centroid of a census tract is in an urban or rural area. To describe NSP geographic access to food, the research team used the address information for each survey respondent, data from the Census Bureau, and address data for food retailers from the USDA. The team calculated measures of geographic access to food based on (1) distances from each participant to the nearest store in the area and (2) the number of retailers, by type, within three distances from each participant's residential address. In urban areas, the distances are less than 0.5 miles, 0.5 to less than 1 mile, and 1 to 2 miles. In rural areas, the distances are less than 5 miles, 5 to less than 10 miles, and 10 to 20 miles. Mabli et al. (2018) describes the retailer data in more detail.

C. Outcome measures

The research team analyzed three sets of health care utilization outcomes. First, the team analyzed whether the following health events occurred in the observation period: hospital admissions, hospital readmissions within 30 days of discharge, emergency department visits that resulted in an inpatient stay, outpatient emergency department visits, primary care physician visits, home health episodes, admittance to a skilled nursing facility, and admittance to a long-term care facility (nursing home) (Exhibit II.1). For all outcomes except hospital readmission and nursing home admission, a second set of outcomes counted the number of times the event occurred in the observation period. A third set of outcomes consisted of total Medicare Part A and Part B costs in the observation period.

The team defined outcomes relative to the date the outcomes survey was completed (during 2015–2016). One set of outcomes measured health care utilization and Medicare costs in each of three one-year periods following the date of the survey, and another set measured characteristics associated with utilization in the three-year period following the survey. For example, if the outcomes survey was completed on December 15, 2015, the one-year set of outcomes measured the occurrence of events from December 16, 2015 through December 15, 2016; December 16, 2016 through December 15, 2017; and December 16, 2017

⁵ Census tracts are geographic boundaries developed by the U.S. Census Bureau. They are drawn to encompass similar population sizes and, thus, vary in spatial size depending on whether they are in a metropolitan or nonmetropolitan area. Census tracts are the largest subcounty geographies defined by the Census Bureau; they generally contain 1,500 to 8,000 people and have a target size of 4,000. In 2010, the United States was divided into more than 73,000 census tracts.

through December 15, 2018. The three-year set measured outcomes from December 16, 2015 through December 15, 2018. These analyses measure outcomes in varying lengths of time relative to the date of the survey. The research team administered the survey to a cross-section of NSP participants, including those who recently had begun to receive meals and those who had received them for several years. As a result, these findings do not represent the effect of an additional two years of participating in the NSP. Instead, they allow the research team to measure health care utilization outcomes over a longer period of time relative to when older adults are known to have received congregate meals.

Exhibit II.1. Outcome measures and data sources^a

Outcome measures	Data source	Description of health event occurrence variables	Description of number of events variables
Hospital admissions	Medicare claims data—inpatient file	Binary variable indicating whether the individual had an acute care hospital admission in the observation period	Continuous variable equal to the number of acute care hospital admissions in the observation period
Hospital readmission within 30 days of discharge	Medicare claims data—inpatient file	Binary variable indicating whether the individual was discharged from the hospital and had an unplanned hospitalization within 30 days of discharge in the observation period	Not included in analysis
Inpatient emergency department (ED) visits	Medicare claims data—inpatient files	Binary variable indicating whether the individual had an ED visit and observation stay in the observation period that led to a hospitalization	Continuous variable equal to the number of ED visits and observation stays in the observation period that led to a hospitalization
Outpatient ED visits	Medicare claims data—outpatient file	Binary variable indicating whether the individual had an ED visit and observation stay in the observation period that did not lead to a hospitalization	Continuous variable equal to the number of ED visits and observation stays in the observation period that did not lead to a hospitalization
Primary care physician (PCP) visits in all settings	Medicare claims data—carrier file	Binary variable indicating whether the individual had a visit to a PCP in the observation period	Continuous variable equal to the number of PCP visits in the observation period
Home health episodes	Medicare claims data—home health file	Binary variable indicating whether the individual had a home health episode ^b in the observation period	Continuous variable equal to the number of home health episodes in the observation period
Admittance to a skilled nursing facility (SNF)	Medicare claims data—SNF	Binary variable indicating whether the individual was admitted to a SNF in the observation period	Continuous variable equal to the number of SNF stays in the observation period
Admittance to a nursing home	Long-term care Minimum Data Set	Binary variable indicating whether the individual was admitted to a nursing home in the observation period ^c	Not included in analysis

^a Observation periods are the three one-year periods following the outcomes survey, unless otherwise noted.

^b Home health episodes lasted 60 days and involved at least one or a mix of the following services for homebound patients: skilled nursing care, physical or speech therapy, occupational therapy, home health aide, and medical social services.

^c The observation period for admittance to a nursing home is the three-year period following the outcomes survey.

The Medicare data were at the beneficiary claim level, meaning that each observation corresponded to a claim associated with a health event experienced by a beneficiary. The research team aggregated the data to the beneficiary level to produce the outcome measures needed for the analysis. For each beneficiary, the team aggregated claim information separately over each of the three one-year observation periods or for the full three-year period. Health care utilization outcomes measuring whether an event occurred in the observation period were defined as binary variables equal to 1 if there was at least one claim in the observation period indicating an event occurred, and equal to 0 if not. Health care utilization outcomes measuring the number of times an event occurred in the observation period were annualized to reflect the number of events an individual experienced over one year (dividing total number of events in observation period by the number of FFS eligible months in that period, and multiplying by 12).

The research team also estimated average Medicare costs per month in the observation period for each beneficiary by summing the costs of all claims over the observation period and dividing by the number of Medicare FFS months in the observation period. Medicare expenditures included only payments made by Medicare for Part A and Part B services as reported in administrative data, and excluded out-of-pocket costs, third party payments, and hospice care and durable medical equipment.

Finally, the research team defined a binary variable for any adverse health event indicating whether the individual had an acute care hospital admission, home health episode, or long-term care admittance in each of the three one-year periods and the full three-year period following the outcomes survey.

D. Analytic approach

The research team performed descriptive tabular analyses of the characteristics and health care utilization of congregate meal participants. For categorical variables, the percentage of participants who responded in each category was estimated. For continuous variables, the mean value is presented.

In estimating the impact of congregate meal participation on the above outcomes, the research team used ordinary least squares (OLS) regression analysis for continuous variables: (1) the number of events that occurred in a given observation period and (2) average monthly Medicare expenditures. The team used logistic regression analysis for binary variables that measured whether a health event occurred in the observation period.⁶ The results of regression analyses are presented using regression-adjusted tables of estimates of program effects. For example, a regression-adjusted table compares the percentages of congregate meal participants and nonparticipants who had a hospital admission during an observation period after accounting or adjusting for compositional differences between the groups.⁷

With the exception of nursing home admissions, the research team conducted multivariate analyses separately for each of the three one-year periods. The team examined nursing home admissions over the

⁶ For several subgroup analyses for the binary outcomes, the research team used OLS in place of logistic regression analyses due to lack of convergence of the nonlinear model likely attributed to the smaller sample sizes and limited variation in the dependent variable.

⁷ Additional details about the analytic approach are available in Mabli et al. (2018).

full three-year period because it was a longer-term outcome and most participants who entered a nursing home remained institutionalized and therefore were not at risk of being admitted in subsequent years.

The team also conducted all analyses separately for two important household and economic subgroups: individuals who lived in households with lower or higher incomes, and individuals who lived alone or with other family members. The income subgroups were defined by dividing the sample into those individuals with household income-to-poverty ratios less than the median value in the sample and those with ratios greater than or equal to the median value. Median income as a percentage of the federal poverty level was equal to 128 percent for both congregate meal participants and nonparticipants.

To address the research question examining the characteristics associated with experiencing adverse health events, the research team used logistic regression analysis. Analyses were conducted separately by year and across the full three-year period, because these analyses focused on longer-term outcomes. Odds ratios (ORs) describe the characteristics associated with any adverse health event and specific events (a hospital admission, any home health episode, and admission to a long-term care facility). A characteristic with an odds ratio below 1 indicates that having that characteristic is associated with $(1 - \text{OR})$ percent lower odds of experiencing an adverse health event, while an odds ratio above 1 indicates $(\text{OR} - 1)$ percent higher odds of experiencing an adverse health event.

Analysis weights allow one to compute unbiased estimates based on sample survey responses from the study population. Weights account for both the probability of selection into the sample and the differential response patterns that might exist in the respondent sample. They also account for whether the individual had a successful match to the Medicare claims data used to construct outcomes and, if so, whether the individual was a Medicare FFS beneficiary. The research team constructed weights separately for congregate meal participants and nonparticipants and accounted for the multistage sampling design of the outcomes evaluation when estimating standard errors. The team used *t*-tests to determine whether regression-adjusted differences in outcomes between participants and nonparticipants were statistically significant at the 0.01, 0.05, and 0.01 levels using a two-tailed test.

Based on weighted data, the congregate meal participant findings in this report are nationally representative of the population of congregate meal participants. This is not true for the nonparticipants, however, because, by design, they were not sampled from a frame of nonparticipating older adults. Instead, the estimates of the effects of congregate meal participation on outcomes that use weighted participant and nonparticipant data are representative of the effects for the population of congregate meal participants; that is, the study is meant to assess the effect of the programs on those who choose to participate in the program, not on the entire population. For the same reason, Chapter IV presents information for congregate meal participants only.

III. Effects of congregate meal participation on outcomes

This chapter discusses findings related to congregate meal participation and health care utilization outcomes. The first section describes key characteristics of congregate meal participants.⁸ It then presents estimates of the effects of congregate meal participation on participants' outcomes. The estimates are based on multivariate analyses that account for observed differences between participants and matched nonparticipants, referred to as regression-adjusted findings. Except where otherwise noted, this chapter presents impact of program participation for three sets of outcomes: (1) whether health events occurred in any of the three one-year periods following the survey, (2) the number of events that occurred among those individuals who experienced them, and (3) the total Medicare cost associated with the events.

A. Characteristics of participants

The descriptive findings showed that many NSP participants were in fair or poor health, had functional impairments that limited daily activities, and had one or more chronic conditions. These and other indicators of health and economic need, as well as the extent to which participants experienced adverse health outcomes, underscore the vulnerability of the population of older adults the program serves.

The majority of congregate meal participants were older than 75, were female, were high school graduates, and lived alone at the time of the survey (Exhibit III.1).⁹ Non-Hispanic black individuals constituted approximately 14 percent of congregate meal participants, and Hispanic individuals accounted for another 14 percent of participants (Appendix A, Table A.1). Just over one-fourth of participants resided in rural areas. Although the OAA prohibits financial means tests for participation in the NSP, most participants were poor or near poor.






About one-fifth of congregate meal participants reported being in fair or poor health at the time they completed the survey (Exhibit III.2). Almost three-quarters had at least one chronic condition,¹⁰ and 23 percent reported having fallen during the past three months. Over a third of participants reported functional impairments and needed help performing one or more activities critical for them to remain in their homes (38 percent had difficulty walking or climbing stairs; Appendix A, Table A.2). Emergency department visits not resulting in an inpatient stay were common, with 29 percent of participants having at least one such visit in the nine-month period before the survey; about 5 percent had an emergency department visit leading to a hospital admission. Some participants (6 percent) experienced a home health episode, and few (2 percent) had an admission to a skilled nursing facility. Three-quarters of participants visited a primary care physician.

⁸ Appendix A, Tables A.1 to A.4 provide additional details about characteristics of congregate meal participants.

⁹ As Chapter II discusses, the research team obtained a matched sample of congregate meal nonparticipants by identifying those who had the closest match to participants on a set of demographic, economic, and health characteristics, and health care utilization measures. As a result, the characteristics of nonparticipants are statistically similar to participants. Because nonparticipants were not sampled from a frame of nonparticipating older adults, this chapter presents descriptive information for participants only.

¹⁰ The chronic condition information presented in this report is based on Medicare claims and enrollment data and may differ from the health condition information in the National Survey of Older American Act Participants (<https://agid.acl.gov/CustomTables/NPS/Year/>) that participants self-report. The classification of conditions also differs across the two data sources.

Exhibit III.1. Selected characteristics of congregate meal participants

Individual characteristics	Congregate meal participants
 Average age	77.3 years
 Female	67%
 High school graduate or equivalent	76%
 Married/living with partner	24%
 Living alone	60%










Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants. Characteristics were measured for the nine months prior to the outcomes survey.

More than 9 out of 10 participants (91 percent) had at least some Medicare expenses during the nine months prior to the survey (Appendix A, Table A.4). The annual average of Medicare expenses among all participants, including those with no Medicare expenditures, was \$631.

