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Food insecurity and the senior-specific food security infrastructure

Kelly Stamper Balistreri
Bowling Green State University

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Author Correspondence
kellyba@bgsu.edu

University of Kentucky Center for Poverty Research
Gatton College of Business and Economics, 550 South Limestone,
234 Gatton Building, Lexington, KY, 40506-0034
Phone: 859-257-7641. E-mail: ukcpr@uky.edu

ukcpr.org

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ABSTRACT

This project explores the correlates of geographic and temporal variation in food security using data from the 2008 to 2018 Current Population Survey's Food Security Supplements. The focus is on the relationship between State-level availability and accessibility of congregate and home-delivered meal programs, as well as the Supplemental Nutrition Assistance Program (SNAP), the Senior Farmer's Market Nutrition Program(SFMNP) and the Commodity Supplemental Food Program(CSFP) on food security among lower-income households headed by older adults (ages 60 and up). Results show some evidence that a State-level food security infrastructure plays a role in the food security outcomes of households headed by older adults.

EXECUTIVE SUMMARY

Roughly five million seniors representing almost 7% of the population ages 60 and older experienced food insecurity in 2018 (Ziliak and Gundersen 2020). To address this problem, the U.S. Department of Agriculture and the U.S. Department of Health and Human Services Administration on Aging (under the Older Americans Act) support food and nutrition programs for older adults, with the combined goals of promoting health and alleviating hunger in order to help older adults remain in their homes and communities. However, the broader role of the economic, social and policy contexts in which seniors live is less understood.

Prior research has clearly demonstrated that a robust child-specific food security infrastructure— a set of nutrition programs and policies targeted toward children—helps economically vulnerable families with children remain food secure (Bartfeld and Dunifon 2006; Bartfeld and Men 2017). However, no parallel studies have investigated whether the same is true for America's seniors. Do the programs and policies designed for older adults form a similar protective barrier? The goal of the proposed project is to answer this question by exploring the role of the *senior-specific State food infrastructure* in alleviating or exacerbating food hardship among America's older adults.

Data and Methods. The data used in the current study are the 2008 through 2018 Food Security Supplement to the Current Population Survey (CPS-FSS). The CPS-FSS uses an 18-item scale to classify households as having high, marginal, low or very low food security. The unit of analysis is the household and analysis is limited to households headed by individuals age 60 and older with incomes placing them at or below 185% of the federal poverty line (FPL). The dependent variables are derived from the full set of 18 questions for households with children, and 10 questions for households without children included on the CPS-FSS: 1) *food insecure* (households with low or very low food security, assessed as three or more affirmative responses), *a*nd 3) *very low food security* (six or more affirmative responses).

Senior-specific food program participation and accessibility is measured at the State level by year and includes the SNAP participation rate among eligible older adults, the number of participants in the USDA Senior Farmers' Market Nutrition Program (SFMNP) and the Commodity Supplemental Food Program (CSFP), along with the number of congregate and home-delivered meals. Participation rates were constructed using the number of participants divided by the number of eligible seniors (at or below 185% FPL for the SFMNP and at or below 130% for the CSFP) in the State obtained from the 1% American Community Surveys (2008-2018). Congregate and home-delivered meals are expressed as the number of meals per lower-income resident ages 60 and older. These measures represent the extent to which the programs reach at-risk seniors, and are designed to capture the variation and availability of these programs.

Results. A series of logistic regression models of household food insecurity (having low or very low food security) and very low food security were estimated. The independent variables include household characteristics, contextual characteristics that vary by State and year along with State and year fixed effects. The models were estimated with robust standard errors clustered by State and were weighted with the household supplement weight.

The models yield some associations between State-level contextual characteristics and the food security status of lower income older adult households. Results showed that higher State-level rates of senior SNAP participation were associated with a reduction in food security among older adult households living in near poverty (1.0 to 1.3% FPL), and a reduction in very low food security among older adult households living in poverty. Further, State-level rates of CSFP participation were associated with a reduction in the odds of both food insecurity and very low food insecurity. Among OAA programs, more home-delivered meals distributed was associated with reduced odds of food insecurity and very low food security among poor and near-poor senior households. No associations were found between State-level rates of participation in SFMNP and the odds of food insecurity among senior households.

INTRODUCTION

Food insecurity—a lack of consistent access to adequate amounts of food—remains a reality for many older adults in the United States. Roughly 5.3 million seniors representing over 7 percent of the population ages 60 and older experienced food insecurity during 2018 (Ziliak and Gundersen 2020). Researchers have examined the individual and household correlates of food insecurity (e.g., Ziliak and Gundersen 2020), the multitude of health consequences of food insecurity (e.g., Lee and Frongillo 2001; Ziliak, Gundersen and Haist 2008), and the impact of specific assistance programs (e.g., Duerr 2006; Szanton, Samuel, Cahill, et al. 2017; Samuel, Szanton, Cahill, et al. 2017) on the food security of older adults. However, the broader role of the economic, social and policy contexts in which seniors live is less understood.

