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# Food Security and Food Access Among Emergency Food Pantry Households

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By James Mabli and David Jones, Mathematica Policy Research

## Abstract

This study characterizes the food security and food access of households that receive food from emergency food pantries. Unlike other analyses of food access that focus exclusively on retail food stores, this study considers access to emergency food pantries as well. It finds that at least 50 percent of emergency food pantry households have access to a pantry and at least 45 percent of pantry households have access to a supermarket or superstore authorized to accept Supplemental Nutrition Assistance Program (SNAP) benefits within 0.6 miles of where they live. The study also finds that food pantry households with greater access to emergency food pantries are less likely to be food insecure. The corresponding relationship of household food insecurity with access to retail food establishments is weak and not statistically significant. The relationship between access to emergency food pantries and household food security holds for many subgroups of interest to social welfare policy officials, including households with children and households with income below the Federal poverty threshold, but not the complements of these subgroups, such as households without children and households with income at or above the poverty threshold.

**Keywords:** Food security, emergency food pantries, food access, food deserts, GIS, spatial analysis, Supplemental Nutrition Assistance Program, SNAP, food stamps, FANRP

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Submitted to:  
USDA, ERS  
Food Economics Division  
355 E Street, SW  
Washington, DC 20024-3221  
Project Officer: Phil Kaufman

Submitted by:  
Mathematica Policy Research  
955 Massachusetts Avenue  
Suite 801  
Cambridge, MA 02139  
Telephone: (617) 491-7900  
Facsimile: (617) 491-8044  
Project Director: James Mabli

## **Food Security and Food Access among Emergency Food Pantry Households**

Final Report

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James Mabli  
David Jones



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## EXECUTIVE SUMMARY

### What Is the Issue?

Household food security measures whether a household has adequate access to enough food for an active, healthy lifestyle. In contrast to physical access to food which focuses on where a household can go to obtain food and how it can get there, food security measures access in terms of whether a household has resources available to obtain food. These concepts are determined by different characteristics of households and of the environment in which households obtain food. Access to food depends on the number and type of retail food stores located in the area in which a household lives or work and a household's ability to travel to these places, such as whether it uses a vehicle, public transportation, or bikes or walks. Food security, on the other hand, depends mostly on the household's economic access to food, based on available resources for food, such as income and food or nutrition assistance, and the set of prices (relative affordability) of food and non-food items in the area in which it lives or works.

To inform the development of policies and programs designed to improve the food security of low income households, the extent of food access and prevalence of food insecurity has been assessed by policymakers and policy researchers. Under the directive of the U.S. Congress in the 2008 Farm Bill to assess the extent of food deserts—predominately low-income areas that have limited access to healthful, affordable food—the Economic Research Service (ERS), USDA, published a comprehensive review of published research, a discussion of new empirical work, an accounting of the many methods and data used to examine food access, and conducted its own empirical work (ERS 2009). To assess food insecurity, ERS has published annual estimates of the number of food insecure households for over fifteen years and ERS researchers have examined how household food security status differs across households with different characteristics in order to better understand who is likely to be food insecure.

This study characterizes the food security of an important subgroup of low income households—those that receive food from emergency food pantries. Unlike other analyses of food access which focus exclusively on retail food stores, it considers access to emergency food pantries as well. Given that the number of pantries and emergency food pantry client households experienced a sizable increase over the last ten years (Mabli et al. 2010), this is an important contribution to the literature assessing low income households' access to food because it provides a more comprehensive depiction of the environment in which food is purchased and acquired. The study examines access to retail food stores and to emergency pantries for all pantry households, and for groups of households with selected characteristics such as income level and household composition. It also examines how households' food security status is associated with varying levels of access to retail and emergency food. The findings from this study contribute to the continued assessment of food access limitations and food security among low income households.

### What Did the Study Find?

At least 50 percent of emergency food pantry households have access to a pantry within 0.6 miles of where they live and at least 75 percent have access to a pantry within 1.4 miles. At least 75

percent of pantry households have access to a food retailer within 0.6 miles of where they live and at least 90 percent have access to a food retailer within 1.4 miles.<sup>1</sup> Fewer households have a supermarket or superstore within close proximity (0.6 miles), though. The percentage of pantry households without access to a supermarket or superstore ranges from 55 percent when identifying stores within 0.6 miles of the household's residential location to 18 percent within 1.4 miles of the household's location. In terms of composition of stores, supermarkets and superstores make up 8 percent of food retailers within 0.6 miles of a household's location and 14 percent within 1.4 miles. The percentage of retailers that are convenience stores, however, is about 33 percent in both of these areas. Finally, access to pantries and food retailers differs only marginally by characteristics of emergency food pantry households.

Food pantry households with greater access to emergency food pantries are less likely to be food insecure. An additional emergency food pantry in an area is associated with a 0.4 percentage point decrease in the probability of a household being food insecure. The corresponding relationship of household food insecurity with access to retail food establishments is weak and not statistically significant. Thus, compared to food insecure pantry households, food secure households have similar levels of access to retail food stores, but greater access to emergency pantries. In addition, there is no observed association between access to emergency food programs and very low food security (a severe range of food insecurity); access to both retail and emergency food for these households is similar to that for households with higher food security.

The relationship between access to emergency food pantries and household food security holds for many subgroups of interest to social welfare policy officials. These include households with children, households with income below the federal poverty threshold, households living in metropolitan areas, and households not participating in the Supplemental Nutrition Assistance Program (SNAP). There is no relationship between access to pantries and food security for the complements of these subgroups, such as households without children, households without elderly members, and so on.

## **How Was the Study Conducted?**

Data for this study come from three main sources: (1) the 2009 Hunger in America (HIA) survey of emergency food clients and emergency food programs, conducted between February and May 2009 by Mathematica Policy Research for Feeding America; (2) the 2009 Store Tracking and Redemption System (STARS) national database of SNAP-authorized retailers; and (3) the 2005–2009 American Community Survey (ACS) U.S. Census Bureau geographic boundaries and population characteristics summary file. The HIA survey provides detailed information about pantry clients' demographic, economic, and household characteristics; food security status; participation in food and nutrition assistance programs; and residence in zip code areas. Household residential zip codes were linked to locations of emergency food pantries from the HIA survey and locations of SNAP-authorized food retailers in the STARS database. The U.S. Census Bureau boundary files were used to help construct food access measures, and the corresponding ACS data files provided the population characteristics of the areas in which households live.

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<sup>1</sup> The set of food retailers examined in this study includes only those that are authorized to accept Supplemental Nutrition Assistance Program benefits.

In order to study food access, we need geography-based data on retail establishments, emergency food pantries, and population characteristics. We geo-coded street addresses of retail food establishments and emergency food pantries in 47 states and the District of Columbia and linked these to pantry client household records in the HIA data.

In contrast to numerous food access studies which define access using *potential* access areas, this study used a measure based on *realized* food access to examine food access and its relationship with household food insecurity. Potential access areas measure where consumers could *possibly* shop, and are typically defined using a radius that approximates a reasonable distance to travel to acquire food. The definition of an area can be informed, for example, by external studies based on surveys that asked consumers how far they travel to obtain food. Realized food access areas, on the other hand, measure where consumers *actually* shop and typically use information from the study sample to define access areas (USDA 2009). Food access is measured using the number of stores and pantries in the area in which a household lives. The current study defines several measures of food access using the distance from the household location to the street address of the emergency food pantry at which the household was interviewed.

This report includes descriptive tables examining distributions of emergency food pantries and retail food establishments in the areas in which pantry households live; it also includes multivariate regression models to estimate the relationship between access to pantries and food retailers and the likelihood that a household is food insecure. The econometric models were re-estimated to test the sensitivity of the findings to various subgroups of the population including whether a household has children; whether there is an elderly member in the household; whether the household lives in a metropolitan area; whether the household has income below the federal poverty threshold; and whether the household participates in federal food assistance programs.

## I. INTRODUCTION AND STUDY OVERVIEW

Improving food access and food security of low income households are important policy goals. Amid growing concerns about the existence of food deserts, defined in the 2008 Farm Bill as areas in the United States with limited access to affordable and nutritious food, particularly such areas composed of predominantly lower income neighborhoods and communities, the U.S. Congress directed the Economic Research Service (ERS) of the USDA to conduct a one year assessment of the extent of food access limitations. The result was a comprehensive review of published research, presentation of new empirical work, and discussion of the many methods and data used to examine food access limitations. The importance of improving food security as a policy goal is reflected in the design and administration of Federal food assistance programs such as the Supplemental Nutrition Assistance Program (SNAP), and community based programs that make up a vast network of emergency food providers. The prevalence of food security is assessed annually by ERS using the Current Population Survey's Food Security Supplement. In addition, ERS and other policy researchers have examined household characteristics by household food security status in order to understand better which households are more likely to be food insecure.

This study characterizes the food access and food security of an important subgroup of low income households—those that receive food from emergency food pantries. It uses data collected during the height of the 2009 recession and considers access to retail food stores and emergency food pantries. Given that the numbers of emergency food pantries and pantry client households experienced sizable increases over the last ten years (Mabli et al. 2010), this is an important contribution to the literature assessing low income households' access to food because it provides a more comprehensive depiction of the environment in which food is purchased and acquired. This study examines access to retail food stores and to emergency pantries for all pantry households, as well as by households with selected characteristics such as income level and household composition. It also examines how pantry households' food security status is associated with varying levels of access to retail and emergency food.