There were several differences by income and living arrangement in the likelihood of experiencing specific health events (Appendix A, Tables A.1 to A.4). The percentage of participants with a hospital admission was similar for lower- and higher-income individuals (8 percent), but the percentage with a readmission within 30 days after discharge was 2 percent for lower-income individuals and close to 0 percent for higher-income individuals. Emergency department visits that did not lead to a hospitalization were also much more common among lower-income individuals (33 versus 24 percent). Those who lived alone were more likely to have an emergency department visit that did not lead to a hospitalization than those who lived with other family members (33 versus 23 percent). In contrast, the likelihood of a hospital admission or readmission within 30 days of discharge was lower for individuals who lived alone than for those who lived with other family members (7 versus 10 percent, and 0 versus 3 percent, respectively).

Exhibit III.2. Health and health care utilization of congregate meal participants

Individual health history at interview	Congregate meal participants
 One or more falls in the past 3 months	23%
 One or more chronic conditions	74%
 Hospitalizations	8%
 ED visits leading to hospitalizations	5%
 Outpatient ED visits	29%
 Primary care physician visits	76%
 Home health events	6%
 Skilled nursing facility admissions	2%
 Average Medicare expenses	\$631

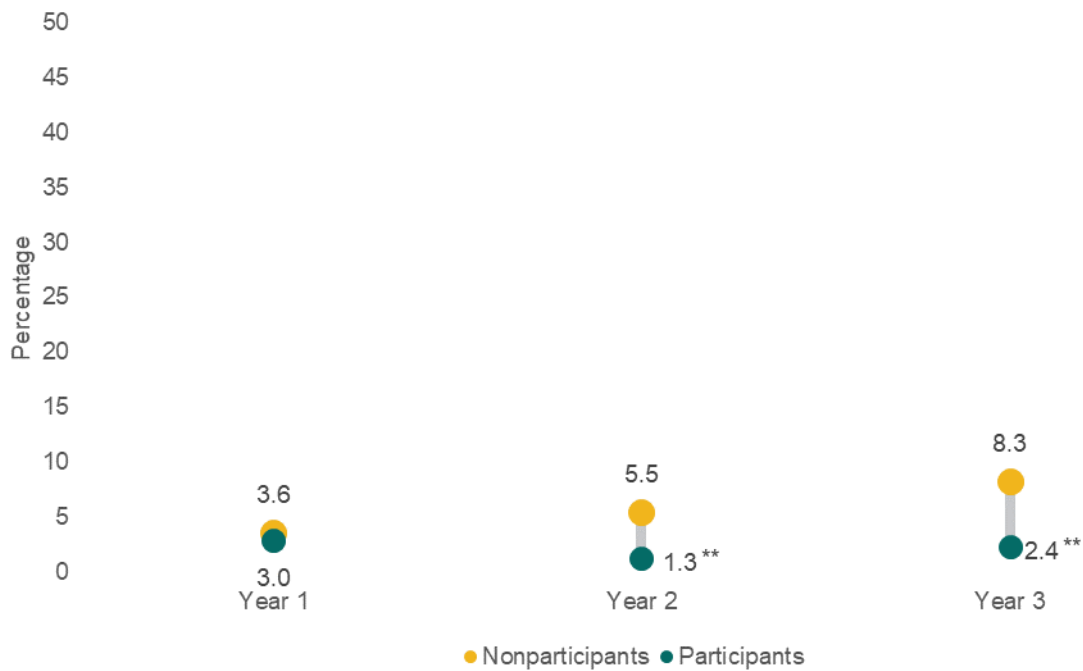
Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Notes: Estimates are based on an unweighted sample size of 316 congregate meal participants. Health conditions and utilization for the nine months prior to the outcomes survey.

B. Impacts of congregate meal participation on health care utilization

Overall, there were few statistically significant effects of congregate meal participation on health care utilization (Appendix A, Tables A.5 and A.6). One effect that was observed involved hospital readmissions. In two of the three time frames the analysis examined—two and three years after the survey—participants were less likely than nonparticipants to have a hospital readmission within 30 days of discharge (Exhibit III.3). About 1 percent of participants had a readmission in Year 2, compared with 6 percent of nonparticipants; in Year 3, these percentages were 2 and 8 percent, respectively. This pattern was not observed in Year 1.

Exhibit III.3. Regression-adjusted percentages of congregate meal participants and nonparticipants who experienced a hospital readmission within 30 days of discharge in Years 1, 2, and 3 following the survey



Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

**Difference between participants and nonparticipants is significantly different from zero at the 0.05 level, two-tailed test.

1. Likelihood of a health event by income

For lower-income individuals, the research team identified several effects of congregate meal participation and fewer for higher-income individuals. Among lower-income individuals, congregate meal participants were less likely than nonparticipants to have a nursing home admission within three years of the interview (13 versus 22 percent, Exhibit III.4). In addition, in both Year 2 and Year 3, lower-income congregate meal participants were less likely than lower-income nonparticipants to have a hospital readmission within 30 days of discharge (Exhibit III.5). The difference between the two groups was 11 percentage points in Year 2 (2 versus 13 percent) and 12 percentage points in Year 3 (1 versus 13 percent). Therefore, among low-income individuals, hospital readmissions are 7 to 25 times higher for nonparticipants than for participants. Lower-income participants were also less likely to have an emergency room visit that led to an admission than lower-income nonparticipants in Year 1 (14 versus 24 percent, for a difference of 10 percentage points). In contrast, participants were more likely than nonparticipants to be admitted to a skilled nursing facility in Year 2 (23 versus 13 percent, for a difference of 10 percentage points). There were no effects observed for other outcomes.

Among higher-income individuals, a similar finding was observed for hospital readmissions, but the magnitude of the difference between congregate meal participants and nonparticipants was much smaller, and the difference was statistically significant only in Year 2 (difference of 2 percentage points, Exhibit

III.6). In addition, higher-income participants were more likely than higher-income nonparticipants to have a hospital admission in Year 3 (37 versus 19 percent).

There were generally no significant effects of the program by living arrangement (Appendix A, Table A.8). Among individuals who lived with other family members at the time of the survey, congregate meal participants were less likely than nonparticipants to be readmitted to a hospital within 30 days of discharge in Year 2. There were no other significant outcomes in either of these groups.

Exhibit III.4. Regression-adjusted percentages of congregate meal participants and nonparticipants who were admitted to a long-term care facility in the three years following the survey, by income subgroup

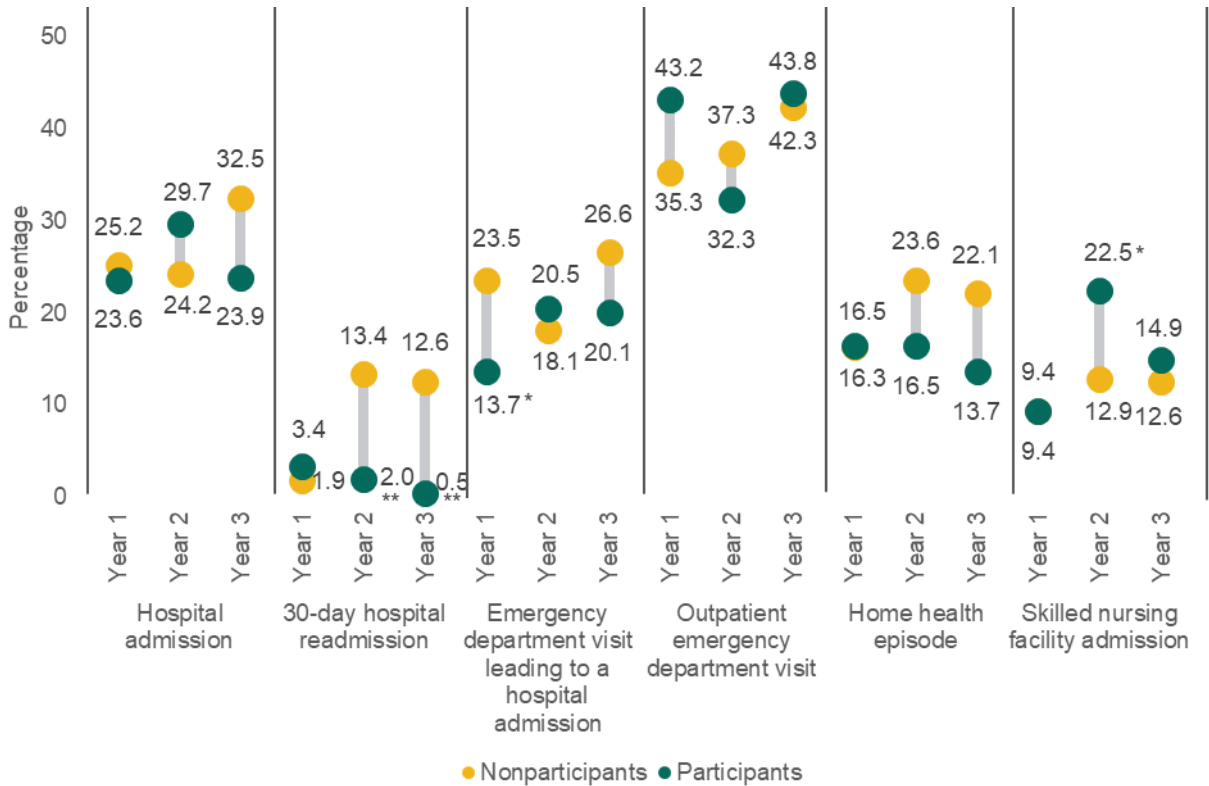


Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

*Difference between participants and nonparticipants is significantly different from zero at the 0.10 level, two-tailed test.

Exhibit III.5. Regression-adjusted percentages of lower-income congregate meal participants and nonparticipants who experienced health events in Years 1, 2, and 3 following the survey



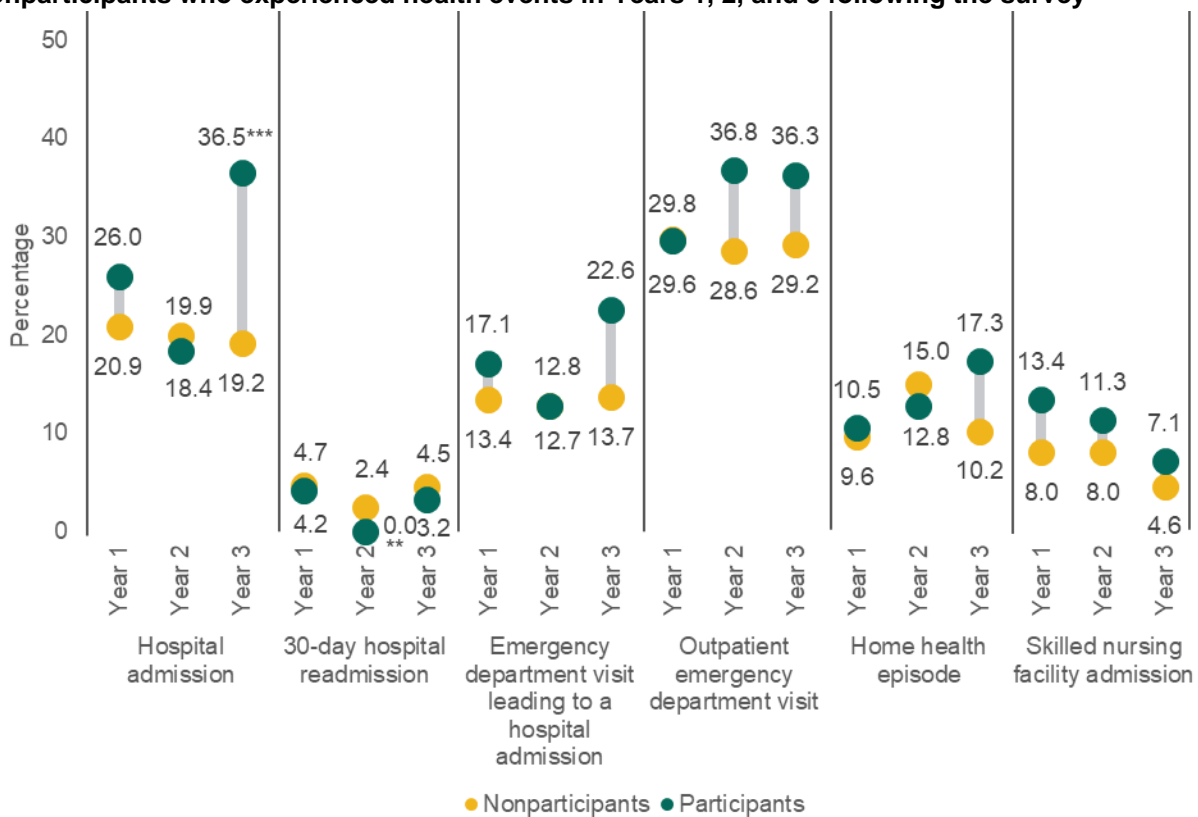
Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

**Difference between participants and nonparticipants is significantly different from zero at the 0.05 level, two-tailed test.