Prior research has established that State variation in the economic, social and policy environment is linked to the food security of households with children net of individual and household characteristics. Coined 'the State food security infrastructure', Bartfeld and colleagues demonstrated that a robust set of nutrition programs and economic policies targeted toward children (e.g., School Breakfast and Lunch Programs) helps financially vulnerable families with children remain food secure (Bartfeld and Dunifon 2006; Bartfeld and Men 2017). However, no parallel studies have investigated whether the same is true for America's older adults. Do the programs and policies designed for older adults form a similar protective barrier? The goal of the current study is to address this gap in the literature on food insecurity by exploring the role of the *senior-specific State food security infrastructure* in alleviating or exacerbating food hardship among America's older adults.

BACKGROUND

To address food hardship among older adults, the U.S. Department of Agriculture, Food and Nutrition Service (USDA FNS) and the U.S. Department of Health and Human Services Administration on Aging (under the Older Americans Act (OAA)) support a wide range of food and nutrition services, with the combined goals of promoting health and alleviating hunger in order to help older adults remain in their homes and communities. The primary programs under the OAA, Title III Grants for State and Community Programs on Aging, provides funding for the Congregate Meals Program and the Home-Delivered Meals programs. These programs are open to all adults' ages 60 and older but many programs also target those who are in greatest social and economic need (Administration for Community Living 2021). In 2018, these meals reached 2.4 million older adults, serving roughly 216 million meals with a majority (67%) served as home-delivered meals, and a third (33%) served as congregate meals in places such as senior centers (Administration for Community Living 2021). However, an estimated 90 percent of lower-income older adults do not receive OAA meal services (GAO 2015).

Many studies have examined the characteristics of home-delivered and congregate meal participants (e.g., Campbell, Godfryd, Buys and Locher (2015); Kowlessar, Robinson, and Schur 2015) and several have examined the impact of home-delivered and congregate meals on the food security of participants. Malbi et al. (2017) utilized a national survey of congregate and home-delivered meal participants that included a matched comparison group of program-eligible nonparticipants. Compared to the nonparticipant groups of seniors, congregate meal participants were less likely to experience food insecurity than those who did not participate in the program, yet home-delivered meal participants were more likely to experience food insecurity, underscoring the vulnerability of those participating in home-delivered meal programs. Other

localized studies suggest that congregate and home-delivered meals may contribute to increased food security among participants. Wright, Vance, Suddeth and Epps (2015) assessed the food security of a sample of Florida older adults enrolled in an OAA meal program and found that food security improved after receiving home-delivered meals. Research by Lee, Johnson and Brown (2011) compared the food security of OAA home-delivered meal participants in Georgia with those who were waitlisted for services, finding that the latter were at higher risk of food insecurity. Rates of participation in congregate and home-delivered meal programs varies across the United States. In 2018, roughly seven OAA meals were served per low-income resident ages 60 and older in Tennessee compared with fifty-eight meals in Wyoming (Author's calculations using AGID Data Portal).

While OAA program eligibility is determined by age, the Supplemental Nutrition Assistance Program (SNAP) is primarily determined by income. In FY 2018, the program served a monthly average of about 5.6 million older adults (USDA 2019) which represents an estimated 48% of the eligible older population (Cunnyngham 2021). A large number of studies (see Gregory, Rabbitt and Ribar 2016 and Hoynes and Schanzenbach 2016 for reviews) have examined the relationship between individual household SNAP benefit receipt and food insecurity but the results vary with some finding a positive association, some a negative association and some finding insignificant results (Schanzenbach 2019). Several studies have also investigated how the general availability of SNAP is associated with household food insecurity. For example, Bartfeld and Dunifon (2006) found that State-level SNAP participation rates were associated with increased food security for households with children living at incomes of near poverty (1.0 to 1.3 times the poverty line), but not for similar households living below the poverty line. However, Bernell, Weber, and Edwards (2006) found that rates of SNAP

participation at the county level were not a significant predictor of food insecurity among households in Oregon. SNAP participation among eligible older adults varies widely from State to State, ranging from a low of 22 percent (Wyoming) to a high of 78 percent (Rhode Island) (Cunnyngham 2021).