The study used three main data sources: (1) the 2009 Hunger in America (HIA) survey of emergency food programs and clients, (2) the 2009 Store Tracking and Redemption System (STARS) national database of SNAP-authorized retailers, and (3) the 2005-2009 American Community Survey (ACS) U.S. Census Bureau geographic boundaries and population characteristics summary file. The HIA survey provided the locations of emergency food programs and provided client household-level information on food security and demographic and economic characteristics. The STARS database provided the locations of retail food establishments authorized to accept SNAP benefits. The U.S. Census Bureau boundary files helped to define the geographic food access areas, and the corresponding ACS data files provided the population characteristics for each of the boundaries.

We describe these data sources, the construction of the analysis file, and the study's methodology in Chapter II. We present analysis findings for the study of economic access in Chapter III and findings for the study of food security and food access in Chapter IV. In Chapter V we summarize the results and discuss limitations of the study.

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## II. DATA AND METHODOLOGY

### A. Introduction

The sample for analysis consists of households receiving emergency food from a pantry. Thus, all households have some level of access to emergency food pantries, but the extent of the access can differ in terms of the distance to program sites and the number of program sites in the area. This chapter describes each of the data sources and how they were used to construct an analysis file. It also describes the descriptive and multivariate methodology used in the analysis.

### B. Data Sources

In this section we describe the three data sources used to create the analysis file: (1) the 2009 Hunger in America (HIA) survey of emergency food programs and client households, (2) the 2009 Store Tracking and Redemption System (STARS) national database of SNAP-authorized retailers, and (3) the 2005-2009 American Community Survey (ACS) U.S. Census Bureau geographic boundaries and population characteristics summary file.

#### 1. Hunger in America 2009

HIA 2009 is a nationally representative survey of emergency food clients and emergency food programs conducted between February and May 2009 by Mathematica Policy Research for Feeding America.<sup>2</sup> The 2009 HIA data consist of program- and client-level data from 185 food banks in the United States covering all or part of 47 states and the District of Columbia.<sup>3</sup> Connecticut, Oregon, and Montana, as well as select counties in various states, were not represented by participating food banks in the survey.

**Program data.** Each food bank provided the locations (street address and zip code) and the type of program (pantry, kitchen, or shelter) for all emergency food programs and nonemergency food programs to which they distribute food.

The first step in constructing an analysis file for this study was to compile a list of emergency and nonemergency food programs. We later use this list to measure household access to emergency food. Next, we excluded all nonemergency programs. These programs have a primary purpose other than emergency food distribution, though they also distribute food. Examples include day care programs, senior congregate feeding programs, and summer camps.

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<sup>2</sup> The survey was nationally representative of all households receiving food from emergency food pantries in Feeding America's network of emergency providers.

<sup>3</sup> These data include food rescue organizations, as well. These are nonprofit organizations that obtain mainly prepared and perishable food products from groceries, farmers, warehouses and distributors, as well as from food service organizations, such as restaurants, hospitals, caterers, and cafeterias, and distribute to agencies that serve clients. In 2009, there were 205 food banks in the Feeding America network. These make up most of the food banks in the country.

Out of the three types of emergency food programs (pantries, kitchens, and shelters), we focused only on emergency food pantries. Only emergency food pantries offer food in a similar form (such as a bag of groceries) to that which supermarkets, groceries, and other stores provide. Pantries are also the most common program, making up about 71 percent of all emergency food programs in the Feeding America network. Finally, the unit of observation for clients at pantries is the household, which more closely aligns with the unit of observation in the food security module in the HIA survey as well as with the standard SNAP unit. Indeed, analyses of the overlap between federal food assistance and private food assistance have focused almost exclusively on pantry food use.<sup>4</sup>

The final step in constructing the list of emergency food pantries was to remove duplicate entries, invalid addresses, and pantries with incomplete address information, giving us a final set of 28,812 unique emergency food pantries.<sup>5</sup> We geocoded the addresses for this set of pantries and defined food access measures. The construction of these measures is described in more detail later in this chapter.

**Client data.** The HIA 2009 included a separate client-level sampling design. A set of programs (pantries, kitchens, and shelters) was sampled using probabilities proportional to a measure of size based on reported poundage distributions as the measure of size; that is, large programs had greater probabilities of selection. Clients were randomly sampled at these program sites on chosen interview days. Survey respondents included households attending pantries, adults attending kitchens, and adults attending shelters. (The survey unit differed by program type: Household was the unit for pantries, and individual was the unit for kitchens and shelters.) However, as with the program location data, we use only pantry households for this study. In section D we discuss the sample sizes used in the analysis.

The client survey data contain the zip code of the client household and the street address and zip code of the program site where the interview was conducted. In addition to the location data, the survey collected detailed information about clients' demographic, economic, and household characteristics; food security status; participation in food and nutrition assistance programs; and frequency of use of emergency food programs. Section C discusses the definitions of food access measures and the descriptions of the set of client-level variables used in the analysis of household food insecurity.

## 2. Store Tracking and Redemption System (STARS) 2009

STARS is the national database of SNAP-authorized retailers, maintained by USDA, Food and Nutrition Service (FNS). FNS uses STARS for retailer authorization, monitoring, and investigation. It contains records for nearly 200,000 SNAP-authorized retailers at a point in time. The retailer information originates in the SNAP retailer application process and includes firm name, type, location, and monthly SNAP redemptions. For this study we used only the firm type and location.

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<sup>4</sup> Several examples include Duffy et al. (2007); Bhattarai et al. (2005); Bartfeld (2003); and Daponte (2000).

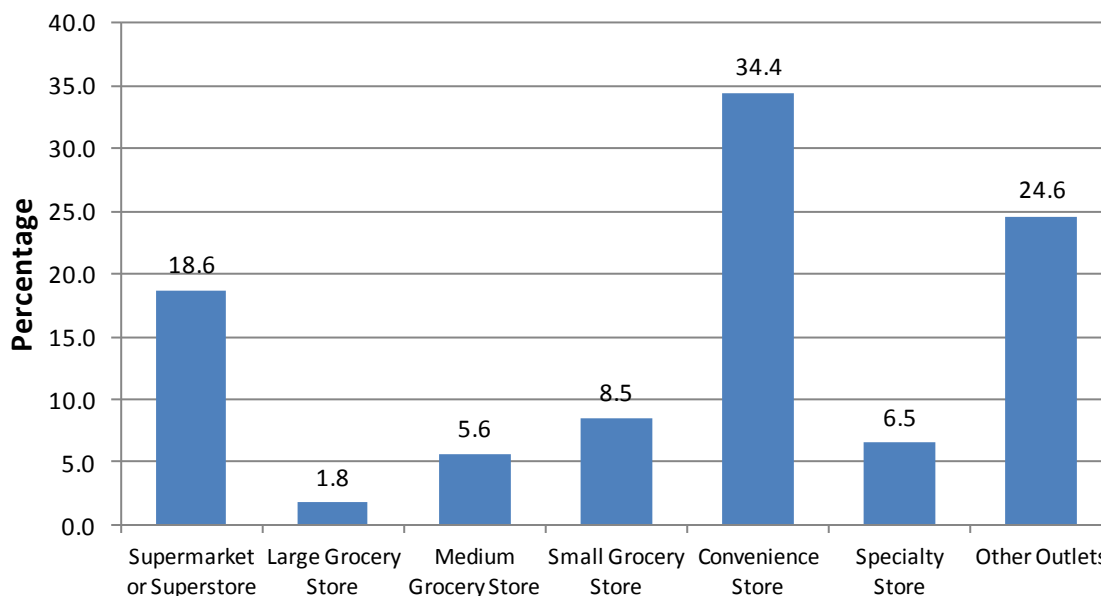
<sup>5</sup> The 28,812 pantries do not include all pantries in the Feeding America network. For example, it does not reflect pantries operated by agencies that chose not to participate in the Hunger in America survey. In addition, this excludes mobile pantries that distribute food to clients using a dry or refrigerated vehicle in an organized format managed either by a food bank or agency staff.



Firm type includes 27 categories and was self-reported by retailers until 2009, when FNS began coding this item to ensure consistency. Firm types include retailers (supermarkets and superstores; small, medium-size, and large grocery stores; specialty stores; convenience stores; farmers' markets, and so on) and meal services (meal delivery services; homeless services; and treatment facilities).

We obtained STARS records for all retailers authorized at any time during calendar year 2009. Figure II.1 presents the distribution of store types. Supermarkets or superstores make up 18.6 percent of all SNAP retailers, while large, medium, and small grocery stores make up 1.8, 5.6, and 8.5 percent, respectively. Convenience stores make up the largest percentage (34.4 percent). The remaining stores are grouped into two types: specialty food stores (stores selling specialty items such as baked goods or bread; fruits or vegetables; meat or poultry products; or seafood products) and other outlets (combination grocery/other stores, delivery routes, farmers' markets, nonprofit food buying cooperatives, wholesalers, or meal service providers). Specialty food stores make up 6.5 percent of retailers, and other outlets make up 24.6 percent.