*Difference between participants and nonparticipants is significantly different from zero at the 0.10 level, two-tailed test.

Exhibit III.6. Regression-adjusted percentages of higher-income congregate meal participants and nonparticipants who experienced health events in Years 1, 2, and 3 following the survey



Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

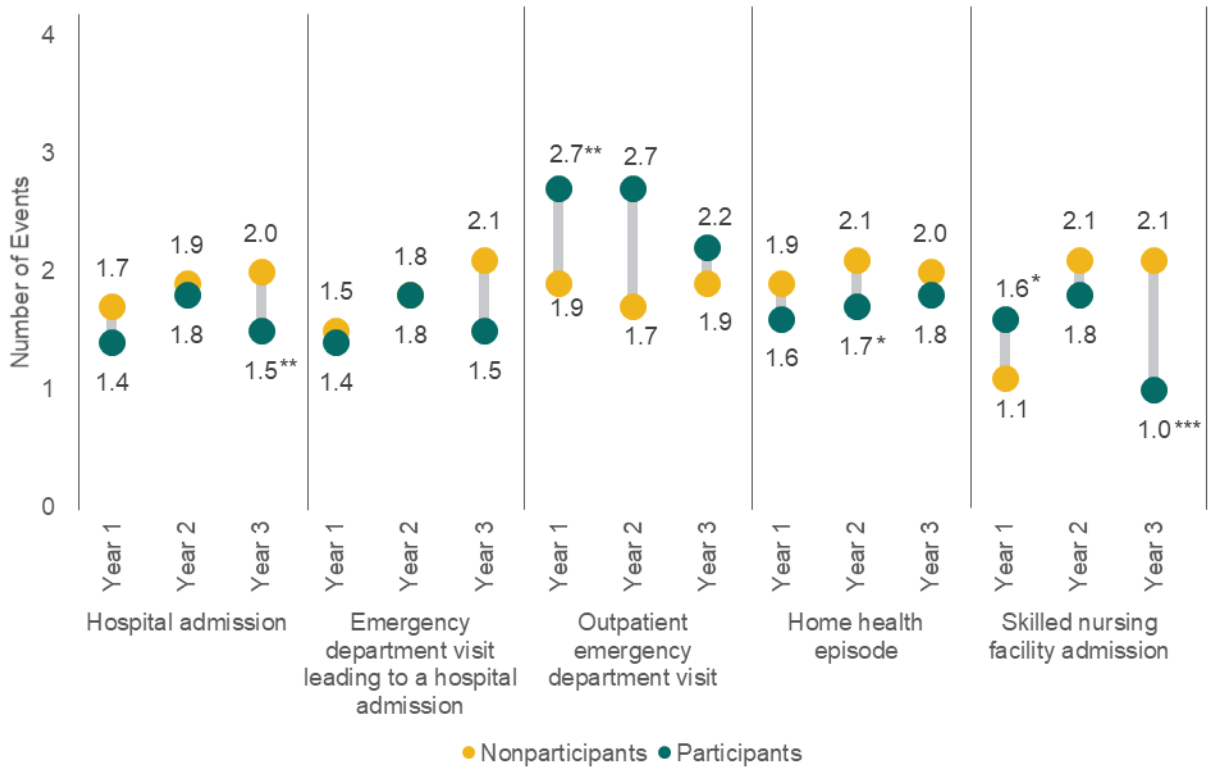
***Difference between participants and nonparticipants is significantly different from zero at the 0.01 level, two-tailed test.

**Difference between participants and nonparticipants is significantly different from zero at the 0.05 level, two-tailed test.

2. Frequency and costs of health events

As previously shown, the only significant difference between all participants and nonparticipants was observed for hospital readmissions within 30 days of discharge (Exhibit III.3). However, for some events, there were differences between participants and nonparticipants in the number of times they occurred. As Exhibit III.7 shows, among those being admitted to a skilled nursing facility, participants transitioned from having more admissions than nonparticipants in Year 1 (1.6 vs 1.1 admissions), to no statistical difference in Year 2, and to fewer admissions in Year 3 (1.0 vs 2.1 admissions). Among those with an emergency room visit that did not lead to an admission, participants had 0.8 more visits in Year 1 than nonparticipants. Among those who were admitted to the hospital, participants had 0.5 fewer admissions in Year 3. Among those experiencing a home health episode, participants had 0.4 fewer episodes than nonparticipants in Year 2.

Exhibit III.7. Regression-adjusted numbers of events experienced by congregate meal participants and nonparticipants, among those who experienced health events in Years 1, 2, and 3 following the survey



Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***Difference between participants and nonparticipants is significantly different from zero at the 0.01 level, two-tailed test.

**Difference between participants and nonparticipants is significantly different from zero at the 0.05 level, two-tailed test.

*Difference between participants and nonparticipants is significantly different from zero at the 0.10 level, two-tailed test.

IV. Characteristics associated with adverse health events

Chapter III showed that for some health utilization outcomes, lower percentages of congregate meal participants experienced the events relative to nonparticipants. For other outcomes, similar percentages of participants and nonparticipants experienced them. In both cases, it is important to learn more about why older adults who receive congregate meals continue to experience these events.

This chapter first examines the characteristics associated with any adverse health event over the three-year period following the survey. Next, the chapter explores characteristics associated with specific adverse effects—a hospital admission, a hospital readmission within 30 days, an emergency department visit leading to a hospital admission (inpatient emergency department visits), a home health episode, a skilled nursing facility admission, and admission to a long-term care facility.¹¹ Appendix B includes supporting tables, including characteristics associated with events in each of the three one-year periods.

The research team used logistic regression analysis to examine demographic, economic, health, community, LSP, and geographic characteristics associated with adverse health events. A characteristic with an odds ratio below 1 indicates that having that characteristic is associated with lower odds of experiencing the event, while an odds ratio above 1 indicates higher odds of experiencing the event.

A. Any adverse health event

In the three years following the survey, veteran status and having had a fall in the previous three months were associated with higher odds of having an adverse health event. Veterans were more than twice as likely (with odds ratio greater than 2) as non-veterans to have an adverse health event (Exhibit IV.1). Individuals who had experienced a fall during the previous three months were nearly twice as likely to have an adverse health event, relative to individuals who did not report a fall. Furthermore, individuals who had experienced a fall were more than five times more likely than individuals who did not report a fall to experience an adverse health event in Year 1 (Appendix B, Table B.1).

Having a high school education; being non-Hispanic Black or a non-Hispanic individual of a race other than White or Black; and receiving meals and services from an LSP that offers health promotion activities were all associated with lower odds of having an adverse health event. Congregate meal participants who had at least a high school education had 60 percent lower odds of experiencing an adverse health event in the three-year period than those who had less than a high school education, though the effect appears to be largest in Year 1, with 76 percent lower odds; in Years 2 and 3, the odds ratios remained below 1 but were not significant (Appendix B, Table B.1). Non-Hispanic Black participants had 58 percent lower odds of such an event compared with non-Hispanic White participants, and the effect was also largest in Year 1. Non-Hispanic individuals who are neither White nor Black or did not report a race had 85 percent lower odds than non-Hispanic White participants, an effect that was significant in both Years 1 and 3. Finally, receiving meals and services from an LSP that offers health promotion activities was also associated with 57 percent lower odds of experiencing an adverse health event over the three-year period.

¹¹ Outpatient emergency department visits and primary care physician visits are not always considered adverse health events. Unlike outpatient emergency department visits that can sometimes substitute for office-based physician visits, hospital admissions and emergency department visits leading to inpatient stays are typically regarded as reflecting adverse, acute health events, rather than substitutes for primary care physician visits (Aminzadeh and Dalziel 2002).

Exhibit IV.1. Odds ratios of participants experiencing adverse health events in the three-year period following the survey

Baseline characteristic	Any adverse health event
Demographic, economic, and household characteristics	
Age	1.01
Female	1.31
Completed high school	0.40*
Married or living with partner	0.90
Veteran	2.10*
Non-Hispanic black	0.42*
Non-Hispanic other ^a	0.15**
Hispanic	0.70
Monthly income-to-poverty lower than median ^b	1.35
Food insecure	0.76
Living alone	0.79
Health characteristics	
HCC score	1.74
High blood pressure/hypertension or diabetes	0.80
Any falls in past three months	2.35**
LSP characteristics	
LSP provides health promotion activities	0.43*
LSP provides nutrition counseling	0.79
LSP provides nutrition screening and assessment	1.88
LSP provides social activities	0.82
Geographic characteristics	
Share of population non-White is higher than median	0.56
Share of population Hispanic is higher than median	1.21
Share of housing units without access to a vehicle is higher than median	1.07
Share of families below 200% of poverty is higher than median	1.64
Has access to supermarket	1.00
Urban	0.99
Midwest	1.44
Northeast	2.06
West	0.95

Source: Administration on Aging (AoA) Nutrition Services Program outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.
LSP = local service provider; HCC = hierarchical condition category.

***/**/* Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander, and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

B. Specific adverse health events

The research team examined the six adverse health events separately in the three years following the survey. Overall, few characteristics were associated with multiple types of events with the exception of prior falls, which were associated with higher odds of experiencing five of the six events (hospital admissions, readmissions, home health episodes, skilled nursing facility admissions, and nursing home admissions).

1. Hospital admissions

Participants who had fallen in the three months before the survey were more than twice as likely to have a hospital admission in the three years following the survey (Exhibit IV.2). The association was strongest in Year 1, with participants who had fallen being almost four times more likely to have a hospital admission relative to those who had not fallen, and decreased over time (Appendix B, Table B.2).

Education and being a non-Hispanic race other than White or Black race were associated with a lower likelihood of having a hospital admission in the three years following the survey (Exhibit IV.2). Participants who had at least a high school education were 62 percent less likely to have a hospital admission in the three years following the survey, though the finding was most prominent in Year 1, where high school graduates were 72 percent less likely to have a hospital admission (Appendix B, Table B.2). Participants classified as non-Hispanic other were 85 percent less likely to have a hospital admission in the three-year period and even less likely in Years 1 and 3.

2. Hospital readmissions

Several characteristics were associated with higher likelihoods of experiencing a hospital readmission over the three-year period (Exhibit IV.2).¹² Hispanic participants were more than six times more likely to experience a hospital readmission, compared with non-Hispanic White participants, as were those who had nearby access to food. Participants who had a fall were more than five times more likely to experience a hospital readmission. Participants who received meals and services from an LSP that offers nutrition counseling were also more likely to experience a hospital readmission. Conversely, participants who received meals and services from an LSP that offers nutrition screening were 68 percent less likely to experience a hospital readmission. Participants who lived in the Western or Midwestern regions were also less likely to experience a hospital readmission.

3. Emergency department visits leading to hospital admissions

Congregate meal participants who lived in urban areas were more than twice as likely to have emergency department visit leading to a hospital admission (Exhibit IV.2). The association was largest in Year 1, but also large and significant in Year 2 (Appendix B, Table B.4).

Being a non-Hispanic race other than White or Black race and living in the West were associated with lower odds (Exhibit IV.2). Being a non-Hispanic individual of a race other than White or Black was associated with 82 percent lower odds of experiencing an inpatient emergency department visit in the three years following the survey. This association was large in Year 3, but not in Years 1 or 2 (Appendix B, Table B.4). Participants who lived in the West had 79 percent lower odds of experiencing an inpatient emergency department visit; the effect was significant in Years 1 and 2.

¹² Hospital readmissions were assessed only over the three-year period, and not the three one-year periods.