In addition to SNAP, the USDA operates the Senior Famers' Market Nutrition Program (SFMNP). The SFMNP awards grants to States to provide low-income seniors with coupons that may be exchanged for fresh and nutritious foods at farmer's markets, roadside stands and community supported agriculture programs. Low-income seniors (those ages 60 and over with households incomes at 185% or below the federal poverty level) are eligible for the program. Several localized studies have investigated the impact of SFMNP on seniors' dietary outcomes and generally find an increase in the consumption of fresh fruits and vegetables (e.g., in Seattle, WA Johnson, Beaudoin, Smith et al. 2004; in Southern Illinois, Middleton and Smith 2011; in South Carolina, Kunkel, Luccia and Moore 2003), but no study has determined the long-term implications of the SFMNP on the food security status of older adults (Wilson 2017). Funding allocated for the SFMNP varies substantially across States, as well as participation among eligible seniors. For example, in 2018, Alabama received 1.6 million dollars in funding, while California received roughly half as much at 773 thousand, and Colorado did not participate in the program at all (USDA FNS 2019).

The USDA also supports the Commodity Supplemental Food Program (CSFP) which provides supplemental food packages to lower-income older adults. In 2018, the CSFP program reached roughly 676,000 low-income seniors per month across all U.S. States and the District of Columbia, with the exception of Alabama (USDA FNS 2021). State agencies determine the eligibility of applicants and distribute the food to those seniors living at or below 130 percent of

the federal poverty level. Prior to 2014, the CSFP also served a small minority of eligible children under age 6 and pregnant, postpartum, and/or breastfeeding women, but now exclusively serves the older adult population. Prior research has centered on the characteristics of older adult CSFP recipients, finding evidence of food insecurity among a sample residing in rural Ohio (Holben, Barnett and Holcomb (2006), New Orleans (Koughan and Atkinson (1993) and Rhode Island (Khan, Schiff, and Mello (2019). AbuSabha et al. (2011) compared two groups of older adults residing in senior housing in New York State, those who received CSFP and those who were eligible but did not receive CSFP. Results showed no difference in levels of food security between seniors who participated in CSFP compared with those who did not. This study also found that CSFP recipients have similar levels of food security as seniors participating in SNAP, suggesting that for older adults, CSFP may serve as a substitute for SNAP benefits. A 2008 qualitative study highlighted the 'simplicity and accessibility' of CSFP for older adults and suggested that for many the CSFP program might serve as a conduit to other services (Finegold, Kramer, Saloner and Parnes (2008).

Studies using national data that examine food security among seniors, whether the focus is on the ameliorative impact of program participation or individual/household characteristics as determinants, have not yet fully examined the broader State-context within which older adults experience differential levels of food security. And yet, 2018 estimates of food insecurity among older adults vary among States, ranging from 2.8% in Minnesota to 14.3% in the District of Columbia (Ziliak and Gundersen 2020) suggesting that State context may matter. To more fully understand food hardship among older adults in the United States, this study draws upon a conceptual framework established by Bartfeld and Dunifon (2006) and expanded by Bartfeld and Men (2017), the *food security infrastructure*. This framework posits that while food security is

linked to a lack of economic resources, it is also influenced by a "set of programs, policies, and economic and social attributes that affect the availability, accessibility, and affordability of food and the extent to which resources are available to households" (Bartfeld and Dunifon 2006 p.923). Here the goal is to examine components of the State-level food security infrastructure that targets older adults: the availability and accessibility of federal nutrition programs for older adults funded under the OAA and the USDA, and their relationship with household food security. The expectation is that lower-income older adult households will benefit from a strong infrastructure, such that larger distributions of OAA meals and higher rates of participation among eligible older adults in USDA programs such as SNAP, CSFP and the SFMNP will be associated with better food security outcomes net of household characteristics.

DATA AND METHODS

Data. The data are from the 2008 through 2018 December Food Security Supplements to the Current Population Survey (CPS-FSS). The unit of analysis is the household, and the sample is limited to households in which the head is age 60 and older with incomes placing them at or below 185% of the federal poverty level (FPL) (N=49,369 households). The CPS data are supplemented by State characteristics obtained from a variety of sources outlined below.

Dependent Variable- Food Insecurity. The CPS-FSS uses an 18-item scale to classify households as having high, marginal, low, or very low food security. Food security is measured at the household level based on responses to a series of eighteen questions for households with children under age 18, and ten questions for household without children. Households are classified as having 'low food security' if they respond affirmatively to three or more questions and 'very low food security' if they respond affirmatively to eight or more questions for

households with children (six or more for households without children). For this analysis, a household is considered *food insecure* if they are classified as having low or very low food security.