**Figure I.1. Calendar Year 2009 Distribution of SNAP Retailers**



Source: STARS 2009 data.

Notes: "Specialty food stores" comprise stores classified as selling one of the following specialized items: baked goods/bread, fruits/vegetables, meat/poultry products, or seafood products.

"Other outlets" comprise stores classified as a combination grocery/other store, delivery route, farmers' market, nonprofit food buying cooperative, wholesaler, or meal service provider.

Data excludes stores located in Oregon, Montana, Connecticut, Guam, and the Virgin Islands and stores with incomplete street address information.

### 3. American Community Survey 2005–2009

Five-year data from the ACS were used to obtain local-area population characteristics for several Census tracts. Because tracts are considered to be small census geographies, the Census Bureau aggregated data over five years (2005 to 2009). These data contain population characteristics for 2005 to 2009 for all census tracts in the United States. Section C discusses the ACS variables used in the analyses.

## C. Construction of Analysis File

To examine the relationship between household food security and access to emergency food pantries and retail food establishments, we first identified the locations of pantries and food retailers using address information. Next, we established boundaries of the geographic areas over which we measure the food access variables and counted the number of pantries and food retailers in those areas. We also obtained data on the characteristics of the population living in those areas. We then combined the three data sources (pantries, food retailers, local population characteristics) into a final analysis file and linked these data to the client household file by household residential zip code. In this section we summarize the construction of the analysis file, describe the areas used as the unit of analysis, and define all key variables.

### 1. Mapping Addresses of Emergency Food Pantries and Retail Food Establishments

To construct the food access measures, we began with the 28,812 unique pantries in the HIA data file and located each pantry to the appropriate point on the map. We located the pantries using the geocoding tool in version 10 of ESRI ArcMap software. This process converted the address information contained in the HIA data to latitude and longitude coordinates and stored them in a newly created file. Pantries that either did not match to a point on a map or offered a post office box address in place of a street address were matched to the population-weighted centroid of their zip codes. The centroids represent the center of the population for the zip code and therefore, approximate the most likely location of the pantry within the zip code. We located 24,256 of the 28,812 pantries with their street location on a map (roughly 85 percent). The remaining 4,556 unmatched addresses and post office boxes were located with their zip code centroids. Appendix A describes the geocoding process for pantries; match rates are presented in Table A.1.

We located each food retailer to a point on the map by applying the same methodology used in locating the pantries. After omitting six records with incomplete street address information and establishments in counties, states, and territories for which we did not have HIA data (Connecticut, Oregon, Montana; Guam and the Virgin Islands; and select counties in various states), the final file contained 176,180 retail food establishments. We located 97 percent of stores to their street location on a map and located the remaining 3 percent of unmatched addresses with their zip code centroids.<sup>6</sup>

The final step was to use a tool in ArcMap that summed the number of pantries in each geographic area. (We define several food access areas in the next section.) Analogously, we counted

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<sup>6</sup> Appendix A details the geocoding process for retail food establishments and summarizes the match rates.

the number of food retailers, both overall and by store type, in each geographic area using a tool in ArcMap. We discuss the distribution of pantries and food retailers per access area below.

## 2. Mapping Household Locations

Pantry households surveyed by HIA are identified geographically by ZIP code of residence. To determine the location of the household, we identified the population-weighted centroid of the zip code in which the household lives.<sup>7</sup> Because the survey data do not include the household street address, the population-weighted centroid is the best approximation of where the household is likely to live. We use the centroid location to define an area around the household for which we measure food access and population characteristics.

## 3. Defining Food Access

When defining households' access to food, studies typically use a measure of "potential" access—an area where consumers could possibly shop—by defining an area around the household's location (USDA 2009). The area is defined by a radius that approximates a reasonable travel distance. An alternative way to define access is to use a measure of "realized" access—an area in which consumers actually shop (USDA 2009). The definition of realized access may be informed by surveys that asked consumers how far they travel to obtain food.

In the current study, we define realized access as the distance from the household location to the street address of the emergency food pantry at which the household was interviewed. Because households may travel farther to obtain free food than purchased food, we believe this distance can serve as an upper bound on the distance households would travel to obtain food from supermarkets, groceries, and other food retailers.<sup>8</sup>

Rather than allow the size of the access area to differ for each household, our analysis applies a single radius to define the food access area for all households. To obtain the food access radius, we estimated the sample distribution of the distance from the population-weighted centroid of each household's residential zip code to the pantry street address at which the household was interviewed. We then selected various percentile distances from this distribution (25th, 50th, and 75th) and defined food access areas around the population-weighted centroid of each household's residential zip code using these distances as radii. To define an access area based on the median distance, for example, we drew a circle with a radius equal to the median distance around each household's population-weighted centroid and counted the number of food retailers and pantries in that area.

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<sup>7</sup>Population-weighted centroids were obtained by performing a query at <http://mcdc.missouri.edu/websas/geocorr2k.html>. We selected census blocks (smallest census geography as the "source," zip codes as the "target," and "population 2000" as the weighted variable) and requested that weighted centroids be calculated and kept on the output file. For household zip codes without a match to a population-weighted centroid, we used a geographic centroid of the zip code in place of a population-weighted centroid. We relied on data obtained from [http://mcdc2.missouri.edu/cgi-bin/broker?\\_PROGRAM=websas.uex2dex.sas&\\_SERVICE=appdev9&path=/pub/data/georef&dset=zipcodes&view=0](http://mcdc2.missouri.edu/cgi-bin/broker?_PROGRAM=websas.uex2dex.sas&_SERVICE=appdev9&path=/pub/data/georef&dset=zipcodes&view=0).

<sup>8</sup>An economic model may predict that households are willing to travel farther to obtain food at lower prices. We acknowledge, however, that preferences also play a role. For example, a household may travel farther to shop at a store with a greater variety of fruits and vegetables or organic food.

Using a single radius for all sample members to define an access area has two advantages relative to allowing the access area to differ by household. First, it avoids the computational burden associated with defining household-specific access areas using GIS software. Second, it reduces measurement error compared with defining the true distance between the household's exact street address and the pantry address, because approximating household locations using population-weighted centroids will be over- and underestimated across the sample. Because we use a single radius for all household members, our measure is technically a cross between a potential and realized access measure. It resembles a potential access measure because it is not the true distance that *each* household travels for food; it more closely resembles a realized access measure because it is based on actual travel behavior. Our measure is a marked deviation from the ways in which food access areas are typically defined using out-of-sample data from studies of low-income household shopping patterns. For example, using National Food Stamp Program Survey data collected in 1996, Ohls et al. (1999) found that the average distance to the nearest supermarket was 1.8 miles for SNAP participants. Using electronic benefit transfer data from Maryland, Cole (1997) found that the average distance to redeem SNAP benefits was 2.7 miles. While researchers can use these out-of-sample data to define food access measures, defining access using data from the actual sample and a more current time period provides a better characterization of true access given how much the food retailer landscape has changed over the past fifteen years.

Table II.1 presents the distribution of food access distances. The median distance that households travel to a pantry is 1.44 miles. Ten percent of households travel at most about a quarter mile to receive food from the pantry, and 25 percent travel at most just over a half mile (0.61 miles). At the upper end of the distribution, 25 percent of households travel at least 3.65 miles, and 10 percent of households travel more than 8.02 miles.<sup>9</sup> Complementing Table II.1, Figure II.1 plots the distance distribution with three vertical lines denoting the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles from Table II.1.