Exhibit IV.2. Odds ratios of participants experiencing specific adverse health events in the three-year period following the survey

Baseline characteristic	Hospital admission	30-day hospital readmission	ED visit leading to a hospital admission	Home health episode	Skilled nursing facility admission	Nursing home admission
Demographic characteristics						
Age	1.01	1.06	1.02	1.07*	1.06	1.12***
Female	1.17	0.97	1.46	1.67	0.63	0.10***
Completed high school	0.38**	1.59	0.57	0.46	0.59	0.45
Married or living with partner	1.57	1.53	1.46	0.31	0.80	0.17*
Veteran	1.52	0.78	1.34	2.93**	0.89	0.47
Non-Hispanic black	0.43	0.10	0.60	0.69	0.20**	0.00***
Non-Hispanic other ^a	0.15**		0.18*	0.19	0.42	0.70
Hispanic	0.80	6.77***	2.49	0.65	0.47	0.63
Monthly income-to-poverty lower than median ^b	1.35	0.34	1.31	1.10	3.38***	3.90***
Food insecure	0.57	0.30	0.88	1.31	0.71	2.52
Living alone	1.38	2.84	1.45	0.47	2.92**	1.60
Health characteristics						
HCC score	1.62	0.22	1.15	1.12	0.58	0.81
High blood pressure/hypertension or diabetes	0.68	1.55	0.91	2.19*	1.22	2.52
Any falls in past three months	2.24*	5.20***	1.78	5.67***	2.74**	3.79***
LSP characteristics						
LSP provides health promotion activities	0.51	0.35	0.70	0.70	1.49	2.89
LSP provides nutrition counseling	0.94	5.91***	1.48	1.01	1.31	1.80
LSP provides nutrition screening and assessment	1.70	0.32**	0.73	1.40	0.59	0.97
LSP provides social activities	0.66	0.42	0.48	0.70	0.45	0.43
Geographic characteristics						
Share of population non-White is higher than median	0.59	0.66	1.77	0.65	1.26	3.54*
Share of population Hispanic is higher than median	0.98	0.65	0.98	0.94	0.86	0.63
Share of housing units without access to a vehicle is higher than median	0.96	0.58	0.89	1.76	1.54	0.63
Share of families below 200% of poverty is higher than median	1.66	1.60	1.59	0.78	1.05	1.04
Has access to supermarket	1.48	7.74**	1.30	0.92	0.81	1.45
Urban	1.19	8.92	2.45*	1.42	0.54	0.62
Midwest	1.31	0.09*	0.81	0.49	0.41	0.68
Northeast	1.23	0.17	0.92	0.99	0.44	1.11
West	0.77	0.03***	0.21**	0.35	0.28**	0.06*

Source: Administration on Aging (AoA) Nutrition Services Program outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants. LSP = local service provider; HCC = hierarchical condition category.

***/**/* Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander, and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

4. Home health episodes

Veteran status, having had a fall, hypertension, and age were associated with a higher likelihood of experiencing a home health episode (Exhibit IV.2). Veterans were nearly three times more likely than non-veterans to have a home health episode in the three years following the survey. The association was large and significant in Year 1, but not significant in Years 2 and 3 (Appendix B, Table B.5). Congregate meal participants who had a fall were more than five times more likely to have a home health episode in the three years following the survey. In each year following the survey, the association was significant and large (Appendix B, Table B.5). Participants with hypertension were more than twice as likely as those without hypertension to have a home health episode in the three-year period. The association was greater than 1 in all three individual years but significant only in Year 2. In addition, one-year increments in age were associated with a 7 percent increase in the likelihood of having a home health episode, a finding that was also significant and at least 7 percent in both Years 1 and 3.

5. Skilled nursing facility admissions

Having lower income, living alone, and having had a fall were associated with higher odds of experiencing a skilled nursing facility admission (Exhibit IV.2). Participants with lower income were more than three times more likely than participants with higher income to be admitted to a skilled nursing facility over the three-year period. The association was significant in Year 2 but not significant in Years 1 and 3 (Appendix B, Table B.6). Living alone was associated with nearly three times higher odds of experiencing a skilled nursing admission, an association that was large and significant in Year 1; in Years 2 and 3, the odds ratios remained above 1 but were not significant. Participants who had fallen in the prior three months were more than twice as likely to have a skilled nursing facility admission in the three-year period. The effect was largest and significant in Year 1.

In contrast, being non-Hispanic Black and living in the West were associated with lower odds of experiencing a skilled nursing facility admission (Exhibit IV.2). Non-Hispanic Black participants had 80 percent lower odds of such an event compared with non-Hispanic White participants; the effect was significant in Years 1 and 2. Living in the West was associated with 72 percent lower odds of being admitted to a skilled nursing facility in the three-year period. The association was significant in Year 2 (Appendix B, Table B.6).

6. Long-term care admissions

Several characteristics were associated with the likelihood of being admitted to a long-term care facility in the three years following the survey (Exhibit IV.2).¹³ Those who had a fall were nearly four times more likely to be admitted to a long-term care facility than those who had not had a fall. Lower income participants were almost four times more likely to have an admission to a long-term care facility than higher income participants. Participants who lived in communities with a higher percentage of non-White individuals (compared with the median across the nation) were more than three times more likely to have a long-term care admission. Age was also associated with a higher likelihood of admission to a long-term care facility, with each additional year of age being associated with a 12 percent increase in an admission. In contrast, participants who were female, married or with a partner, or living in the West were at least 80 percent less likely than their counterparts to be admitted to a long-term care facility.

¹³ Long-term care admissions were assessed only over the three-year period and not the three one-year periods.

C. Characteristics with limited time associations with adverse health events

Some characteristics were associated with a higher or lower likelihood of experiencing the events in Year 1, but these associations were not sustained in the subsequent two years. For example, congregate meal participants who lived alone were more than two times as likely to have any adverse event, more than three times as likely to have a hospitalization, nearly five times more likely to have a home health episode or an inpatient emergency department visit, and nearly 10 times more likely to have a skilled nursing facility admission in Year 1 (Appendix B, Tables B.1, B.2, B.4, B.5, and B.6). In each case, the higher association was not significant in Years 2 and 3. Hypertension followed a similar pattern for any adverse event, hospitalizations, and inpatient emergency department visits; participants with hypertension were more than twice as likely to have an adverse event, hospital admission, or emergency department visit leading to a hospital admission than those without hypertension in Year 1 but were less likely in Year 3. In contrast, participants whose service provider offered nutrition counseling were half as likely as those whose provider did not offer nutrition counseling in Year 1 to have any adverse event, but were more than three times as likely in Year 3.

V. Conclusion

This chapter summarizes findings on the effects of congregate meal participation on participants' health care utilization. It also presents recommendations for additional research motivated by these findings.

A. Effects on health care utilization

Although there were few statistically significant effects on health care utilization among congregate meal participants overall, there were large effects on utilization among lower-income participants. Participants were less likely than nonparticipants to have a hospital readmission within 30 days of discharge, with sizable differences in readmission rates two and three years after the survey. These effects were particularly pronounced among lower-income individuals, with hospital readmission rates of 2 percent for participants versus 13 percent for nonparticipants in Year 2 and 0.5 versus 13 percent in Year 3. Similarly, while there were no effects on the rate of admission to a long-term care facility for congregate meal participants overall, there was an effect among lower-income individuals: in this group of older adults, participants were less likely than nonparticipants to be admitted to a long-term care facility in Year 2 (13 versus 22 percent).

Among older adults who had an outpatient emergency department visit or an admission to a skilled nursing facility, participants had slightly more visits and admissions, on average, than nonparticipants in Year 1. However, participants who experienced adverse health events had fewer events in Years 2 and 3 relative to nonparticipants. In Year 2, among individuals who had a home health episode, participants had fewer episodes than nonparticipants. In Year 3, participants had fewer hospital admissions than nonparticipants (among individuals with an admission) and had fewer skilled nursing facility admissions (among individuals with an admission).

B. Characteristics associated with adverse health events

Several characteristics of congregate meal participants were associated with experiencing an adverse health event in the three years following the survey. The likelihood of experiencing an event was higher among veterans and those who had a recent fall and was lower among high school graduates, non-Hispanic Black individuals, non-Hispanic individuals who reported a race other than White or Black, and participants who received meals from LSPs that offered health promotion activities.

There were also several significant associations between participants' characteristics and specific types of adverse health events during the three years following the survey, including the following:

- A hospital admission was more than twice as likely among participants who had recently experienced a fall and was less likely among high school graduates and non-Hispanic individuals who reported a race other than White or Black.
- A home health episode was more likely among individuals who were older, were veterans, had recently experienced a fall, or had hypertension.
- An admission to a skilled nursing facility was more likely among participants who had lower income, those who lived alone, and those who recently had a fall.
- Being admitted to a long-term care facility was more likely among individuals who were older, had recently experienced a fall, had lower income, or were living in a community with a high percentage

of non-White individuals. It was less likely among those who were female, married or living with a partner, or non-Hispanic Black.

Some characteristics were associated with a higher or lower likelihood of adverse health events in the first year following the survey, but these associations were not evident in the subsequent two years.

Congregate meal participants who lived alone at the time of the interview were more than twice as likely to have any adverse event, more than three times more likely to have a hospitalization, and nearly five times more likely to have a home health episode in the first year following the survey, but there were generally no associations after the first year. Similarly, participants who had hypertension were more likely to experience any adverse event and to be admitted to a hospital in the first year, but there were generally no associations after that.

C. Discussion

This report addressed the NSP evaluation's research objectives to examine overall wellness measured using longer-term outcomes related to health and avoidance of institutionalization. Whereas Mabli et al. (2018) measured health care utilization outcomes within one year of when older adults were known to have received congregate meals, this report measured outcomes within three years of that date. Thus, this report extended the findings from a one-year assessment of the effect of receiving congregate meals on health care utilization to a three-year assessment.

The descriptive findings showed that many NSP participants were in fair or poor health, had functional impairments that limited daily activities, and had multiple chronic conditions. These and other indicators of health and economic need described in this report underscore the vulnerability of the population of older adults the program serves. These vulnerabilities were reflected in higher health care needs and the extent to which participants experienced adverse health outcomes. For example, many NSP participants recently had an emergency department visit, home health episode, or hospital admission before the survey.

The analysis examined the effect of NSP participation on overall health and well-being by comparing health care utilization outcomes for participants and nonparticipants. Relative to nonparticipants, congregate meal participants had a lower likelihood of being readmitted to a hospital within 30 days of discharge but similar likelihoods of experiencing other adverse health events. This finding might reflect the way in which the NSP serves as a primary access point for many home- and community-based services to help older adults meet their health and nutrition needs. These offerings may be more effective among individuals who have been hospitalized because many of these individuals require a variety of long-term in-home and community-based supports, such as homemaker and home-health aide services, transportation, physical activity and chronic disease self-management programs, home repair and modification, and falls prevention programs; these services may not be available to nonparticipants for extended periods of time after discharge.

The lower rate of hospital readmission was particularly pronounced among lower income individuals in two of the three years following the survey. There are several possible explanations for stronger effects among lower-income older adults. First, although there is no means test for the NSP, the program targets older adults with the greatest need. It is possible that LSPs with limited resources and staff availability target the provision of services to older adults who need them most. If needs are greater among lower-income older adults, these individuals may receive more assistance and support after discharge. Second, lower-income individuals are more likely than those with higher incomes to be eligible for non-NSP

programs that can help provide stability after a discharge. All older adults in the lower-income group are income-eligible for the Supplemental Nutrition Assistance Program (SNAP), for example, but a much smaller percentage of those in the higher-income group are. Having access to SNAP and other support programs may free up discretionary income to pay for medications, transportation to medical appointments, and other basic needs. Third, lower-income individuals may be more closely connected to the network of food assistance and care providers from personal history or information sharing among peers needing similar services. Learning more about the services LSPs offer to older adults who were recently discharged from the hospital will help to identify effective strategies for continuing to reduce readmission rates among congregate meal participants.

One of the main benefits of using a three-year period, as opposed to the one-year period used in the earlier report on health care utilization (Mabli et al. 2018), is the ability to examine longer-term effects of congregate meal participation on admissions to long-term care facilities. Mabli et al. (2018) found that participants were less likely than nonparticipants to have a nursing home admission during the year following the survey, and that the effect was especially large for low-income individuals. The analyses conducted for this report showed that these findings are sustained over a three-year period. Although more research is needed to understand the differences in program effectiveness by income, the lower rate of admission to a long-term care facility among lower-income participants compared with lower-income nonparticipants suggests that the program is achieving its goal of improving older adults' ability to age in place and delay or avoid institutionalization, particularly among older adults who have the greatest economic need.

Overall, the lower rates of hospital readmissions and nursing home admissions among congregate meal participants align with expectations of how the combination of receiving nutritious meals, social support from peers and program staff, and LSP services can affect health outcomes. These findings are consistent with findings from a previous analysis that found that congregate meal participants had better food security, socialization experiences, and diet quality than nonparticipants (Mabli et al. 2017).

However, this report also found that nontrivial percentages of participants experienced adverse health events and were admitted to nursing homes. More research is needed to explore the mechanisms through which receiving congregate meals and supportive services leads to lower rates of hospital readmissions and nursing home admission but not to impacts on other adverse health events. Obtaining qualitative information from program participants and program staff would help identify the mechanisms and explore whether they differ by economic circumstances, care received by family members, medical histories, geography, length of meal program participation, or other key characteristics.