Independent Variables of State Context

Congregate/Home Meal Programs. Two indicators are included for meals funded under the Older Americans Act by State and year: the number of congregate meals served per low-income adult ages 60 and older in the State, and the number of home-delivered meals distributed per low-income adult ages 60 and older in the State. The numerators for these measure were compiled from the Administration for Community Living Aging Integrated Database (AGID), and the denominator from the 2008-2018 1% American Community Survey. Households are defined as lower income if they have an annual income placing them at or below 185% of the federal poverty line (FPL). Although financial means tests are not permitted to participate in congregate or home-delivered meal programs, roughly a third of congregate meal participants and thirty-five percent of home-delivered meal participants had annual incomes placing them below the federal poverty line, with most of the rest having incomes placing them below 200 percent of federal poverty guidelines (Mabli et al. 2017).

SFMNP. The number of Senior Farmers' Market Nutrition Program (SFMNP) participants ages 60 and over by State and year were obtained from the SFMNP yearly profiles issued by the USDA Food and Nutrition Service. Participation rates were constructed using the number of recipients divided by the number eligible seniors (with incomes at or below 185% FPL) in the State obtained from the 2008-2018 1% American Community Survey. The SFMNP also serves several tribal governments in the Oklahoma, Michigan, New Mexico, Mississippi, and North Dakota. These counts were included in the totals for the respective States and years.

Commodity Supplemental Food Program. The number of Commodity Supplemental Food Program (CSFP) recipients were obtained from the CSFP yearly profiles issued by USDA FNS. Participation rates by State and year were constructed using the number of recipients divided by the number of eligible seniors (with incomes at or below 130% FPL) in the State obtained from the 2008-2018 1% American Community Survey.

Senior Snap Participation Rates. The availability and accessibility of SNAP for older adult households is operationalized as the estimated number of older adults who are enrolled in SNAP each month among those who are eligible, by State and year. This SNAP participation rate among seniors was collected from a variety of reports (Cronquist 2018; Cunnyngham 2021; Vigil 2019; Eslami 2015). Following Bartfeld et al. (2006), the senior SNAP participation rate is serving as a proxy for greater program accessibility with the understanding that programs such as SNAP may be more widely used by households in more need even after controlling for observable socioeconomic and demographic characteristics. This could result in biased results if there are unobserved characteristics that contribute to program participation that vary systematically across States, net of other characteristics. To address this issue, the models will control for two State-level measures of well-being, residential stability and the share of the older population living in poverty (described below), which will help to control for differences in need across States and time. There are additional programs aimed at encouraging senior SNAP participation such as the Elderly Simplified Application Project (ESAP) and Standard Medical Deduction (SMD) demonstration project. These programs are meant to streamline and encourage SNAP participation among older adults but are available only in certain States in a limited number of years so they are not included in the present analysis.

Economic and social characteristics. As a measure of cost of living that has shifted over

time and across States, the models include the share of the older population ages 60 and older that have annual incomes placing them at or below the federal poverty line. Also included is a measure of residential stability which here is considered a proxy for social support. This indicator was also obtained from the 2008-2018 1% American Community Surveys and measures the share of the population that did not change residential location in the last year.

Household characteristics. Household characteristics that have been linked to food insecurity in prior research, excluding those that are most likely to be influenced by variables in the models such as SNAP participation, are included. Measures include characteristics of the household head (educational attainment, race/ethnicity, sex, and age), household characteristics (size, housing tenure, metro status), as well as indicators of children present in the household, any household members that may be noncitizens, any household members that have a disability (including hearing, visual, cognitive, ambulatory, self-care, and independent living), as well as any employed persons in the household. Given that prior research on OAA meal clients suggests that the majority are poor or near-poor (Mabli et al. 2017), household income is used to calculate income-to-needs ratios defined as the midpoint of the household's income bin divided by the household-size and composition-specific poverty threshold for the corresponding year. Poor households are those residing at or below the federal poverty line, near-poor households reside between 1.0 to 1.3 times the poverty line, and lower-income households reside at 1.3 to 1.85% of the poverty line. Means and standard errors for all indicators are shown in Table 1.

ANALYSES

I estimate a series of logistic regression models of household food insecurity that include household characteristics, State-level characteristics, as well as year and State fixed effects. All

analyses are weighted using the household supplement weight supplied by the CPS, and standard errors are clustered at the State. Multilevel models were initially conducted to account for the non-independence of the clustered data as households are nested within States. However, the intraclass correlation coefficient in the null model was sufficiently small ($\rho = .01$) suggesting less evidence of nesting effects in the sample. Given this study spans 11 years, I follow Bartfeld and Wen (2018) and rely on within State variation to assess the association of State characteristics with household food insecurity.

RESULTS

Table 2 presents coefficients and odds ratios from the logistic regression of food insecurity (here measured as low or very low food security) for households that are headed by an older adult. Model 1 includes the full set of household characteristics. The significant predictors follow prior research indicating that lower income households, households that are renting, those headed by women, by Hispanic or Non-Hispanic Black older adults, as well as those with any children under age 18, those in which no one is employed, and those households which include any persons with a disability have higher odds of reporting food insecurity.