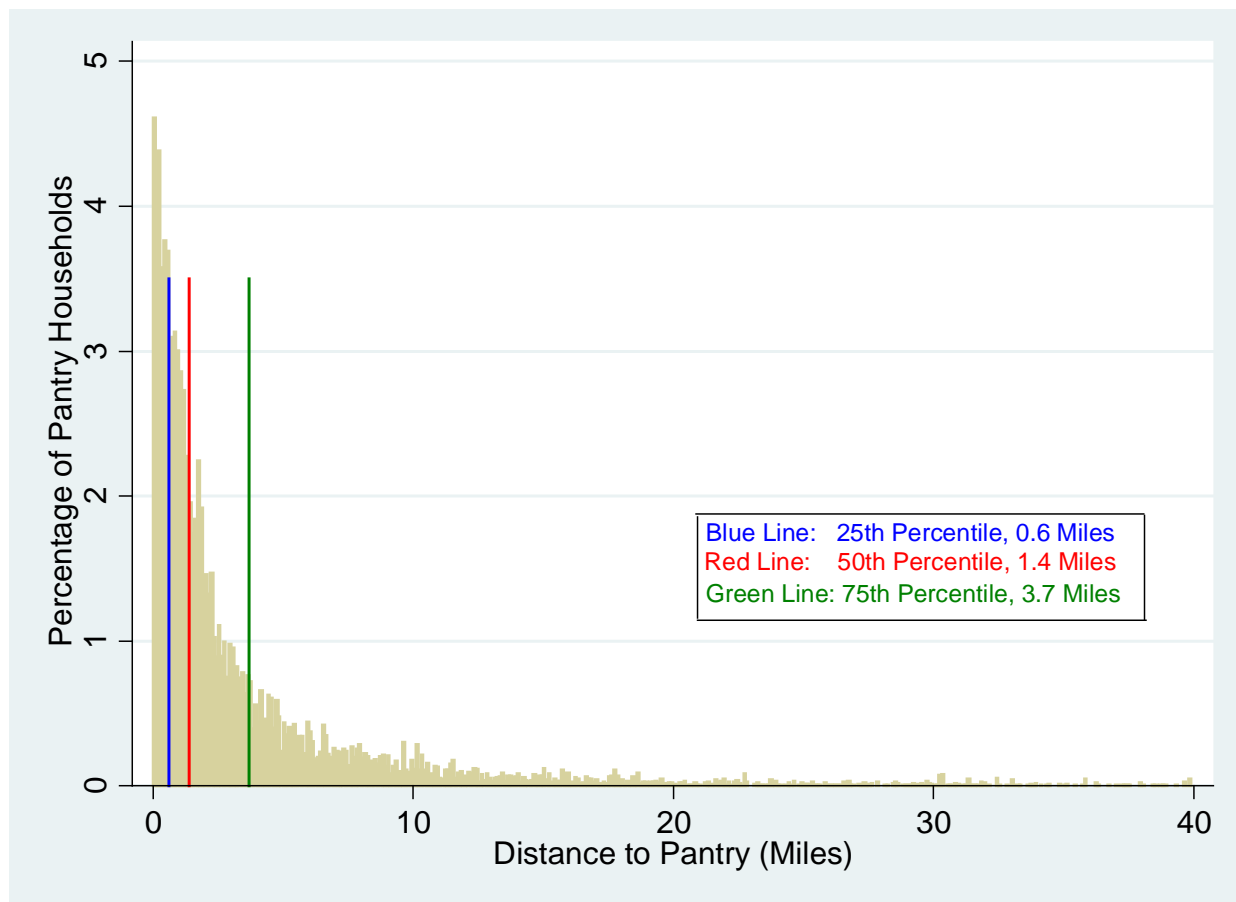
**Table II.1. Distribution of Distance (in Miles) Between Centroid of Respondent's Residential Zip Code and Street Address of Emergency Food Pantry Interview Site**

	Miles
Mean Distance	3.35
Standard Deviation	5.74
10th Percentile	0.26
25th Percentile	0.61
50th Percentile	1.44
75th Percentile	3.65
90th Percentile	8.02

Source: Hunger in America 2009.

<sup>9</sup>Households in metropolitan and nonmetropolitan areas have equal median access distances (1.44 miles in metro and 1.43 miles in nonmetropolitan areas), but the distances differ greatly in the right tail of the distributions. As a result, the mean and standard deviations are quite different between the two sets of households (3.03 and 4.90 in metropolitan areas and 5.39 and 9.16 in nonmetropolitan areas). About 79 percent of HIA households live in metropolitan areas, and 21 percent in nonmetropolitan areas. The national distribution was 83 percent and 17 percent in 2000. (See <http://www.ers.usda.gov/briefing/rurality/ruralurbcon/>. Accessed August, 19, 2011.)

**Figure II.1. Distribution of Distance (in Miles) Between Centroid of Respondent’s Residential Zip Code and Street Address of Emergency Food Pantry Interview**

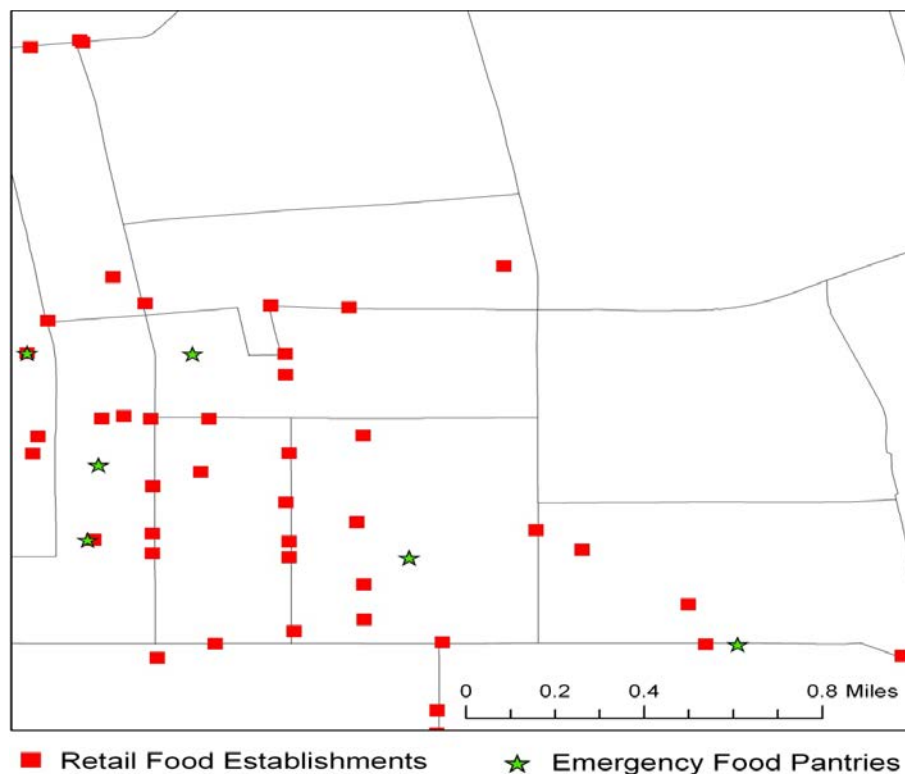


Source: Hunger in America 2009.

Note: For the purposes of presenting this figure, the distribution was artificially censored at the 98th percentile distance (equal to 40 miles).

To measure household access to food, we used the 25th, 50th, and 75th percentiles from Table II.1 as alternative measures of food access areas. Using these distances as radii, we drew circles around each household’s estimated residential location. This is depicted in Figure II.2 in which the household residential location is represented by a star (and the amorphous shapes are Census tract boundaries (often called polygons)). We then overlaid the map of pantries and food retailers discussed in the previous section with the map of household locations and access areas, and counted the number of pantries and food retailers in each area. Next, we merged these measures onto the HIA client household data using a common identifier of the population-weighted centroid of the household’s zip code. Chapter III of this chapter describes the distributions of pantries and food retailers in greater detail.<sup>10</sup>

<sup>10</sup> When deciding where a household is likely to live within a zip code, because we know that they visited the pantry, we might conclude that they are more likely to live in the portion of the zip code that is closest to the pantry, rather than the population-weighted centroid. In this case, choosing the population-weighted centroid (and ignoring the

**Figure II.2. Locating Retail Food Establishments and Emergency Food Pantries on a Map of Census Tract Boundaries**

Source: Hunger in America 2009; STARS 2009; ACS 2005 to 2009

It is important to note that the number of stores and pantries in the area does not capture other dimensions of food access such as the depth of stock of items within a store or the variation in the hours and days each week that pantries operate. For example, pantries generally are open much more seldom than stores, with some operating only for a single day per month. There may also be regulations in areas regarding how often households may receive food from a single pantry and, in areas in which emergency food networks coordinate food distribution to households, whether households may obtain food from multiple pantry sites. Our measures of access to pantries do not account for these additional dimensions of access, but they are important for interpreting access measures and relationships between food security and access.

*(continued)*

extra information regarding where they visited a pantry) would lead to an overestimate of the distance traveled on average. However, pantries are also more likely to be located in population centers, given their target populations. Therefore, locating households at the population-weighted centroids, where they are most likely to be within close proximity of a pantry, could lead to underestimates of distance traveled on average. Thus, there are potentially competing biases in the construction of the distance measure.

#### 4. Defining Population Characteristics

We used the 2005 to 2009 ACS summary file to obtain a set of population characteristics for each food access area. Because the ACS reports at the census tract level we used a feature of the ARCGIS software to aggregate the population characteristics for all Census tracts<sup>11</sup> within the three food access areas. We defined a set of variables for each household's access area intended to capture the socioeconomic conditions of the local areas. We chose variables that are likely to be related to numbers of pantries and food retailers in an area:

- Total population
- Total families with income below 200 percent of the federal poverty threshold
- Percentage of families with income below 200 percent of the federal poverty threshold
- Percentage of total population that is non-white
- Percentage of total population that is Hispanic
- Percentage of population over 25 years of age that has no more than a high school diploma or equivalent (GED)
- Percentage of female-headed households with children
- Percentage of housing units without access to a vehicle

In the analytic work, we estimate models by whether the census tract containing the population-weighted centroid of the household's residential zip code was in a metropolitan or nonmetropolitan area. These descriptors are defined according to the June 2003 Office of Management and Budget (OMB) urban/rural continuum codes for the counties in which they are located. Metropolitan/nonmetropolitan counties are identified according to the OMB definitions outlined on the ERS website.<sup>12</sup> Metropolitan counties have codes between 1 and 3, and nonmetropolitan counties have codes between 4 and 9. In the analysis file, roughly 80 percent of the census tracts were in metropolitan counties.