The prevalence of adverse health effects among congregate meal participants, even those for which the program had a favorable effect, points to the need to examine the characteristics associated with congregate meal participants experiencing these events. This report was the first to explore these associations, including those with nursing home admissions, among a national sample of congregate meal participants. A consistent finding across several analyses in Chapter IV was the strong association between an older adult having a recent fall and experiencing an adverse health event such as a hospitalization, home health episode, or nursing home admission. Although much research has documented the prevalence of falls among older adults and their attendant detriment to health and well-being, the consistency and strength of these findings for the congregate meal participant population underscore the need to learn more about what the National Aging Network is doing to expand, enrich, and target its falls prevention programs at meal sites.

Veterans are more likely than non-veterans to experience any adverse health event and, specifically, a home-health episode. Unfortunately, little is known about the relationship between being a veteran and experiencing these events. Veterans who use the Veterans Health Administration health care system are more likely to be a racial or ethnic minority, poor, or disabled and, thus, are more likely to experience adverse health events (Wang et al. 2015). The findings in this report suggest that even after accounting for these factors among congregate meal participants, veteran status remains strongly associated with longer-term health care utilization. More research is needed to understand the types of services available to veterans at congregate meal sites and whether veterans endure specific mental health issues that interfere with their ability to use NSP services to improve their health.

The likelihood of experiencing an adverse health event was lower among participants who received meals from LSPs that offered health promotion activities, relative to those served by LSPs that did not offer these activities. More information is needed about the structure of these activities and the resources required to offer them across all meal sites. By collecting information from two key groups—LSPs, to learn more about the types of health promotion activities they offer, and participants, to learn more about which activities they have found to be most useful—the National Aging Network can identify the specific types of health promotion activities that are most effective in improving participants' lives.

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Appendix A

Chapter III supplementary tables

Table A.1. Selected demographic and household characteristics of Nutrition Services Program participants at the time of the survey

Characteristic	All individuals	Individuals in higher-income households	Individuals in lower-income households	Individuals who live alone	Individuals who live with other family members
Average age (years)	77.3	77.0	77.6	77.7	76.7
Female	66.9	56.4	77.4	68.6	64.4
Veteran	16.1	22.4	9.9	12.3	22.1
High school graduate, GED, or equivalent	75.8	87.8	63.8	78.3	72.0
Race/ethnicity					
Non-Hispanic Black	13.6	12.1	15.1	14.2	12.6
Non-Hispanic other ^a	5.0	5.2	4.8	4.2	6.1
Non-Hispanic White	67.7	73.0	62.3	64.6	72.4
Hispanic	13.8	9.7	17.9	17.0	8.9
Marital status					
Married or living with partner	23.8	31.9	15.7	0.7	59.2
Widowed	48.8	50.2	47.5	61.6	29.3
Divorced, separated, or never married	27.3	17.8	36.9	37.7	11.4
Monthly income-to-poverty ratio ^b	162.1	237.7	86.4	166.8	155.0
Lives alone	60.4	60.6	60.1	100.0	0.0
Food insecure	16.5	13.0	20.1	21.3	9.2
LSP provides health promotion activities	52.2	51.6	52.7	46.8	60.4
LSP provides nutrition counseling	19.3	23.4	15.2	18.5	20.5
LSP provides nutrition screening and assessment	51.6	47.4	55.8	45.9	60.3
LSP provides social activities	62.0	59.8	64.2	59.7	65.6
Share of population non-White is higher than median	64.9	63.7	66.0	64.3	65.8
Share of population Hispanic is higher than median	61.1	58.1	64.1	62.3	59.2
Share of housing units without access to a vehicle is higher than median	56.8	48.2	65.3	63.4	46.6
Share of families below 200% of poverty is higher than median	50.3	42.0	58.7	55.3	42.7
Has access to supermarket	73.2	78.3	68.0	77.1	67.2
Urban	72.3	71.8	72.8	75.7	67.2
Midwest	23.1	26.1	20.1	21.1	26.2
Northeast	25.8	31.6	19.9	29.6	19.9
West	29.4	27.6	31.2	34.4	21.8
South	21.7	14.7	28.7	14.9	32.1

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data.

Note: All units are percentages, unless otherwise noted.

Tabulations restricted to survey respondents who had valid matches to Medicare administrative records and were not participating in Medicare Advantage for the full year.

Tabulations are based on unweighted sample sizes of 316 congregate meal participants. Individual estimates within the table may have slightly fewer observations due to item nonresponse to individual questions.

LSP = local service provider.

^a “Other” includes Asian, American Indian, or Alaska native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table A.2. Selected health characteristics of Nutrition Services Program participants at or before the time of the survey

Characteristic	All individuals	Individuals in higher-income households	Individuals in lower-income households	Individuals who live alone	Individuals who live with other family members
General health					
Excellent, very good, or good	78.7	81.7	75.7	78.7	78.8
Fair or poor	21.3	18.3	24.3	21.3	21.2
Number of prescription medications taken every day					
0	10.3	8.5	12.0	11.8	7.9
1 or 2	21.5	15.0	28.2	24.7	16.8
3 or more	68.2	76.5	59.7	63.5	75.3
Number of falls in the past three months					
0	76.8	75.7	78.0	75.2	79.3
1 or more	23.2	24.3	22.0	24.8	20.7
Number of falls in the past three months that caused an injury					
0	83.0	75.4	91.4	80.4	87.8
1 or more	17.0	24.6	8.6	19.6	12.2
Mobility					
Able to walk	99.5	99.0	100.0	99.5	99.6
Able to walk but has difficulty walking or climbing stairs	37.9	41.1	34.8	39.8	35.1
Mean HCC Score	0.8	0.8	0.8	0.8	0.8
Dual enrollment status	29.8	7.3	52.3	35.6	20.8
Chronic conditions					
0	26.4	26.5	26.3	25.5	27.8
1 or more	73.6	73.5	73.7	74.5	72.2
Mean number of chronic conditions	1.7	1.5	1.8	1.7	1.6

Source: Medicare claims and enrollment data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: All units are percentages, unless otherwise noted. Tabulations restricted to survey respondents that had valid matches to Medicare administrative records and were not participating in Medicare Advantage for the full year.

Incidence of chronic conditions measured at the end of 2014 before the 2015–2016 survey was conducted.

Tabulations are based on unweighted sample sizes of 316 congregate meal participants. Individual estimates within the table may have slightly fewer observations due to item nonresponse to individual questions.

HCC = hierarchical conditional category score.

Table A.3. Health care utilization among Nutrition Services Program participants in the nine months before the survey

	All individuals	Individuals in higher-income households	Individuals in lower-income households	Individuals who live alone	Individuals who live with other family members
Experienced the event (%)					
Hospital admission	7.9	7.9	8.0	6.6	9.9
30-day hospital readmission	1.2	0.2	2.2	0.2	2.7
Emergency department visit leading to a hospital admission	5.3	6.4	4.1	5.1	5.6
Outpatient emergency department visit	28.5	24.1	32.9	32.5	22.5
Primary care physician visit in any setting	76.0	76.1	75.8	75.1	77.3
Home health episode	6.3	5.9	6.7	6.0	6.7
Nursing home admission	1.5	1.4	1.6	1.4	1.7
Skilled nursing facility admission	2.0	2.3	1.8	2.1	1.9
Number of times the event occurred among those that experienced the event					
Hospital admission	1.7	1.8	1.7	1.7	1.7
Emergency department visit leading to a hospital admission	1.9	1.8	2.0	1.7	2.1
Outpatient emergency department visit	2.1	2.3	2.0	2.1	2.1
Primary care physician visit in any setting	6.8	6.5	7.1	7.3	6.1
Home health episode	1.7	1.4	2.0	1.7	1.7
Skilled nursing facility admission	1.6	1.3	1.9	1.3	2.0

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Utilization was measured in the nine months preceding the survey for each participant.

Tabulations are based on unweighted sample sizes of 316 congregate meal participants.

Table A.4. Monthly Medicare expenditures among Nutrition Services Program participants

	All individuals	Individuals in higher-income households	Individuals in lower-income households	Individuals who live alone	Individuals who live with other family members
Total Medicare expenditures					
Percentage of participants with non-zero expenditures	91.4	90.8	92.0	90.3	93.1
Average among those with non-zero expenditures	\$690	\$641	\$739	\$727	\$637
Average among all participants	\$631	\$582	\$680	\$657	\$593
Inpatient					
Percentage of participants with non-zero expenditures	8.0	8.0	8.0	6.9	9.5
Average among those with non-zero expenditures	\$2,314	\$2,531	\$2,097	\$2,345	\$2,280
Average among all participants	\$184	\$202	\$167	\$163	\$217
Outpatient					
Percentage of participants with non-zero expenditures	72.0	70.4	73.6	72.8	70.7
Average among those with non-zero expenditures	\$287	\$233	\$340	\$340	\$206
Average among all participants	\$207	\$164	\$250	\$247	\$145
Skilled nursing facility					
Percentage of participants with non-zero expenditures	2.0	2.3	1.8	2.1	1.9
Average among those with non-zero expenditures	\$1,129	\$940	\$1,367	\$1,073	\$1,223
Average among all participants	\$23	\$21	\$24	\$22	\$23
Home health					
Percentage of participants with non-zero expenditures	6.3	5.9	6.7	6.0	6.7
Average among those with non-zero expenditures	\$340	\$295	\$379	\$313	\$377
Average among all participants	\$21	\$17	\$25	\$19	\$25
Physician services					
Percentage of participants with non-zero expenditures	91.1	90.5	91.7	90.2	92.4
Average among those with non-zero expenditures	\$215	\$197	\$233	\$228	\$197
Average among all participants	\$196	\$178	\$214	\$205	\$182

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Expenditures were measured in the nine months preceding the survey for each participant.

Tabulations are based on unweighted sample sizes of 316 congregate meal participants.

Table A.5. Regression-adjusted percentages of congregate meal participants and nonparticipants who experienced health events in Years 1, 2, and 3 following the survey

Outcome	Participants		Nonparticipants		Difference	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Hospital admission						
Year 1	25.1	(2.9)	22.6	(2.9)	2.5	(3.8)
Year 2	23.2	(2.4)	22.9	(3.7)	0.2	(4.5)
Year 3	29.9	(3.3)	26.2	(3.6)	3.7	(4.9)
30-day hospital readmission						
Year 1	3.0	(0.9)	3.6	(1.0)	-0.7	(1.4)
Year 2	1.3	(0.8)	5.5	(1.5)	-4.1**	(1.8)
Year 3	2.4	(0.9)	8.3	(1.8)	-5.9***	(2.1)
Emergency department visit leading to a hospital admission						
Year 1	14.9	(2.0)	18.2	(2.7)	-3.3	(2.8)
Year 2	15.8	(1.9)	16.2	(3.2)	-0.4	(3.9)
Year 3	20.7	(2.7)	20.0	(3.7)	0.7	(4.4)
Outpatient emergency department visit						
Year 1	34.0	(3.1)	32.5	(3.0)	1.4	(4.3)
Year 2	34.1	(3.0)	32.8	(3.6)	1.3	(4.8)
Year 3	38.9	(3.5)	36.2	(4.4)	2.8	(5.4)
Primary care physician visit in any setting						
Year 1	85.8	(2.5)	80.8	(2.6)	5.1	(3.5)
Year 2	82.2	(2.3)	81.7	(2.6)	0.6	(3.2)
Year 3	81.9	(3.1)	85.7	(2.5)	-3.8	(3.9)
Home health episode						
Year 1	13.5	(1.7)	12.5	(1.9)	1.0	(3.1)
Year 2	14.3	(2.2)	19.4	(3.0)	-5.1	(3.6)
Year 3	15.4	(2.2)	15.6	(3.0)	-0.1	(4.3)
Skilled nursing facility admission						
Year 1	8.7	(1.8)	8.3	(1.9)	0.4	(2.9)
Year 2	14.4	(2.4)	10.2	(2.0)	4.2	(3.3)
Year 3	10.2	(1.7)	8.4	(1.7)	1.8	(2.2)

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***/**/* Significantly different from zero at the 0.01/0.05/0.10 level, two-tailed test.

Table A.6. Regression-adjusted percentages of congregate meal participants and nonparticipants who experienced nursing home admissions in the three-year period following the survey

Outcome	Participants		Nonparticipants		Difference	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All individuals	11.7	(1.6)	13.8	(2.0)	-2.0	(2.9)
Individuals in higher-income households	10.4	(2.0)	9.6	(2.0)	0.9	(3.3)
Individuals in lower-income households	13.0	(2.0)	21.8	(3.6)	-8.7*	(4.4)
Individuals who live alone	15.1	(2.4)	18.2	(3.2)	-3.0	(4.2)
Individuals who live with other family members	7.5	(1.9)	9.3	(2.2)	-1.8	(3.2)

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***/**/* Significantly different from zero at the 0.01/0.05/0.10 level, two-tailed test.