Model 2 includes the State-level contextual variables used to investigate the senior-specific food security infrastructure. Among those representing the accessibility and availability of select USDA sponsored food and nutrition programs, the results suggest that households in States that have higher CSFP and SNAP participation rates among eligible older adults is associated with a (marginally significant) reduction in the odds of household food insecurity. There is no evidence that higher levels of residential stability, here considered a proxy for social connectedness, or the share of older adults living in poverty at the State-level is associated with the food security of households headed by older adults. Nor is there evidence that State-level

participation rates in either the Senior Farmers Market Nutrition Program or the rates of OAA meals served has an association with household food security.

Even though the focus here is on adults residing at lower-incomes, it could be that the effects of the program characteristics vary by income. The final model tests whether State characteristics moderate the relationship between income and food insecurity. The results suggest that a higher number of home-delivered meals reduces the negative relationship between poverty and near poverty status (1.0 to 1.3 times the poverty line) and food insecurity among older adult households. This result seems consistent with the recent evidence that home-delivered meal program recipients are more likely to live at much lower incomes compared to non-participants and participants in the congregate meal program (Mabli et al. 2017). There is also evidence that higher SNAP participation rates among seniors at the State-level reduces household food insecurity among households that are living just above the poverty line in near-poverty although the impact is very small in size. Counter to expectations, the results also show that increasing residential stability is weakly associated with food insecurity among older adult households that are living in near poverty.

The analysis was repeated for the more severe condition of very low food security and the results are presented in Table 3. In the first model, the household characteristics follow a similar pattern as with food insecurity (low or very low food security). Turning to the second model and focusing on the State-level characteristics, the results show a marginal association between higher rates of CSFP participation and a reduction in the odds of very low food insecurity among older adult households. No other State-level characteristics emerged as significant predictors. The final model includes a set of interactions between State-level characteristics and income categories. Here we see that higher senior SNAP participation rates at

the State-level are associated with a reduction in the odds of very low food security among older households living at or below the poverty line. As with the broader measure of food insecurity, the results show that a higher number of home-delivered meals per low-income older adult reduces the negative relationship between both poverty, and near poverty status with food insecurity among older adult households. Contrary to expectations, the interaction model for very low food security also shows a small positive association between congregate meals with food security among poor older adult households.

In an attempt to better isolate the potential association between the senior-focused contextual characteristics and the food security status of older adult households, the analysis was repeated for households that contained only lower-income older adults, that is, all households in which residents were ages 60 and over. The results are quite similar, with higher rates of CSFP participation emerging as a significant predictor associated with a reduced odds of food insecurity for lower-income households composed of all older adults. Similarly, an increased number of home-delivered meals per lower-income older adult was associated with a reduction in the odds of food insecurity (both low/very low and very low) among all-senior households living in poverty.

DISCUSSION

This project is innovative by integrating multiple measures of contextual information that are specific to the senior population with population-based data measuring senior food hardship. This study moves beyond a singular focus on individual and household characteristics associated with food hardship by also considering how characteristics of the State-level food security may be associated with food security among older adult households. The results suggest that for

some of the poorest older adult households, the State-level accessibility of home-delivered meals and both the SNAP and CSFP programs are working to reduce food insecurity among senior households.

The importance of senior-specific meals cannot be overstated. Prior research has found that States' increased investment in home-delivered meals is associated with a decrease in the proportion of older adults requiring long-term care, and may be an especially effective way to keep seniors in the community and out of nursing homes (Thomas and Mor 2013). The finding here that the State-level participation among eligible seniors in the CSFP is associated with reduced odds of food insecurity is encouraging and supports prior research on the importance of this program for seniors. A recent study of Rhode Island seniors found that receipt of CSFP was associated with an over twenty-percent reduction in food the prevalence of food insecurity (Ba, Schiff, and Mello 2019). In a qualitative study, Finegold et al (2008) found that the CSFP served as the sole source of food assistance for many seniors and as a door to other services seniors might not otherwise access.

Limitations of this study include relatively crude measurements of OAA program participation and meal allocation at the state level. A finer grain of geographic detail of meals delivered in both the home and congregate setting might provide more accurate measures. In addition, given that this analysis was primarily investigating programs targeting older adults, this analysis does not include measures of The Emergency Food Assistance Program (TEFAP). Other costs are not measured, such as food and medical costs that may restrict older adult's ability to afford sufficient food. One measure that has the potential to address this issue is the Elder Economic Security Index which incorporates health care costs, food costs, and transportation costs to estimate the amount of income that a person or couple ages 65 and older

need to meet their basic needs (Center for Social and Demographic Research on Aging 2017). The Elder Index was not available for each state and year needed for this project, but future studies should incorporate it into examinations of geographic variation in the food security of older adults.