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<sup>11</sup> 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 geographies defined by the Census Bureau and generally contain 1,500 to 8,000 people and a target size of 4,000. Because the population characteristics in the ACS 2005-2009 summary data file are defined using the 2000 census tract boundaries, it was necessary that we also used the 2000 version of the boundaries to match the population data. In 2000, the United States was divided into more than 60,000 census tracts. Census tracts are typically much smaller than counties. There are roughly 60,000 census tracts in the U.S. but only just over 3,100 counties. On average, counties contain 20 census tracts. Although census tract boundaries are drawn to comprise targeted population sizes, the boundaries are also drawn to align with county boundaries. In other words, census boundaries never cross county boundaries and counties are comprised of a set number of census tracts.

<sup>12</sup> <http://www.ers.usda.gov/briefing/rurality/ruralurbcon/>

## D. Analysis Variables and Methodology

We present descriptive tables of the numbers of pantries and food retailers in household food access areas. We present the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentiles of the distributions of the numbers of pantries and food retailers within household access areas. Analysis of access to retailers by store type focuses on the median (50<sup>th</sup> percentile) number of pantries and food retailers. We also examine these distributions for household subgroups based on household demographic and economic characteristics.

To examine the relationship between food insecurity and emergency pantry household access to food, we estimate logistic regression models that relate the likelihood that a household is food insecure to the following sets of variables:

- Food access variables, including the number of pantries in a selected area around the household's residential location and the number of food retailers in the same area around the household's residential location.
- Demographic variables, including the age, citizenship status, education, gender, marital status, and race and ethnicity of the household head; number of children less than 6 years old, number of children between 6 and 17 years old, and number of adults in household; and whether the household contains an elderly individual.
- Economic variables, including household income relative to the federal poverty threshold; employment status (part-time, full-time, or nonemployed) of the household head; and participation in federal food assistance programs including SNAP, WIC, NSLP, and SBP.

The original HIA sample comprised 42,441 pantry households. After excluding households with missing demographic and economic information used in the multivariate analysis, the effective sample size is 35,959 households.

We perform several estimations:

- Different dependent variables: In half of the specifications, the dependent variable is the likelihood that a household is food insecure, relative to being food secure. In the other half of the specifications, it is the likelihood that a household is food insecure with very low food security, relative to not being food insecure with very low food security. Household food security status is based on responses to a six-item food security module with a 12-month recall period.<sup>13</sup>
- Different food access measures: We examine how different food access measures affect the relationship between access and food insecurity. Specifically, we estimate different models for food access areas defined by the 25th, 50th, and 75th percentile distances.

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<sup>13</sup> The six-item version has been shown to approximate closely the three main categories of the food security measure in the full 18-item module (Bickel et al. 2000). Two limitations of the six-item measure, relative to the full scale, are that it does not measure the most severe levels of food security and does not ask about conditions of children in the household (see <http://www.ers.usda.gov/briefing/foodsecurity/surveytools.htm> for additional details).



- Different subsamples: In addition to estimating models for the full sample, we re-estimate them according to whether the household has children; whether the household contains an elderly member; whether households live in metropolitan or nonmetropolitan areas; whether households have income below 100 percent of the federal poverty threshold; and whether households participate in SNAP, WIC, NSLP, and SBP (as well as the complements of these groups). The sample sizes for these subgroup analyses are presented in the regression tables in Appendix B.

All regressions are weighted using a monthly weighting variable that makes the results nationally representative of all households receiving food from an emergency food pantry in Feeding America's network in an average month between February and May 2009. Standard errors for all analyses are adjusted for the Hunger in America survey's complex design. In all analyses, the weights are normalized to the sum of the original population.

The main model specification assumes that the number of emergency food pantries is an exogenous regressor in the estimation of the relationship between household food security and food access. To the extent, however, that pantries make strategic decisions to locate facilities in poorer areas, in which households have higher rates of food insecurity, this assumption may be questionable. We make the case below that this is *not* the case and that by controlling for population characteristics in the original model, we can sufficiently address the potential endogeneity of this variable.

The general problem of endogeneity is that factors subsumed by an error term in a regression are correlated with both a regressor (the number of pantries) and the dependent variable (household food insecurity). This effect causes the coefficient on the endogenous regressor to be biased. In many cases, such as the iconic example from the labor economics literature that estimates the impact of education on individual wages, the factor in the error term associated with both the regressor (education) and the dependent variable (wages) is unobserved. An example is "unobserved ability," such that individuals with greater ability obtain both more schooling and higher wages. Similarly, in food security literature, when one estimates the impact of SNAP participation on household food security, the factor in the error term associated with both the regressor (SNAP participation) and the dependent variable (household food insecurity) may be an unobserved propensity to be "food-needy" (Nord and Golla 2011).

We attribute any potential endogeneity in the "number of pantries" variable to observed, rather than unobserved, factors. Our belief stems partly from the number of pantries being an area-level measure assigned to each household in the data, which contrasts with the endogenous variables in the labor market model and SNAP food security model examples above. In those examples, the endogenous variable is almost always at the individual or household level. The attribution is mostly due to pantries locating facilities in communities with households of lower socioeconomic status (percentage in poverty, percentage with at most a high school education, and percentage of female-headed households), all of which are observed. Thus, we are confident that by controlling for the population characteristics of the area in which a household lives, we sufficiently address any bias caused by the endogenous relationship.

We also expect the direction of the bias to be positive. If pantries locate in areas of high food insecurity, then if the bias is strong enough, not accounting for it may produce a positive coefficient on the variable measuring access to pantries. In the model that includes area population characteristics, we obtain a negative coefficient on pantry access in the food insecurity regression.

Thus, even if the bias remains present in our model after including the area characteristics, we can think of the negative estimate as an upper bound on the “true” negative estimate (meaning that the “true” estimate is likely a negative estimate that is larger in magnitude than the estimate we obtain).

### III. ACCESS TO EMERGENCY FOOD PANTRIES AND FOOD RETAILERS AMONG EMERGENCY FOOD PANTRY HOUSEHOLDS

This chapter examines access to emergency food pantries and food retailers of pantry households. We present distributions of the numbers of pantries and retail stores in the areas in which households live, as well as the composition of types of stores in the area including supermarkets and convenience stores. We also present findings by demographic and economic characteristics of households.

#### A. Access to Emergency Food Pantries and Retail Food Establishments

We characterize the distribution of household access to pantries and food retailers for three sizes of food access areas: small (within 0.6 miles), medium (within 1.4 miles), and large (within 3.7 miles). The median number of pantries is 1, 2, and 8 in the three areas, respectively (Table III.1). As expected, the number of pantries increases the larger the access area. While most pantry households have access to a pantry within 1.4 miles, at least 10 percent do not have pantries this close. In the smallest defined access area (radius of 0.6 miles), 25 percent of households do not have access to a pantry.<sup>14</sup>

**Table III.1. Distribution of the Number of Emergency Food Pantries in Food Access Areas**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
10th Percentile	0	0	1
25th Percentile	0	1	2
50th Percentile	1	2	8
75th Percentile	2	7	24
90th Percentile	5	16	57

Source: Hunger in America 2009; STARS 2009; ACS 2005–2009.

Not surprisingly, households have access to more food retailers than food pantries. The average household has 3 food retailers in the small access area, 16 in the medium access area, and 55 in the large access area (Table III.2). Based on the medium access area, 25 percent of households live in areas with up to six food retailers and another 25 percent of households live in areas with 33 or more. Like the distribution of the number of pantries, the number of retailers increases the larger the access area. The range of the number of retailers is striking as the access area increases in spatial size. The differential between the 10th and 90th percentiles ranges from 19 stores using the smallest access area, to 297 stores using the largest access area. While some of these numbers are very large,

<sup>14</sup> It may seem counterintuitive that households interviewed at a pantry site are identified as not having access to a pantry. However, we defined three food access areas based on the sample distribution of distance between the households' residential zip code centroid and the pantry address. For some households, this area is too small to contain their actual distance to the program site. Thus, some households live in access areas that contain no pantries.

the counts include all store types and cover both metropolitan and nonmetropolitan areas. We separately examine access to stores in metropolitan and nonmetropolitan areas later in this chapter.

**Table III.2. Distribution of the Number of Food Retailers in Food Access Areas**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
10th Percentile	0	1	4
25th Percentile	1	6	16
50th Percentile	3	16	55
75th Percentile	8	33	131
90th Percentile	19	74	301

Source: Hunger in America 2009; STARS 2009; ACS 2005–2009.

The median number of stores in each access area differs by store type. The average pantry household has no supermarket or superstore within 0.6 miles; 3 supermarkets or superstores within 1.4 miles, and 10 supermarkets or superstores within 3.7 miles. Convenience stores are the most prevalent store type. The median number of convenience stores is 5 within 1.4 miles of a household and 18 within 3.7 miles (Table III.3).

**Table III.3. Median Number of Food Retailers in Food Access Areas, by Store Type**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
All Stores	3	16	55
Supermarkets or Superstores	0	3	10
Large or Medium Groceries	0	1	3
Small Groceries	0	1	3
Convenience Stores	1	5	18
Specialty Stores	0	1	3
Other Outlets	1	4	14

Source: Hunger in America 2009; STARS 2009; ACS 2005–2009

As the food access area increases in size, the percentage of retailers that are supermarkets or superstores increases, but the percentage that are convenience stores remains more or less constant. The median percentage of retailers that are supermarkets or superstores increases from 7.6 percent within 0.6 miles around a household's residential location to 16.7 percent within 3.7 miles (Table III.4). For convenience stores, the percentage remains about the same at 33.3 percent. In all three access areas, large or medium groceries; small groceries; and specialty stores make up small proportions of the overall mix of the stores in the area, relative to supermarkets or superstores; convenience stores; and other outlets.