Table A.7. Regression-adjusted percentages of individuals who experienced health events in Years 1, 2, and 3 following the survey, by congregate meal participation status and household income

Outcome	Individuals in lower-income households			Individuals in higher-income households		
	Participants	Non-participants	Difference	Participants	Non-participants	Difference
Hospital admission						
Year 1	23.6	25.2	-1.7	26.0	20.9	5.1
Year 2	29.7	24.2	5.5	18.4	19.9	-1.5
Year 3	23.9	32.5	-8.7	36.5	19.2	17.3***
30-day hospital readmission						
Year 1	3.4	1.9	1.5	4.2	4.7	-0.6
Year 2	2.0	13.4	-11.4**	0.0	2.4	-2.4**
Year 3	0.5	12.6	-12.1**	3.2	4.5	-1.3
Emergency department visit leading to a hospital admission						
Year 1	13.7	23.5	-9.8*	17.1	13.4	3.7
Year 2	20.5	18.1	2.5	12.7	12.8	-0.1
Year 3	20.1	26.6	-6.5	22.6	13.7	8.9
Outpatient emergency department visit						
Year 1	43.2	35.3	7.9	29.6	29.8	-0.2
Year 2	32.3	37.3	-5.0	36.8	28.6	8.2
Year 3	43.8	42.3	1.5	36.3	29.2	7.0
Primary care physician visit in any setting						
Year 1	89.2	80.7	8.5	82.4	81.2	1.2
Year 2	82.9	81.6	1.3	82.4	80.8	1.6
Year 3	81.7	86.3	-4.6	82.7	83.2	-0.5
Home health episode						
Year 1	16.5	16.3	0.2	10.5	9.6	0.9
Year 2	16.5	23.6	-7.1	12.8	15.0	-2.3
Year 3	13.7	22.1	-8.4	17.3	10.2	7.1
Skilled nursing facility admission						
Year 1	9.4	9.4	0.0	13.4	8.0	5.4
Year 2	22.5	12.9	9.6*	11.3	8.0	3.3
Year 3	14.9	12.6	2.3	7.1	4.6	2.5

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***/**/* Significantly different from zero at the 0.01/0.05/0.10 level, two-tailed test.

Table A.8. Regression-adjusted percentages of individuals who experienced health events in Years 1, 2, and 3 following the survey, by congregate meal participation status and living arrangement

Outcome	Individuals who live alone			Individuals who live with other family members		
	Participants	Non-participants	Difference	Participants	Non-participants	Difference
Hospital admission						
Year 1	28.2	27.3	0.9	21.8	18.6	3.1
Year 2	25.0	25.0	0.0	20.9	21.2	-0.4
Year 3	30.8	28.8	2.1	30.5	21.3	9.2
30-day hospital readmission						
Year 1	5.4	6.7	-1.3	1.1	4.2	-3.1
Year 2	2.2	4.6	-2.5	0.0	5.5	-5.6***
Year 3	1.6	8.3	-6.7*	4.9	5.3	-0.4
Emergency department visit leading to a hospital admission						
Year 1	18.9	25.2	-6.3	12.8	10.8	2.0
Year 2	16.6	22.1	-5.5	15.2	10.5	4.7
Year 3	23.9	22.6	1.3	19.4	15.8	3.6
Outpatient emergency department visit						
Year 1	36.5	34.9	1.6	33.7	30.4	3.3
Year 2	36.6	30.6	5.9	33.2	34.2	-1.1
Year 3	41.0	39.9	1.1	37.2	30.4	6.7
Primary care physician visit in any setting						
Year 1	85.1	80.0	5.1	87.0	80.7	6.4
Year 2	83.0	81.2	1.7	80.9	81.8	-0.9
Year 3	79.6	85.9	-6.3	83.7	86.0	-2.3
Home health episode						
Year 1	15.7	13.0	2.7	10.1	12.4	-2.3
Year 2	13.6	20.9	-7.2	14.8	19.0	-4.2
Year 3	15.2	15.3	0.0	18.8	14.0	4.7
Skilled nursing facility admission						
Year 1	13.3	11.0	2.3	5.5	3.7	1.8
Year 2	18.6	12.5	6.1	9.2	8.5	0.7
Year 3	12.8	8.8	3.9	7.9	8.0	-0.1

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***/**/* Significantly different from zero at the 0.01/0.05/0.10 level, two-tailed test.

Table A.9. Regression-adjusted numbers of events experienced by congregate meal participants and nonparticipants who experienced health events in Years 1, 2, and 3 following the survey

Outcome	Participants		Nonparticipants		Difference	
	Number	Standard error	Number	Standard error	Number	Standard error
Hospital admission						
Year 1	1.4	(0.1)	1.7	(0.1)	-0.3	(0.2)
Year 2	1.8	(0.1)	1.9	(0.2)	-0.1	(0.3)
Year 3	1.5	(0.1)	2.0	(0.2)	-0.5**	(0.2)
Emergency department visit leading to a hospital admission						
Year 1	1.4	(0.1)	1.5	(0.1)	-0.1	(0.1)
Year 2	1.8	(0.2)	1.8	(0.3)	0.0	(0.3)
Year 3	1.5	(0.1)	2.1	(0.3)	-0.6	(0.3)
Outpatient emergency department visit						
Year 1	2.7	(0.2)	1.9	(0.2)	0.8**	(0.3)
Year 2	2.7	(0.3)	1.7	(0.4)	1.0	(0.7)
Year 3	2.2	(0.3)	1.9	(0.2)	0.3	(0.4)
Primary care physician visit in any setting						
Year 1	6.8	(0.3)	7.0	(0.6)	-0.2	(0.7)
Year 2	8.9	(0.7)	7.4	(0.6)	1.5	(0.9)
Year 3	8.5	(0.7)	8.0	(0.7)	0.5	(0.9)
Home health episode						
Year 1	1.6	(0.1)	1.9	(0.2)	-0.3	(0.3)
Year 2	1.7	(0.1)	2.1	(0.1)	-0.4*	(0.2)
Year 3	1.8	(0.2)	2.0	(0.2)	-0.3	(0.3)
Skilled nursing facility admission						
Year 1	1.6	(0.1)	1.1	(0.1)	0.4*	(0.2)
Year 2	1.8	(0.1)	2.1	(0.3)	-0.4	(0.3)
Year 3	1.0	(0.1)	2.1	(0.2)	-1.2***	(0.3)

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***/**/* Significantly different from zero at the 0.01/0.05/0.10 level, two-tailed test.

Table A.10. Regression-adjusted average total Medicare spending of congregate meal participants and nonparticipants in the three years following the survey

Outcome	Participants		Nonparticipants		Difference	
	Dollars	Standard error	Dollars	Standard error	Dollars	Standard error
Average total Medicare expenditures ^a (\$)						
Year 1	999	(142)	1,008	(145)	-9	(215)
Year 2	1,363	(190)	994	(149)	369	(247)
Year 3	1,304	(260)	1,289	(220)	14	(273)

Source: Medicare claims data matched to AoA NSP outcomes survey, 2015–2016, weighted data.

Note: Estimates are based on an unweighted sample size of 683 congregate meal participants and nonparticipants.

***/**/* Significantly different from zero at the 0.01/0.05/0.10 level, two-tailed test.

^a Total expenditures exclude expenditures for durable medical equipment and hospice care.

Appendix B

Chapter IV supplementary tables

Table B.1. Odds ratios of participants experiencing any adverse health event in the three-year period following the survey

Baseline characteristic	Year 1 OR (95% CI)	Year 2 OR (95% CI)	Year 3 OR (95% CI)	Years 1 to 3 OR (95% CI)
Age	1.06* (1.00 - 1.12)	1.02 (0.95 - 1.08)	1.03 (0.97 - 1.10)	1.01 (0.94 - 1.09)
Female	1.46 (0.47 - 4.58)	1.07 (0.42 - 2.71)	0.57 (0.21 - 1.55)	1.31 (0.49 - 3.48)
Completed high school	0.24** (0.08 - 0.70)	0.71 (0.27 - 1.86)	0.76 (0.33 - 1.75)	0.40* (0.16 - 1.03)
Married or living with partner	1.56 (0.54 - 4.53)	0.89 (0.25 - 3.17)	0.45 (0.06 - 3.21)	0.90 (0.25 - 3.24)
Veteran	1.42 (0.49 - 4.13)	1.62 (0.42 - 6.28)	1.03 (0.30 - 3.50)	2.10* (0.87 - 5.09)
Non-Hispanic Black	0.29* (0.08 - 1.01)	0.55 (0.16 - 1.91)	0.75 (0.20 - 2.87)	0.42* (0.15 - 1.15)
Non-Hispanic other ^a	0.02*** (0.00 - 0.23)	0.41 (0.08 - 2.05)	0.13* (0.01 - 1.36)	0.15** (0.03 - 0.79)
Hispanic	0.26 (0.05 - 1.43)	0.43 (0.09 - 2.12)	2.74 (0.32 - 23.71)	0.70 (0.17 - 2.88)
Monthly income-to-poverty lower than median ^b	1.00 (0.53 - 1.90)	2.45** (1.16 - 5.18)	0.71 (0.31 - 1.63)	1.35 (0.69 - 2.65)
Food insecure	0.52 (0.15 - 1.79)	0.59 (0.22 - 1.59)	1.14 (0.40 - 3.31)	0.76 (0.27 - 2.14)
Living alone	2.40* (0.89 - 6.48)	1.35 (0.47 - 3.84)	0.41 (0.09 - 1.83)	0.79 (0.24 - 2.57)
HCC score	0.76 (0.38 - 1.53)	1.49 (0.51 - 4.31)	1.54 (0.52 - 4.55)	1.74 (0.77 - 3.93)
High blood pressure/hypertension or diabetes	2.07* (0.94 - 4.57)	1.26 (0.58 - 2.73)	0.40** (0.20 - 0.82)	0.80 (0.43 - 1.46)
Any falls in past three months	5.19*** (2.14 - 12.59)	2.63** (1.11 - 6.24)	2.41 (0.83 - 7.05)	2.35** (1.04 - 5.32)
LSP provides health promotion activities	0.88 (0.28 - 2.73)	0.65 (0.23 - 1.88)	0.40** (0.19 - 0.85)	0.43* (0.17 - 1.10)
LSP provides nutrition counseling	0.45* (0.19 - 1.08)	1.08 (0.49 - 2.41)	3.18** (1.08 - 9.36)	0.79 (0.38 - 1.65)
LSP provides nutrition screening and assessment	1.61 (0.59 - 4.42)	1.34 (0.67 - 2.69)	0.83 (0.28 - 2.50)	1.88 (0.85 - 4.15)
LSP provides social activities	0.57 (0.21 - 1.53)	0.85 (0.35 - 2.06)	0.61 (0.21 - 1.76)	0.82 (0.33 - 2.05)
Share of population non-White is higher than median	0.75 (0.24 - 2.37)	1.11 (0.42 - 2.98)	1.28 (0.52 - 3.15)	0.56 (0.23 - 1.37)
Share of population Hispanic is higher than median	0.98 (0.38 - 2.56)	0.79 (0.27 - 2.35)	0.63 (0.25 - 1.58)	1.21 (0.51 - 2.86)
Share of housing units without access to a vehicle is higher than median	0.89 (0.42 - 1.87)	2.54* (0.92 - 7.00)	0.62 (0.22 - 1.71)	1.07 (0.49 - 2.33)
Share of families below 200% of poverty is higher than median	0.67 (0.26 - 1.75)	0.59 (0.21 - 1.70)	2.98 (0.78 - 11.37)	1.64 (0.68 - 3.93)
Has access to supermarket	2.37* (0.85 - 6.64)	0.83 (0.33 - 2.07)	0.76 (0.27 - 2.14)	1.00 (0.39 - 2.56)
Urban	3.60** (1.06 - 12.18)	0.89 (0.35 - 2.27)	0.74 (0.24 - 2.29)	0.99 (0.42 - 2.33)
Midwest	0.43 (0.11 - 1.66)	0.55 (0.18 - 1.68)	1.93 (0.68 - 5.48)	1.44 (0.54 - 3.89)
Northeast	0.32 (0.08 - 1.28)	1.21 (0.34 - 4.31)	4.01** (1.09 - 14.75)	2.06 (0.64 - 6.69)
West	1.02 (0.23 - 4.54)	0.42 (0.11 - 1.62)	0.38 (0.11 - 1.35)	0.95 (0.34 - 2.65)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.