CONCLUSION

The findings from this study provide some evidence that context matters for older adult food security. Indeed, food security among older adult households was less likely in states that had higher senior participation in SNAP and CSFP. The results also suggest that the context matters the most for older adults living in poverty or in near poverty. For them, residing in a state that delivers more meals to more homes was associated with less food insecurity. The US population is continuing to age, and the demand for social services that help older adults avoid food insecurity is increasing. Indeed, despite the beneficial effects of these meal programs, funding often fails to keep up with demand (Kamp, Wellman, and Russel 2010).

Food and nutrition programs for children have had a remarkable impact by reducing hunger, improving nutrition intake, reducing the incidence of low birthweight, and improving children's ability to learn (see Gundersen and Ziliak 2014 for a review). The success of these programs may be attributed, at least in part, to increases in funding over time which has enabled the programs to adapt to changing need (Kamp, Wellman and Russel 2010). In 2019, funding for OAA nutrition services increased from $680 million in 2001 to $907 million in 2019. However, when adjusted for inflation, the total funding for OAA nutrition services fell by 8 percent during the same time period (Ujvari, Fox-Grage, and Houser 2019). This, combined with the fact that seniors will outnumber children in the U.S. as soon as 2035, suggest increased support for the senior-specific food security infrastructure is warranted.

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Table 1. Variable means and standard deviations for the analytic sample (N=48,369).

Household Characteristics	Mean	Std. Dev.
Food Security Status		
Food Insecure (Low or Very Low Food Security)	0.20	0.40
Very Low Food Security	0.09	0.28
Household Income		
Below poverty (< 100% FPL)	0.31	0.46
Near Poverty (100 - 130% FPL)	0.18	0.39
Lower-Income (130 to 185% FPL)	0.50	0.50
Education of Household Head		
Less than High School	0.28	0.45
High School	0.37	0.48
Some College	0.23	0.42
College Degree	0.12	0.32
Age of Household Head	71.77	7.81
Race/ethnicity of Household Head		
NonHispanic White	0.68	0.47
NonHispanic Black	0.15	0.36
Hispanic	0.12	0.32
NonHispanic Other Race	0.05	0.22
Female	0.60	0.49
Housing Tenure		
Home Owned or Being Bought	0.65	0.48
Renter	0.33	0.47
Live without paying	0.02	0.15
Size of Household	1.72	1.09
Children in HH	0.07	0.26
Any Employed in HH	0.25	0.43
Disabled Person in HH	0.50	0.50
Any Noncitizen in HH	0.06	0.23
State Level Characteristics		
Senior SNAP Recipiency Rate	37.81	13.63
Home - Delivered Meals (per population ages 60+ at or below 185% FPL)	9.07	4.21
Congregate Meals (per population ages 60+ at or below 185% FPL)	5.35	3.15
Commodity Supplemental Food Program Participants (per population ages 60+ at or below 130% FPL)	6.29	7.36
Senior Farmers Market Nutrition Program Participants (per population ages 60+ at or below 185% FPL)	5.12	5.63
Percent Nonmovers	88.69	2.37
Percent of the Older Adult Population Living in Poverty	9.56	1.65

Note: Data are from the CPS-FSS 2008- 2018 and include households headed by an older adult (ages 60 and older) with annual household incomes <= 185% FPL.

Table 2 . Logistic regression estimates of food insecurity among lower-income households headed by an older adult (N= 48,369).