**Table III.4. Median Percentages of Each Store Type in Food Access Areas**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Supermarkets or Superstores	7.6	14.3	16.7
Large or Medium Groceries	0.0	5.3	6.4
Small Groceries	0.0	3.8	5.0
Convenience Stores	33.3	33.3	33.6
Specialty Stores	0.0	4.3	5.6
Other Outlets	16.7	22.0	23.1

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Note: Table entries are the median percentages of each store type for each access area. For supermarkets and superstores, for example, the percentages are calculated for a given access area by obtaining the distribution of the percentage of stores that are supermarkets or superstores, and taking the median of this distribution.

The percentage of emergency pantry households without access to a supermarket or superstore ranges from 55 percent in small access areas to 17.6 percent in medium access areas and 8.5 percent in large access areas (Table III.5). When all groceries are considered collectively with supermarkets and superstores, the percentages of households with no stores in the area decrease by about 18 to 25 percent to 40.0, 13.6, and 5.7 in the three areas, respectively.

**Table III.5. Percentages of Emergency Pantry Households with No Access to Supermarkets, Superstores, and Groceries in Food Access Areas**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Percentage of households with no supermarkets or superstores	54.9	17.6	8.5
Percentage of households with no supermarkets or superstores or large groceries or medium groceries	44.3	14.5	6.4
Percentage of households with no supermarkets or superstores or large groceries or medium groceries or small groceries	40.0	13.6	5.7

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

## B. Access to Emergency Food Pantries and Retail Food Establishments by Household Characteristics

Table III.6 presents the median number of pantries and retail food establishments in the middle access area, defined using a distance of 1.4 miles from the household location.

Access to pantries and food retailers differs only marginally by characteristics of emergency food pantry households. The median number of pantries around where households live is greater for

households without children than for households with children (3 pantries versus 2 pantries); and for households in metropolitan areas than for households in nonmetropolitan areas (3 pantries versus 1 pantry). All other subgroups have 2 pantries.

**Table III.6. Median Number of Emergency Food Pantries and Retail Food Establishments, within 1.4 miles of Household Location, by Household Subgroups**

	Number of Pantries	Number of Food Retailers	Number of Supermarkets or Superstores	Number of Convenience Stores	Percentage of Households with No Supermarkets or Superstores
Households with Children	2	16	3	5	15.3
Households without Children	3	16	3	5	13.6
Households with Elderly Member	2	13	2	4	15.1
Households without Elderly Member	2	16	3	5	14.3
Households Living in Metropolitan Area	3	20	3	7	14.3
Households Living in Nonmetropolitan Area	1	4	1	1	16.7
Households with Annual Income Below 100 Percent of the Federal Poverty Threshold	2	16	3	5	13.6
Households with Annual Income At or Above 100 Percent of the Federal Poverty Threshold	2	14	2	4	16.6
Households Participating in SNAP	2	16	2	5	12.5
Households Not Participating in SNAP	2	16	3	5	15.0
Households Participating in WIC	2	17	3	5	16.6
Households Not Participating in WIC	2	17	3	5	15.8
Households Participating in NSLP or SBP	2	15	3	5	15.8
Households Not Participating in NSLP or SBP	2	16	3	5	14.3

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

The number of food retailers varies more across household subgroups than the number of pantries. Households with elderly members have fewer stores in the area, on average, than households without elderly (13 versus 16 stores); households with income below the federal poverty threshold have more stores in the area than households with income above the poverty threshold (16 versus 14 stores); and households with at least one member participating in the NSLP or SBP have fewer stores than households without someone participating in these programs (15 versus 16 stores). The largest difference exists for households in metropolitan areas as compared to those in nonmetropolitan areas (20 versus 4 stores).

The median number of supermarkets and superstores in the area differs for some household subgroups. Households with elderly members have fewer supermarkets or superstores in the area, on average, than households without elderly (2 versus 3 stores); households with income below the

federal poverty threshold have more supermarkets or superstores in the area than households with income above the federal poverty threshold (3 versus 2 stores); and households participating in SNAP have fewer supermarkets or superstores than income-eligible households not participating in SNAP (2 versus 3 stores). Like all stores, the largest difference exists for households in metropolitan areas as compared to those in nonmetropolitan areas (3 versus 1 supermarket or superstore).

There are also differences in the median number of convenience stores across several household subgroups. Households with at least one elderly adult have fewer convenience stores in the area than those without any elderly; households with income below the federal poverty threshold have more convenience stores than those with income above the poverty threshold; and households in metropolitan areas have more convenience stores than those in nonmetropolitan areas.

The last characteristic of food access environment that we examine by household subgroup is the percentage of households living in areas without a supermarket or superstore. Compared to their complements, the following subgroups have a higher percentage of households with no supermarket or superstore in the area in which the household lives: households with children; households with elderly members; households in nonmetropolitan areas; households with income at or above the federal poverty threshold; households not participating in SNAP (that are income eligible for SNAP); households participating in WIC; and households not participating in the NLSY or SBP (that have school-age children in the household). The most sizable differences in the percentage of households without a supermarket or superstore in the area is for households with elderly members compared to those without elderly members (21.5 versus 16.6 percent); households in nonmetropolitan areas compared to those in metropolitan areas (42.9 versus 11.6 percent); and households with members participating in WIC compared to those with eligible nonparticipants (17.1 versus 14.9 percent).

### **C. Summary of Findings**

At least 50 percent of emergency food pantry households have access to a pantry within 0.6 miles of where they live and at least 75 percent of pantry households have access to a pantry within 1.4 miles. At least 75 percent of pantry households have access to a food retailer within 0.6 miles of where they live and at least 90 percent have access to a food retailer within 1.4 miles. Fewer households have a supermarket or superstore within close proximity (0.6 miles), though. The percentage of pantry households without access to a supermarket or superstore ranges from 55 percent when identifying stores within 0.6 miles of the household's residential location to 18 percent within 1.4 miles of the household's location. In terms of composition of stores, supermarkets and superstores make up 8 percent of food retailers within 0.6 miles of a household's location and 14 percent within 1.4 miles. The percentage of retailers that are convenience stores, however, is about 33 percent in both of these areas. Finally, access to pantries and food retailers differs only marginally by characteristics of emergency food pantry households.

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#### IV. HOUSEHOLD FOOD INSECURITY AND FOOD ACCESS OF EMERGENCY FOOD PANTRY HOUSEHOLDS

This chapter describes multivariate analysis of the relationship between household food insecurity and access to both emergency food pantries and retail food establishments. Our analysis controls for differences in household demographic and economic characteristics, and differences in the population characteristics of the areas in which households live.

##### A. Examining the Distribution of Household Food Security Status

Table IV. 1 provides estimates of the percentages of households that are food insecure, food insecure with low food security, and food insecure with very low food security for the full sample of emergency food pantry households and for the subgroups of households that we examine in the multivariate analysis.

**Table IV.1. Distribution of Household Food Security Status among Emergency Food Pantry Households, by Subgroup<sup>a</sup>**

	Food Insecure	Food Insecure with Low Food Security	Food Insecure with Very Low Food Security
All Households	77.1	40.9	36.1
Households with Children	79.5	44.0	35.5
Households without Children	75.1	38.4	36.5
Households with Elderly Member	62.0	42.1	19.9
Households without Elderly Member	80.7	40.7	40.1
Households Living in Metropolitan Area	78.0	40.7	37.2
Households Living in Nonmetropolitan Area	73.1	41.9	31.1
Households with Annual Income Below 100 Percent of the Federal Poverty Threshold	79.8	41.1	38.7
Households with Annual Income At or Above 100 Percent of the Federal Poverty Threshold	69.5	40.5	29.0
Households Participating in SNAP	79.5	41.4	38.1
Households Not Participating in SNAP	75.3	40.7	34.6
Households Participating in WIC	76.7	47.8	28.8
Households Not Participating in WIC	77.1	40.1	37.1
Households Participating in NSLP or SBP	75.7	39.8	35.9
Households Not Participating in NSLP or SBP	80.4	43.8	36.6

Source: Hunger in America 2009.

<sup>a</sup>Sample representative of emergency food pantry households who had nonmissing values of the demographic and economic variables used in the multivariate analysis.

Seventy-seven percent of emergency food pantry households were food insecure in 2009 (Table IV.1). This group consists of 40.9 percent of households that were food insecure with low food security and 36.1 percent of households that were food insecure with very low food security. As a

point of comparison, in the general population of all households in the United States, at least 14.7 percent were food insecure at some point during 2009, with 9.0 and 5.7 percent having low and very low food security (Nord et al. 2010).

The percentages of households that were food insecure differ by household subgroup (Table IV.1). A greater percentage of households with children were food insecure compared with households without children (79.5 percent versus 75.1 percent). Other differences include whether households have elderly members (62.0 percent versus 80.7 percent for households with and without elderly members); whether households live in a metropolitan area (78.0 percent versus 73.1 percent for households in metropolitan versus nonmetropolitan areas); whether households have annual income at or below the federal poverty threshold (79.8 percent for households with income at or below poverty and 69.5 percent for households with income above poverty); and whether households participate in SNAP (79.5 percent for households participating in SNAP and 75.3 percent for households not participating).