LSP = local service provider; CI = confidence interval.

***/**/* Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table B.2. Odds ratios of participants experiencing a hospital admission in the three-year period following the survey

Baseline characteristic	Year 1 OR (95% CI)	Year 2 OR (95% CI)	Year 3 OR (95% CI)	Years 1 to 3 OR (95% CI)
Age	1.03 (0.98 - 1.09)	1.00 (0.94 - 1.06)	1.02 (0.96 - 1.08)	1.01 (0.95 - 1.08)
Female	1.52 (0.42 - 5.47)	1.09 (0.40 - 2.98)	0.66 (0.25 - 1.76)	1.17 (0.41 - 3.30)
Completed high school	0.28** (0.10 - 0.75)	1.11 (0.46 - 2.69)	0.96 (0.41 - 2.22)	0.38** (0.15 - 0.98)
Married or living with partner	2.67 (0.81 - 8.82)	1.19 (0.33 - 4.38)	0.68 (0.09 - 5.25)	1.57 (0.46 - 5.41)
Veteran	1.16 (0.33 - 4.16)	1.28 (0.31 - 5.29)	1.01 (0.28 - 3.65)	1.52 (0.63 - 3.66)
Non-Hispanic Black	0.35 (0.08 - 1.41)	0.82 (0.26 - 2.55)	0.48 (0.11 - 2.02)	0.43 (0.15 - 1.19)
Non-Hispanic other ^a	0.02*** (0.00 - 0.24)	0.40 (0.07 - 2.38)	0.07* (0.00 - 1.16)	0.15** (0.03 - 0.87)
Hispanic	0.42 (0.08 - 2.22)	0.72 (0.16 - 3.24)	3.79 (0.52 - 27.68)	0.80 (0.19 - 3.37)
Monthly income-to-poverty lower than median ^b	0.79 (0.41 - 1.51)	2.62** (1.26 - 5.45)	0.75 (0.35 - 1.62)	1.35 (0.67 - 2.69)
Food insecure	0.45 (0.11 - 1.92)	0.20** (0.05 - 0.70)	0.78 (0.25 - 2.44)	0.57 (0.21 - 1.50)
Living alone	3.60** (1.24 - 10.40)	1.61 (0.58 - 4.48)	0.58 (0.13 - 2.58)	1.38 (0.46 - 4.13)
HCC score	0.79 (0.38 - 1.64)	1.91 (0.60 - 6.13)	1.45 (0.50 - 4.21)	1.62 (0.77 - 3.38)
High blood pressure/hypertension or diabetes	2.32** (1.03 - 5.22)	0.85 (0.35 - 2.03)	0.41** (0.19 - 0.88)	0.68 (0.37 - 1.25)
Any falls in past three months	3.70*** (1.55 - 8.83)	2.50** (1.19 - 5.26)	2.37 (0.81 - 6.96)	2.24* (0.97 - 5.17)
LSP provides health promotion activities	0.84 (0.26 - 2.75)	0.69 (0.27 - 1.77)	0.45** (0.21 - 0.95)	0.51 (0.21 - 1.25)
LSP provides nutrition counseling	0.55 (0.23 - 1.30)	1.52 (0.68 - 3.41)	3.04* (1.00 - 9.27)	0.94 (0.46 - 1.93)
LSP provides nutrition screening and assessment	1.35 (0.47 - 3.86)	0.96 (0.51 - 1.82)	0.77 (0.25 - 2.38)	1.70 (0.76 - 3.81)
LSP provides social activities	0.51 (0.17 - 1.55)	0.66 (0.27 - 1.62)	0.56 (0.19 - 1.69)	0.66 (0.25 - 1.70)
Share of population non-White is higher than median	0.68 (0.21 - 2.19)	1.32 (0.52 - 3.35)	1.37 (0.58 - 3.26)	0.59 (0.25 - 1.42)
Share of population Hispanic is higher than median	0.75 (0.29 - 1.95)	0.97 (0.31 - 2.97)	0.59 (0.23 - 1.52)	0.98 (0.41 - 2.34)
Share of housing units without access to a vehicle is higher than median	1.07 (0.46 - 2.48)	1.99 (0.75 - 5.31)	0.62 (0.22 - 1.74)	0.96 (0.42 - 2.21)
Share of families below 200% of poverty is higher than median	0.87 (0.29 - 2.61)	0.59 (0.22 - 1.62)	3.32* (0.90 - 12.18)	1.66 (0.71 - 3.90)
Has access to supermarket	3.82** (1.20 - 12.10)	0.76 (0.33 - 1.73)	0.77 (0.27 - 2.26)	1.48 (0.59 - 3.72)
Urban	3.23* (0.87 - 11.93)	0.73 (0.29 - 1.88)	1.02 (0.31 - 3.43)	1.19 (0.52 - 2.73)
Midwest	0.53 (0.14 - 2.08)	0.49 (0.17 - 1.40)	2.29 (0.82 - 6.39)	1.31 (0.45 - 3.76)
Northeast	0.30 (0.07 - 1.33)	0.94 (0.28 - 3.11)	5.01** (1.35 - 18.60)	1.23 (0.39 - 3.94)
West	1.10 (0.25 - 4.84)	0.46 (0.15 - 1.42)	0.42 (0.11 - 1.56)	0.77 (0.27 - 2.19)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.

LSP = local service provider; CI = confidence interval.

***/**/* Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table B.3. Odds ratios of participants experiencing a 30-day hospital readmission in the three-year period following the survey

Baseline characteristic	Years 1 to 3 OR (95% CI)
Age	1.06 (0.95 - 1.17)
Female	0.97 (0.23 - 4.16)
Completed high school	1.59 (0.11 - 23.59)
Married or living with partner	1.53 (0.01 - 394.30)
Veteran	0.78 (0.08 - 7.85)
Non-Hispanic Black	0.10 (0.00 - 4.02)
Non-Hispanic other ^a	
Hispanic	6.77*** (1.68 - 27.20)
Monthly income-to-poverty lower than median ^b	0.34 (0.09 - 1.31)
Food insecure	0.30 (0.03 - 2.65)
Living alone	2.84 (0.06 - 135.41)
HCC score	0.22 (0.03 - 1.37)
High blood pressure/hypertension or diabetes	1.55 (0.22 - 10.97)
Any falls in past three months	5.20*** (1.78 - 15.23)
LSP provides health promotion activities	0.35 (0.07 - 1.82)
LSP provides nutrition counseling	5.91*** (2.20 - 15.90)
LSP provides nutrition screening and assessment	0.32** (0.12 - 0.87)
LSP provides social activities	0.42 (0.07 - 2.56)
Share of population non-White is higher than median	0.66 (0.15 - 2.83)
Share of population Hispanic is higher than median	0.65 (0.07 - 6.05)
Share of housing units without access to a vehicle is higher than median	0.58 (0.08 - 4.09)
Share of families below 200% of poverty is higher than median	1.60 (0.44 - 5.81)
Has access to supermarket	7.74** (1.09 - 55.23)
Urban	8.92 (0.60 - 133.71)
Midwest	0.09* (0.01 - 1.42)
Northeast	0.17 (0.01 - 2.15)
West	0.03*** (0.00 - 0.22)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.
LSP = local service provider; CI = confidence interval.

***/**/* Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table B.4. Odds ratios of participants experiencing an emergency department visit leading to a hospital admission in the three-year period following the survey

Baseline characteristic	Year 1 OR (95% CI)	Year 2 OR (95% CI)	Year 3 OR (95% CI)	Years 1 to 3 OR (95% CI)
Age	1.02 (0.95 - 1.09)	0.99 (0.92 - 1.06)	1.02 (0.97 - 1.08)	1.02 (0.96 - 1.08)
Female	0.93 (0.24 - 3.53)	0.96 (0.34 - 2.77)	1.09 (0.41 - 2.88)	1.46 (0.56 - 3.78)
Completed high school	0.43 (0.16 - 1.19)	1.16 (0.40 - 3.39)	0.84 (0.32 - 2.20)	0.57 (0.22 - 1.53)
Married or living with partner	1.83 (0.34 - 9.82)	1.82 (0.48 - 6.91)	0.61 (0.07 - 5.32)	1.46 (0.36 - 5.95)
Veteran	1.57 (0.31 - 7.97)	0.51 (0.13 - 2.06)	2.53 (0.61 - 10.48)	1.34 (0.55 - 3.26)
Non-Hispanic Black	0.60 (0.18 - 1.98)	0.78 (0.20 - 3.03)	0.49 (0.10 - 2.39)	0.60 (0.21 - 1.76)
Non-Hispanic other ^a		0.51 (0.06 - 4.54)	0.05** (0.00 - 0.75)	0.18* (0.03 - 1.27)
Hispanic	2.35 (0.54 - 10.25)	3.82* (0.78 - 18.65)	4.18 (0.59 - 29.66)	2.49 (0.55 - 11.32)
Monthly income-to-poverty lower than median ^b	0.96 (0.44 - 2.09)	2.61* (0.98 - 6.93)	1.51 (0.58 - 3.94)	1.31 (0.62 - 2.76)
Food insecure	0.45 (0.09 - 2.24)	0.22** (0.06 - 0.79)	1.13 (0.28 - 4.62)	0.88 (0.28 - 2.74)
Living alone	4.74** (1.19 - 18.91)	1.23 (0.44 - 3.45)	0.61 (0.15 - 2.49)	1.45 (0.53 - 3.94)
HCC score	0.61 (0.21 - 1.79)	2.02 (0.54 - 7.48)	1.23 (0.35 - 4.38)	1.15 (0.45 - 2.90)
High blood pressure/hypertension or diabetes	2.33* (0.88 - 6.17)	1.55 (0.57 - 4.20)	0.96 (0.34 - 2.66)	0.91 (0.45 - 1.87)
Any falls in past three months	3.12* (0.90 - 10.87)	5.92*** (2.65 - 13.19)	1.71 (0.60 - 4.90)	1.78 (0.75 - 4.22)
LSP provides health promotion activities	1.67 (0.53 - 5.19)	0.51 (0.15 - 1.69)	0.33** (0.12 - 0.91)	0.70 (0.24 - 2.04)
LSP provides nutrition counseling	0.60 (0.27 - 1.33)	1.15 (0.40 - 3.34)	5.59*** (1.91 - 16.38)	1.48 (0.69 - 3.15)
LSP provides nutrition screening and assessment	0.22*** (0.08 - 0.63)	0.88 (0.36 - 2.13)	0.56 (0.16 - 1.92)	0.73 (0.31 - 1.71)
LSP provides social activities	0.42 (0.12 - 1.45)	0.72 (0.21 - 2.44)	0.75 (0.17 - 3.32)	0.48 (0.15 - 1.56)
Share of population non-White is higher than median	3.23** (1.05 - 9.92)	0.61 (0.21 - 1.82)	2.88* (0.83 - 9.94)	1.77 (0.57 - 5.53)
Share of population Hispanic is higher than median	0.39 (0.13 - 1.23)	1.60 (0.45 - 5.71)	0.57 (0.20 - 1.63)	0.98 (0.31 - 3.07)
Share of housing units without access to a vehicle is higher than median	1.30 (0.41 - 4.14)	1.35 (0.39 - 4.68)	0.54 (0.15 - 1.96)	0.89 (0.31 - 2.61)
Share of families below 200% of poverty is higher than median	1.79 (0.44 - 7.31)	1.67 (0.40 - 6.99)	2.62 (0.70 - 9.77)	1.59 (0.52 - 4.88)
Has access to supermarket	1.93 (0.67 - 5.55)	1.21 (0.55 - 2.69)	0.66 (0.18 - 2.41)	1.30 (0.50 - 3.39)
Urban	4.53** (1.15 - 17.88)	3.16* (0.99 - 10.09)	1.59 (0.29 - 8.80)	2.45* (0.94 - 6.38)
Midwest	0.54 (0.16 - 1.88)	0.22** (0.06 - 0.78)	1.49 (0.41 - 5.42)	0.81 (0.25 - 2.59)
Northeast	0.12*** (0.03 - 0.59)	0.80 (0.23 - 2.82)	8.47*** (1.82 - 39.48)	0.92 (0.24 - 3.46)
West	0.08*** (0.01 - 0.49)	0.06*** (0.01 - 0.27)	0.60 (0.11 - 3.19)	0.21** (0.05 - 0.80)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.

LSP = local service provider; CI = confidence interval.