	Coefficient	Std. Err.	Odds Ratio		Coefficient	Std. Err.	Odds Ratio		Coefficient	Std. Err.	Odds Ratio	
Household Characteristics												
Income												
Poverty (< 100% FPL)	0.659	0.03	1.933	***	0.658	0.03	1.930	***	0.657	0.02	1.928	
Near Poverty (100 - 130% FPL)	0.474	0.04	1.606	***	0.475	0.04	1.608	***	0.479	0.03	1.615	
ref. Lower-Income (130% - 185%FPL)												
Education												
High School Degree	-0.299	0.04	0.742	***	-0.296	0.04	0.744	***	-0.293	0.04	0.746	***
Some College	-0.143	0.04	0.867	***	-0.141	0.04	0.869	***	-0.137	0.04	0.872	**
College Degree	-0.376	0.05	0.687	***	-0.373	0.05	0.688	***	-0.373	0.05	0.689	***
ref. Less than High School												
Race/Ethnicity of Household Head												
NonHispanic Black	0.401	0.04	1.494	***	0.401	0.04	1.493	***	0.400	0.04	1.492	***
Hispanic	0.303	0.06	1.354	***	0.305	0.06	1.356	***	0.314	0.06	1.369	***
NonHispanic Other Race	0.044	0.07	1.045		0.043	0.07	1.044		0.049	0.07	1.050	
ref. NonHispanic white												
Housing Tenure												
Renter	0.611	0.03	1.843	***	0.611	0.03	1.842	***	0.612	0.03	1.844	***
Live without paying	-0.008	0.10	0.992		-0.008	0.10	0.992		-0.014	0.10	0.986	
ref. Owned or being bought												
Female	0.156	0.03	1.169	***	0.157	0.03	1.170	***	0.156	0.03	1.169	***
Household Size	0.019	0.02	1.019		0.019	0.02	1.019		0.018	0.02	1.018	
Location												
Nonmetropolitan Area	-0.061	0.04	0.941		-0.063	0.04	0.939		-0.067	0.04	0.935	
Unidentified	-0.081	0.13	0.922		-0.058	0.14	0.944		-0.073	0.14	0.930	
ref. Metropolitan Area												
Any children in household	0.419	0.07	1.520	***	0.423	0.07	1.526	***	0.422	0.07	1.525	***
Any employed in household	-0.192	0.04	0.825	***	-0.192	0.04	0.826	***	-0.195	0.04	0.823	***
Any disabled in household	0.617	0.03	1.854	***	0.617	0.03	1.854	***	0.619	0.03	1.857	***
Any noncitizen in household	-0.151	0.07	0.860	*	-0.163	0.07	0.850	*	-0.165	0.07	0.848	*

Table 2 continued. Logistic regression estimates of food insecurity among lower-income households headed by an older adult (N= 48,369).

State-Level Characteristics

Senior SNAP Recipiency Rate					-0.004	0.00	0.996	#	-0.002	0.00	0.998	
Home -Delivered Meals (per lower-income population ages 60+)					0.001	0.01	1.001		0.016	0.01	1.016	
Congregate Meals (per lower-income population ages 60+)					-0.018	0.02	0.983		-0.020	0.02	0.981	
Commodity Supplemental Food Program Participants (per population ages 60+ at 130% FPL)					-0.011	0.01	0.989	#	-0.012	0.01	0.988	*
Senior Farmers Market Nutrition Program Participants (per population ages 60+ at 185% FPL)					0.003	0.01	1.003		0.001	0.01	1.001	
Percent Nonmovers					0.005	0.01	1.005		-0.003	0.01	0.997	
Percent of the Older Adult Population Living in Poverty					0.054	0.03	1.056		0.004	0.02	1.004	
Interactions of State Characteristics and Poverty												
Poverty * Senior Snap Recipiency Rate									-0.003	0.00	0.997	
Poverty * Home-Delivered Meals									-0.023	0.01	0.977	**
Poverty * Congregate Meals									-0.001	0.01	0.999	
Poverty * CSFP									0.005	0.00	1.005	
Poverty * Senior Farmers Market Nutrition Program									-0.003	0.01	0.997	
Poverty * Percent Nonmovers									-0.009	0.01	0.991	
Poverty * Percent of the Older Adult Population Living in Poverty									0.004	0.02	1.004	
Near Poverty * Senior Snap Recipiency Rate									-0.004	0.00	0.996	*
Near Poverty * Home-Delivered Meals									-0.021	0.01	0.980	**
Near Poverty * Congregate Meals									0.000	0.00	1.000	
Near Poverty * CSFP									0.000	0.01	1.000	
Near Poverty * Senior Farmers Market Nutrition Program									0.006	0.01	1.006	
Near Poverty* Percent Nonmovers									0.039	0.01	1.040	**
Near Poverty * Percent of the Older Adult Population Living in Poverty									-0.013	0.02	0.987	
Intercept	-6.44	1.47	0.002	*	-6.72	1.82	0.001	**	-6.46	1.95	0.002	**
Log-Likelihood Chi Square(df)	14808718(29)				14840358(36)				14930696(49)			

*p <.001, **p <.01, *p <.05, #p <.10

Note. Models also include age and age-squared of household head, plus year and state fixed-effects. Household-level FSS supplement weights were applied. Lower-income households are defined as those having annual income <=185% FPL.

Table 3. Logistic regression estimates of very low food security among lower-income households headed by an older adult (N= 48,369).