## **B. Food Insecurity and Food Access of Pantry Households**

We examined the relationship between food insecurity and food access by estimating separate logistic regressions of the likelihood that a household is food insecure and the likelihood that a household is food insecure with very low food security. The key explanatory variables are the number of emergency food pantries and retail food establishments in the food access area. Other variables include demographic and economic characteristics of the household and population characteristics of the local area.

In presenting our findings, we focus on the associations of the dependent variable (food insecurity) with the pantry and food retailer access variables, and briefly discuss the associations with the household and population characteristics. Logistic regression coefficient estimates are difficult to interpret, therefore we also present the marginal effects that measure the increase in the probability of a household being food insecure associated with a one percentage point increase in the value of the explanatory variable. For the full sample, we present marginal effects for all explanatory variables; for the subgroup analyses, we present the marginal effect only for the food access variables (numbers of pantries and food retailers). The coefficients for the other explanatory variables can be found in Appendix B.

As discussed in Chapter II, the sample size for the analyses that use the full sample of pantry households is 35,959 households. The sample sizes for each of the subgroup analyses can be found in the regression tables in Appendix B.

It is important to emphasize that while we present marginal effects to make the results more accessible to a policy audience, this is only to simplify interpretation of regression findings. That is, we view this work as mostly descriptive analysis using regression analysis and do not view any results as causal in nature.

## **1. Food Insecurity and Food Access of Pantry Households**

Among food pantry clients, household food insecurity is negatively associated (less food insecurity) with the number of pantries in the area in which a household resides (Table IV.2). An additional pantry in the area is associated with a 0.438 percentage point decrease in the likelihood that a household is food insecure. The estimate of the association implies, other things equal, that if the percentage of food insecure households that live in an area with the average number of pantries is 77.1 percent, then the percentage of food insecure households that live in an area with one pantry more than the average number is 76.7 percent. There is no statistically significant relationship, though, with the number of food retailers in the area. Examining very low food security shows that there is no observed relationship between household food insecurity with very low food security and the number of pantries or the number of food retailers (Table IV.3).

**Table IV.2. Logistic Regression of Food Insecurity on Access to Emergency Food Pantries and Retail Food Establishments**

Variable	Coefficient	Standard Error of Coefficient	Marginal Effect <sup>a</sup>	Standard Error of Marginal Effect <sup>a</sup>
Access to Pantries	-0.026	0.014	-0.438*	0.231
Access to Food Retailers	0.001	0.004	0.020	0.063
Female	0.188	0.062	3.228***	1.096
Age	-0.015	0.003	-0.246***	0.054
Married	-0.063	0.083	-1.067	1.407
Number of Children 0 to 5 in Household	-0.179	0.050	-3.024***	0.843
Number of Children 6 to 17 in Household	-0.037	0.054	-0.621	0.906
Number of Adults in Household	0.106	0.041	1.788***	0.678
Elderly Member In Household	-0.758	0.087	-14.389***	1.830
Completed High School (compared to Less than High School)	-0.152	0.066	-2.582**	1.149
Completed More than High School (compared to Less than High School)	-0.274	0.077	-4.778**	1.394
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.053***	0.009
Employed Part-Time (compared to not employed)	-0.243	0.117	-4.306*	2.206
Employed Full-Time (compared to not employed)	-0.300	0.124	-5.411**	2.368
White, non-Hispanic (compared to Hispanic)	0.047	0.106	0.793	1.779
Black, non-Hispanic (compared to Hispanic)	-0.157	0.122	-2.683	2.132
Other, non-Hispanic (compared to Hispanic)	-0.205	0.221	-3.621	4.121
Citizen	-0.113	0.137	-1.859	2.190
SNAP participant	0.059	0.067	0.999	1.116
WIC Participant	-0.398	0.115	-7.288***	2.276
NSLP/SBP Participant	0.022	0.102	0.364	1.706
Household Lives in Metro Area (compared to non-metro area)	0.004	0.003	0.067***	0.051
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.002	0.002	0.026	0.026
Percentage of Non-White Individuals	0.000	0.003	0.008	0.043
Percentage of Individuals of Hispanic Origin	0.001	0.005	0.011	0.078
Percentage of Individuals with At Most High School Education	-0.002	0.004	-0.029	0.065
Percentage of Households Headed by Female with Children	-0.002	0.013	-0.026	0.218
Percentage of Households without Access to a Vehicle	0.314	0.105	5.577	1.985
Total Population of Access Area	0.000	0.000	0.000	0.000
Constant	2.122	0.257		

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

<sup>a</sup> Marginal effects and standard error of marginal effects in percentage points (all estimates have been multiplied by 100).

\*, \*\*, \*\*\* Significantly different from zero at the .10, 0.05, 0.01 level, two-tailed test.

**Table IV.3. Logistic Regression of Very Low Food Security on Access to Emergency Food Pantries and Retail Food Establishments**

Variable	Coefficient	Standard Error of Coefficient	Marginal Effect <sup>a</sup>	Standard Error of Marginal Effect <sup>a</sup>
Access to Pantries	-0.009	0.017	-0.212	0.382
Access to Food Retailers	-0.007	0.004	-0.160	0.098
Female	-0.179	0.056	-4.110***	1.288
Age	-0.010	0.003	-0.237***	0.060
Married	-0.181	0.071	-4.074***	1.598
Number of Children 0 to 5 in Household	-0.039	0.049	-0.893	1.125
Number of Children 6 to 17 in Household	0.024	0.050	0.540	1.138
Number of Adults in Household	0.069	0.033	1.578**	0.756
Elderly Member In Household	-0.871	0.092	-17.878***	1.622
Completed High School (compared to Less than High School)	-0.133	0.062	-3.002**	1.409
Completed More than High School (compared to Less than High School)	-0.096	0.071	-2.164	1.603
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.000	-0.069***	0.011
Employed Part-Time (compared to not employed)	-0.298	0.086	-6.523***	1.800
Employed Full-Time (compared to not employed)	-0.428	0.094	-9.138***	1.860
White, non-Hispanic (compared to Hispanic)	0.187	0.097	4.264*	2.220
Black, non-Hispanic (compared to Hispanic)	-0.192	0.123	-4.325	2.710
Other, non-Hispanic (compared to Hispanic)	0.173	0.109	4.005	2.575
Citizen	0.375	0.108	8.125***	2.201
SNAP participant	-0.004	0.062	-0.082	1.416
WIC Participant	-0.553	0.124	-11.625***	2.365
NSLP/SBP Participant	-0.071	0.098	-1.607	2.205
Household lives in Metro Area (compared to non-metro area)	0.004	0.002	0.086***	0.052
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	-0.002	0.002	-0.048*	0.035
Percentage of Non-White Individuals	0.003	0.002	0.060	0.042
Percentage of Individuals of Hispanic Origin	-0.004	0.004	-0.095	0.100
Percentage of Individuals with At Most High School Education	0.001	0.004	0.015	0.080
Percentage of Households Headed by Female with Children	-0.006	0.010	-0.142	0.234
Percentage of Households without Access to a Vehicle	0.284	0.085	6.271	1.832
Total Population of Access Area	0.000	0.000	0.000	0.000
Constant	-0.047	0.210		

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

<sup>a</sup> Marginal effects and standard error of marginal effects in percentage points (all estimates have been multiplied by 100).

\*, \*\*, \*\*\* Significantly different from zero at the .10, 0.05, 0.01 level, two-tailed test.

For food pantry clients, the relationship between household food insecurity and the number of pantries remains negative and statistically significant when a medium size access area (1.4 miles in radius) is used (Table IV.4). Compared with the marginal effect of an additional pantry in a smaller area (0.6 mile radius), the marginal effect is less than a third the size in magnitude (an additional pantry is associated with a 0.130 percentage point decrease in household food insecurity compared with a 0.438 percentage point decrease in the small access area). For access in the largest area (3.7 mile radius), the estimate decreases in magnitude and converges to a value of zero, and loses its statistical significance. Thus, as the spatial size of the area in which we measure pantry access increases, the relationship between a household's likelihood of being food insecure and the number of pantries in the area weakens. As in the small access area, there is no statistical relationship between the likelihood of a household being food insecure and the number of food retailers in the medium or large access areas.

The median number of pantries is 1 in the smallest area (0.6 mile radius), 2 in the medium area (1.4 miles), and 8 in the largest area (3.7 miles). The regression findings in the smallest area suggest that we are largely measuring the difference between having one pantry nearby and having none nearby, whereas with larger areas, we are measuring the effect of having more than one pantry in the area. Thus, the association between access to pantries and household food insecurity may be due to proximity and not the number of pantries.

**Table IV.4. Marginal Effects of Food Access on the Likelihood of Household Food Insecurity, by Geographic Area of Food Access**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Food Insecure			
Access to Pantries	-0.438*	-0.130*	-0.008
Access to Food Retailers	0.020	-0.010	-0.008
Food Insecure with Very Low Food Security			
Access to Pantries	-0.212	-0.072	0.014
Access to Food Retailers	-0.160	-0.051*	-0.014

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

Notes: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Tables IV.2 and IV.3.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

There is no observed relationship between the likelihood of a household being food insecure with very low food security and the number of pantries in the area for any access measures (Tables IV.3 and IV.4). This result is also generally true for access to food retailers, with the exception of the middle access area. That association, while negative, is fairly negligible in size.