***/**/*Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table B.5. Odds ratios of participants experiencing a home health episode in the three-year period following the survey

Baseline characteristic	Year 1 OR (95% CI)	Year 2 OR (95% CI)	Year 3 OR (95% CI)	Years 1 to 3 OR (95% CI)
Age	1.13*** (1.04 - 1.23)	1.04 (0.97 - 1.11)	1.08** (1.01 - 1.16)	1.07* (0.99 - 1.15)
Female	1.32 (0.31 - 5.67)	0.93 (0.26 - 3.26)	1.82 (0.64 - 5.18)	1.67 (0.60 - 4.60)
Completed high school	0.14** (0.03 - 0.64)	1.07 (0.18 - 6.25)	0.73 (0.23 - 2.32)	0.46 (0.15 - 1.37)
Married or living with partner	0.06** (0.01 - 0.69)	0.73 (0.18 - 3.04)	0.24 (0.03 - 1.81)	0.31 (0.06 - 1.76)
Veteran	19.01*** (2.15 - 168.20)	0.49 (0.10 - 2.37)	1.65 (0.39 - 7.10)	2.93** (1.18 - 7.30)
Non-Hispanic Black	0.08*** (0.01 - 0.46)	0.91 (0.27 - 3.10)	4.52** (1.20 - 16.98)	0.69 (0.25 - 1.90)
Non-Hispanic other ^a		0.43 (0.04 - 5.17)	0.51 (0.02 - 10.65)	0.19 (0.02 - 1.73)
Hispanic	0.35 (0.05 - 2.32)	0.47 (0.03 - 6.31)	1.78 (0.13 - 25.10)	0.65 (0.14 - 2.99)
Monthly income-to-poverty lower than median ^b	2.34 (0.68 - 8.12)	1.30 (0.42 - 4.10)	0.56 (0.20 - 1.57)	1.10 (0.45 - 2.67)
Food insecure	0.80 (0.14 - 4.57)	0.77 (0.29 - 2.01)	1.69 (0.31 - 9.17)	1.31 (0.47 - 3.67)
Living alone	4.95* (0.94 - 26.15)	0.69 (0.21 - 2.22)	0.24** (0.06 - 0.92)	0.47 (0.13 - 1.76)
HCC score	0.07*** (0.01 - 0.51)	1.78 (0.40 - 7.88)	0.67 (0.32 - 1.41)	1.12 (0.42 - 2.98)
High blood pressure/hypertension or diabetes	1.62 (0.46 - 5.74)	3.89** (1.32 - 11.51)	2.26 (0.57 - 8.88)	2.19* (0.95 - 5.05)
Any falls in past three months	13.46*** (3.46 - 52.38)	4.43*** (1.53 - 12.82)	4.90** (1.47 - 16.33)	5.67*** (2.42 - 13.28)
LSP provides health promotion activities	3.94** (1.16 - 13.39)	0.67 (0.29 - 1.55)	0.29* (0.07 - 1.11)	0.70 (0.25 - 1.95)
LSP provides nutrition counseling	0.80 (0.19 - 3.41)	1.01 (0.33 - 3.05)	1.71 (0.60 - 4.82)	1.01 (0.42 - 2.46)
LSP provides nutrition screening and assessment	0.64 (0.20 - 2.12)	2.44 (0.79 - 7.56)	1.01 (0.27 - 3.78)	1.40 (0.50 - 3.89)
LSP provides social activities	0.17*** (0.05 - 0.54)	0.48 (0.18 - 1.32)	1.09 (0.14 - 8.45)	0.70 (0.22 - 2.24)
Share of population non-White is higher than median	1.55 (0.50 - 4.79)	0.48 (0.16 - 1.45)	1.14 (0.26 - 4.92)	0.65 (0.19 - 2.24)
Share of population Hispanic is higher than median	0.30* (0.07 - 1.17)	0.79 (0.23 - 2.67)	0.67 (0.23 - 2.00)	0.94 (0.31 - 2.90)
Share of housing units without access to a vehicle is higher than median	0.92 (0.23 - 3.61)	3.51* (0.87 - 14.20)	0.92 (0.25 - 3.45)	1.76 (0.65 - 4.74)
Share of families below 200% of poverty is higher than median	0.65 (0.20 - 2.16)	0.47 (0.12 - 1.80)	0.73 (0.14 - 3.82)	0.78 (0.30 - 2.01)
Has access to supermarket	2.20 (0.76 - 6.37)	0.92 (0.37 - 2.29)	1.54 (0.52 - 4.57)	0.92 (0.35 - 2.44)
Urban	1.26 (0.37 - 4.25)	1.53 (0.54 - 4.35)	0.92 (0.27 - 3.16)	1.42 (0.54 - 3.73)
Midwest	0.06*** (0.01 - 0.41)	0.42 (0.10 - 1.76)	0.72 (0.14 - 3.58)	0.49 (0.14 - 1.67)
Northeast	0.10** (0.01 - 0.69)	0.86 (0.22 - 3.30)	1.08 (0.26 - 4.49)	0.99 (0.25 - 3.98)
West	0.12** (0.02 - 0.75)		0.42 (0.10 - 1.81)	0.35 (0.09 - 1.29)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.

LSP = local service provider; CI = confidence interval.

***/**/*Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table B.6. Odds ratios of participants experiencing a skilled nursing facility admission in the three-year period following the survey

Baseline characteristic	Year 1 OR (95% CI)	Year 2 OR (95% CI)	Year 3 OR (95% CI)	Years 1 to 3 OR (95% CI)
Age	1.05 (0.97 - 1.14)	1.09** (1.02 - 1.16)	1.05 (0.96 - 1.14)	1.06 (0.99 - 1.13)
Female	0.49 (0.14 - 1.77)	0.29* (0.07 - 1.14)	0.72 (0.28 - 1.80)	0.63 (0.18 - 2.18)
Completed high school	0.26** (0.08 - 0.85)	0.86 (0.33 - 2.24)	1.72 (0.31 - 9.41)	0.59 (0.25 - 1.42)
Married or living with partner	0.81 (0.04 - 15.92)	0.34 (0.06 - 1.98)	1.39 (0.13 - 15.39)	0.80 (0.17 - 3.74)
Veteran	2.09 (0.34 - 12.91)	0.23* (0.05 - 1.04)	0.62 (0.12 - 3.29)	0.89 (0.21 - 3.70)
Non-Hispanic Black	0.13* (0.01 - 1.48)	0.06** (0.00 - 0.69)	1.80 (0.18 - 18.31)	0.20** (0.05 - 0.85)
Non-Hispanic other ^a		1.00 (0.14 - 6.92)	0.38 (0.01 - 25.40)	0.42 (0.05 - 3.26)
Hispanic	3.28 (0.79 - 13.69)	0.01*** (0.00 - 0.11)		0.47 (0.10 - 2.24)
Monthly income-to-poverty lower than median ^b	0.83 (0.29 - 2.36)	4.67*** (1.73 - 12.61)	2.63 (0.56 - 12.33)	3.38*** (1.45 - 7.88)
Food insecure	0.18 (0.01 - 2.89)	1.17 (0.41 - 3.34)	2.45 (0.58 - 10.35)	0.71 (0.24 - 2.11)
Living alone	9.70* (0.68 - 138.32)	2.02 (0.46 - 8.78)	3.02 (0.71 - 12.86)	2.92** (1.05 - 8.14)
HCC score	0.66 (0.17 - 2.50)	0.55 (0.15 - 2.06)	0.55 (0.14 - 2.23)	0.58 (0.20 - 1.62)
High blood pressure/hypertension or diabetes	2.05 (0.46 - 9.25)	0.70 (0.23 - 2.13)	2.98* (1.00 - 8.94)	1.22 (0.47 - 3.18)
Any falls in past three months	3.27** (1.16 - 9.18)	1.79 (0.69 - 4.63)	2.15 (0.66 - 7.04)	2.74** (1.11 - 6.80)
LSP provides health promotion activities	2.23 (0.49 - 10.24)	1.29 (0.38 - 4.39)	0.49 (0.12 - 2.00)	1.49 (0.51 - 4.31)
LSP provides nutrition counseling	0.48 (0.10 - 2.26)	3.65** (1.24 - 10.79)	6.18* (0.78 - 49.11)	1.31 (0.47 - 3.70)
LSP provides nutrition screening and assessment	0.24*** (0.10 - 0.58)	0.58 (0.22 - 1.54)	3.29 (0.39 - 27.66)	0.59 (0.25 - 1.40)
LSP provides social activities	1.04 (0.23 - 4.61)	0.41 (0.11 - 1.58)	0.06*** (0.01 - 0.40)	0.45 (0.16 - 1.23)
Share of population non-White is higher than median	4.29 (0.71 - 25.81)	1.36 (0.32 - 5.83)	0.68 (0.08 - 5.93)	1.26 (0.37 - 4.35)
Share of population Hispanic is higher than median	0.88 (0.27 - 2.91)	0.67 (0.19 - 2.38)	0.71 (0.17 - 3.05)	0.86 (0.33 - 2.27)
Share of housing units without access to a vehicle is higher than median	2.97 (0.53 - 16.75)	2.74* (0.84 - 9.01)	0.42 (0.09 - 2.03)	1.54 (0.65 - 3.65)
Share of families below 200% of poverty is higher than median	1.53 (0.52 - 4.52)	0.25* (0.06 - 1.06)	0.61 (0.06 - 5.93)	1.05 (0.36 - 3.07)
Has access to supermarket	0.41 (0.11 - 1.49)	1.45 (0.51 - 4.14)	1.03 (0.24 - 4.38)	0.81 (0.32 - 2.06)
Urban	0.16** (0.03 - 0.88)	0.92 (0.28 - 3.01)	1.73 (0.25 - 12.20)	0.54 (0.23 - 1.24)
Midwest	1.89 (0.33 - 10.91)	0.11*** (0.03 - 0.50)	0.47 (0.02 - 10.45)	0.41 (0.10 - 1.62)
Northeast	1.01 (0.14 - 7.32)	0.16** (0.03 - 0.77)	0.89 (0.06 - 12.42)	0.44 (0.12 - 1.54)
West	0.35 (0.07 - 1.73)	0.15** (0.02 - 0.97)		0.28** (0.08 - 0.98)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.

LSP = local service provider; CI = confidence interval.

***/**/*Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

Table B.7. Odds ratios of participants experiencing a nursing home admission in the three-year period following the survey

Baseline characteristic	Years 1 to 3 OR (95% CI)
Age	1.12*** (1.05 - 1.20)
Female	0.10*** (0.02 - 0.53)
Completed high school	0.45 (0.12 - 1.74)
Married or living with partner	0.17* (0.02 - 1.21)
Veteran	0.47 (0.08 - 2.62)
Non-Hispanic Black	0.00*** (0.00 - 0.07)
Non-Hispanic other ^a	0.70 (0.05 - 10.41)
Hispanic	0.63 (0.08 - 5.28)
Monthly income-to-poverty lower than median ^b	3.90*** (1.80 - 8.46)
Food insecure	2.52 (0.60 - 10.63)
Living alone	1.60 (0.41 - 6.21)
HCC score	0.81 (0.19 - 3.52)
High blood pressure/hypertension or diabetes	2.52 (0.75 - 8.45)
Any falls in past three months	3.79*** (1.44 - 9.97)
LSP provides health promotion activities	2.89 (0.74 - 11.26)
LSP provides nutrition counseling	1.80 (0.52 - 6.20)
LSP provides nutrition screening and assessment	0.97 (0.39 - 2.42)
LSP provides social activities	0.43 (0.10 - 1.89)
Share of population non-White is higher than median	3.54* (0.98 - 12.69)
Share of population Hispanic is higher than median	0.63 (0.24 - 1.67)
Share of housing units without access to a vehicle is higher than median	0.63 (0.14 - 2.78)
Share of families below 200% of poverty is higher than median	1.04 (0.24 - 4.49)
Has access to supermarket	1.45 (0.46 - 4.59)
Urban	0.62 (0.13 - 3.05)
Midwest	0.68 (0.15 - 3.18)
Northeast	1.11 (0.19 - 6.53)
West	0.06* (0.00 - 1.17)

Source: AoA NSP outcomes survey, 2015–2016, weighted data; AoA LSP process survey, 2014, weighted data matched to outcome survey data records.

Note: Estimates are based on an unweighted sample size of 316 congregate meal participants.
LSP = local service provider; CI = confidence interval.

***/**/* Significantly different from one at the 0.01/0.05/0.10 level, two-tailed test.

^a “Other” includes Asian, American Indian, or Alaska Native; Native Hawaiian or other Pacific Islander; and races not identified by respondents in the survey.

^b Income-to-poverty based on DHHS poverty guidelines (<https://aspe.hhs.gov/2015-poverty-guidelines>).

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