	Coefficient	Std. Err.	Odds Ratio		Coefficient	Std. Err.	Odds Ratio		Coefficient	Std. Err.	Odds Ratio	
Household Characteristics												
Income												
Poverty (< 100% FPL)	0.766	0.05	2.15	***	0.764	0.05	2.15	***	0.766	0.04	2.151	
Near Poverty (100 - 130% FPL)	0.526	0.06	1.69	***	0.527	0.05	1.69	***	0.532	0.04	1.703	
Education												
High School Degree	-0.204	0.05	0.82	***	-0.203	0.05	0.82	***	-0.204	0.05	0.815	***
Some College	0.008	0.06	1.01		0.009	0.08	1.01		0.009	0.08	1.009	
College Degree	-0.193	0.08	0.82	*	-0.192	0.10	0.83	#	-0.193	0.10	0.825	*
Race/Ethnicity of Household Head												
NonHispanic Black	0.168	0.06	1.18	***	0.168	0.06	1.18	***	0.171	0.07	1.186	**
Hispanic	0.020	0.08	1.02		0.022	0.08	1.02		0.032	0.11	1.032	
NonHispanic Other Race	-0.029	0.09	0.97		-0.028	0.09	0.97		-0.027	0.13	0.974	
Housing Tenure												
Renter	0.600	0.04	1.82	***	0.599	0.04	1.82	***	0.068	0.04	1.070	***
Live without paying	0.116	0.13	1.12		0.116	0.13	1.12		-0.047	0.03	0.955	
Female	0.066	0.04	1.07	#	0.068	0.04	1.07	#	0.068	0.04	1.070	#
Household Size	-0.047	0.03	0.95	#	-0.047	0.03	0.95	#	-0.047	0.03	0.954	#
Location												
Nonmetropolitan Area	-0.093	0.05	0.91		-0.095	0.05	0.91		-0.097	0.05	0.907	
Unidentified	-0.376	0.19	0.69		-0.341	0.20	0.71		-0.354	0.20	0.702	
Any children in household	0.165	0.10	1.18	***	0.165	0.10	1.18	***	0.166	0.10	1.181	
Any employed in household	-0.175	0.06	0.84	***	-0.175	0.06	0.84	***	-0.177	0.06	0.838	**
Any disabled in household	0.665	0.04	1.95	***	0.664	0.04	1.94	***	0.665	0.04	1.945	***
Any noncitizen in household	-0.203	0.10	0.82	*	-0.203	0.10	0.82	*	-0.210	0.10	0.810	*

Table 3 continued. Logistic regression estimates of very low food security among lower-income households headed by an older adult (N= 48,369).

State-Level Characteristics

Senior SNAP Recipiency Rate	-0.002	0.00	1.00	0.001	0.00	1.001
Home -Delivered Meals (per lower-income population ages 60+)	-0.008	0.01	0.99	0.011	0.02	1.011
Congregate Meals (per lower-income population ages 60+)	-0.032	0.02	0.97	-0.042	0.02	0.959 *
Commodity Supplemental Food Program Participants (per population ages 60+ at 130% FPL)	-0.021	0.01	0.98 #	-0.021	0.01	0.979 *
Senior Farmers Market Nutrition Program Participants (per population ages 60+ at 185% FPL)	0.002	0.01	1.00	-0.001	0.01	0.999
Percent Nonmovers	-0.003	0.02	1.00	-0.019	0.03	0.981
Percent of the Older Adult Population Living in Poverty	0.040	0.04	1.04	0.034	0.04	1.035
Interactions of State Characteristics and Poverty						
Poverty * Senior Snap Recipiency Rate				-0.006	0.00	0.994 *
Poverty * Home-Delivered Meals				-0.029	0.01	0.972 **
Poverty * Congregate Meals				0.025	0.01	1.025 *
Poverty * CSFP				0.001	0.00	1.001
Poverty * Senior Farmers Market Nutrition Program				-0.004	0.01	0.996
Poverty * Percent Nonmovers				0.020	0.02	1.021
Poverty * Percent of the Older Adult Population Living in Poverty				0.011	0.02	1.011
Near Poverty * Senior Snap Recipiency Rate				-0.001	0.00	0.999
Near Poverty * Home-Delivered Meals				-0.026	0.01	0.975 **
Near Poverty * Congregate Meals				0.000	0.01	1.000
Near Poverty * CSFP				0.000	0.01	1.000
Near Poverty * Senior Farmers Market Nutrition Program				0.009	0.01	1.009
Near Poverty* Percent Nonmovers				0.027	0.02	1.027
Near Poverty * Percent of the Older Adult Population Living in Poverty				-0.001	0.02	0.999
Intercept	-5.684	2.11	0.00 *	-5.821	2.27	0.00 *	-4.25	3.01	0.014
Log-Likelihood Chi Square(df)	7686607.9(31)			7708682.9 (37)			7758951(49)		

*p <.001, **p <.01, *p <.05, #p <.10

Note. Models also include age and age-squared of household head, plus year and state fixed-effects. Household-level FSS supplement weights were applied. Lower-income households are defined as those having annual income <=185% FPL.