The demographic and economic characteristics of the household have the expected relationship with household food insecurity and household food insecurity with very low food security (Tables IV.2 and IV.3). Focusing on the specification that uses the smallest access area to measure pantry

and food retailer access<sup>15</sup> (pantries and stores within a 0.6 mile radius), we find that households are less likely to be food insecure if the household head is male, is older, has completed at least a high school education (relative to completing less than high school), and is employed part-time or full-time (relative to not being employed) (Table IV.3). In addition, food insecurity is less likely in households with fewer adults, with a greater number of young children, with elderly members, with more income as a percentage of poverty, and that participates in WIC.

The demographic and economic characteristics that are associated with the likelihood that a household is food insecure with very low food security are for the most part similar to those that are associated with the likelihood that a household is food insecure. Several differences are that households are more likely to be food insecure with very low food security if the household head is not married; is white and not Hispanic; and is a citizen. There are no significant associations between these characteristics and household food insecurity more generally. In addition, while having a female household head is statistically associated with food insecurity and very low food security, the sign of the association differs: households with a female household head are more likely to be food insecure, but less likely to have very low food security, compared to those with male household heads.

Several characteristics of the local population in the area in which a household lives are also associated with food insecurity. Living in a metropolitan area is positively associated with a household being food insecure and with having very low food security. And households are less likely to be food insecure with very low food security if they live in an area in which a greater percentage of households have an income below 200 percent of the federal poverty threshold.

## 2. Food Insecurity and Food Access for Pantry Household Subgroups

In this section, we present the findings from the household subgroup analyses. We first discuss the associations for the food insecurity model and then summarize how the findings differ when examining very low food security. We focus on the associations between food insecurity and pantries, as the association between food insecurity and retail food establishments is weak and not significant in most tables.

**Households with children.** Household food insecurity is negatively associated with access to pantries for households with children using all three access measures; there are no observed associations with any pantry access measure for households without children (Table IV.5). An additional pantry in the small access area (0.6 mile radius) is associated with a 1.045 percentage point decrease in the likelihood that a household with children is food insecure. For the medium and large access areas, the magnitude of the association decreases as the size of the area increases, and the association weakens in statistical significance. An additional pantry in the area is associated with 0.283 and 0.108 percentage point decreases in the likelihood that a household with children is food insecure when the medium and large access areas are used, respectively.

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<sup>15</sup> Results for the regressions that use the larger access areas can be found in Appendix D.

**Table IV.5. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure, by Geographic Area of Food Access and whether Household Has Children**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Households with Children			
Access to Pantries	-1.045***	-0.283**	-0.108**
Access to Food Retailers	0.044	-0.027	-0.002
Households without Children			
Access to Pantries	-0.083	-0.046	0.064
Access to Food Retailers	0.011	0.006	-0.015

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

Notes: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

**Households with elderly members.** For households without an elderly member, pantry access measured using the smallest access area is negatively associated with the likelihood of being food insecure (Table IV.6). An additional pantry in the area in which the household lives is associated with a 0.413 percentage point decrease in the likelihood that a household without elderly members is food insecure. There are no significant associations when larger access measures are used. The association is not significant for household with an elderly member.

**Table IV.6. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure, by Geographic Area of Food Access and whether Household Has Elderly Members**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Households with Elderly			
Access to Pantries	-0.283	-0.080	0.054
Access to Food Retailers	-0.096	0.016	-0.010
Households without Elderly			
Access to Pantries	-0.413*	-0.113	-0.009
Access to Food Retailers	0.020	-0.023	-0.008

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

Notes: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.



**Households located in metropolitan areas.** For households living in metropolitan areas, the likelihood of being food insecure is lower in areas with more pantries (Table IV.7). For households in metropolitan areas, an additional pantry is associated with a 0.412 percentage point decrease in the likelihood of being food insecure when the small access area measure is used. The associations for larger access areas are not significant. There is no observed association between food insecurity and pantry access for households in nonmetropolitan areas using any access measure.

**Table IV.7. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure, by Geographic Area of Food Access and whether Household Lives in Metropolitan Area**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Households Living in Metropolitan Area			
Access to Pantries	-0.412*	-0.106	0.001
Access to Food Retailers	0.034	-0.008	-0.008
Households Living in Non-Metropolitan Area			
Access to Pantries	0.664	0.097	-0.286
Access to Food Retailers	-0.189	0.048	-0.006

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

Note: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

**Households with annual income below 100 percent of the federal poverty threshold.** Access to pantries is inversely associated with the likelihood of a household being food insecure for households with annual income below 100 percent of the federal poverty threshold; there is no observed association for households with income above this threshold (Table IV.8). For households with income below 100 percent of the federal poverty threshold, an additional pantry is associated with a 0.558 percentage point decrease in the likelihood of being food insecure when the small access area measure is used. The magnitude of the marginal effect, while still statistically significant, decreases to 0.121 percentage points in the regression that uses the medium access area.

**Table IV.8. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure, by Geographic Area of Food Access and whether Household Has Annual Income Below 100 Percent of Federal Poverty Threshold**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Households with Income Below Poverty Threshold			
Access to Pantries	-0.558***	-0.121*	-0.030
Access to Food Retailers	0.018	-0.025	-0.008
Households with Income At or Above Poverty Threshold			
Access to Pantries	-0.121	-0.176	0.068
Access to Food Retailers	0.071	0.044	-0.009

Source: Hunger in America 2009; STARS 2009; ACS 2005–2009.

Notes: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

**Households participating in federal food assistance programs.** The likelihood of a household being food insecure is negatively associated with pantry access for households not participating in SNAP that are income-eligible for the program (Table IV.9). There is no observed association with pantry access for SNAP participant households. For households not participating in SNAP, an additional pantry is associated with a 0.647 percentage point decrease in the likelihood of being food insecure when a small access area measure is used and a 0.238 percentage point decrease when the medium access measure is used. Having a household member participate in WIC results in the opposite outcome. Pantry access is negatively associated with household food insecurity for households that contain a WIC participant but there is no significant association for households that do not contain a WIC participant that are income-eligible for the program and at least one child under 5 years old. Finally, for households that contain an NSLP or SBP participant, food insecurity is lower in areas with more pantries. An additional pantry in the area decreases the likelihood of being food insecure by 0.710 percentage points. The results for the middle and large access areas are decreasing according to the size of the area, but remain statistically significant.

**Table IV.9. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure, by Geographic Area of Food Access and whether Household Participates in Federal Food Assistance Programs**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Households Participates in SNAP			
Access to Pantries	-0.081	0.053	0.024
Access to Food Retailers	0.002	-0.055*	-0.008
Households Does Not Participate in SNAP			
Access to Pantries	-0.647**	-0.238**	-0.037
Access to Food Retailers	-0.025	-0.014	-0.016
Households Contains WIC Participant			
Access to Pantries	-1.304*	-0.484**	-0.195**
Access to Food Retailers	0.095	-0.045	0.010
Households Does Not Contain WIC Participant			
Access to Pantries	-0.189	0.005	-0.112
Access to Food Retailers	-0.184	-0.072	0.019*
Households Contains NSLP or SBP Participant			
Access to Pantries	-0.710*	-0.215*	-0.084*
Access to Food Retailers	-0.008	-0.035	-0.003
Households Does Not Contain NSLP or SBP Participant			
Access to Pantries	-0.800	-0.085	0.019
Access to Food Retailers	0.033	-0.007	-0.014

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

Note: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

**Food insecure with very low food security.** Although pantry access and household food insecurity is negatively related among many household subgroups, there are many fewer significant associations when the dependent variable is the likelihood of being food insecure with very low food security (Table IV.10). Furthermore, for several subgroups the relationship between pantry access and food insecurity with very low food security is positive.

Pantry access is negatively associated with very low food security for households with children, but the association becomes positive for households without children (Table IV.10, column 1). In addition, for poorer households there is no association between pantry access and food insecurity with very low food security. Finally, negative associations between access to pantries and *food insecurity* were found for households with elderly members, but not households without elderly members; households in metropolitan areas, but not households in nonmetropolitan areas;

**Table IV.10. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure with Very Low Food Security, by Geographic Area of Food Access and Household Subgroup**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
Households with Children			
Access to Pantries	-1.467***	-0.440**	-0.140**
Access to Food Retailers	0.042	-0.032	0.003
Households without Children			
Access to Pantries	0.453***	0.108	0.123**
Access to Food Retailers	-0.286	-0.065**	-0.028***
Households with Elderly			
Access to Pantries	-0.453	-0.097	0.088
Access to Food Retailers	-0.235	-0.013	-0.012
Households without Elderly			
Access to Pantries	-0.121	-0.038	0.004
Access to Food Retailers	-0.141	-0.062**	-0.015
Households Living in Metropolitan Area			
Access to Pantries	-0.234	-0.076	0.013
Access to Food Retailers	-0.149	-0.050*	-0.014
Households Living in Non-Metropolitan Area			
Access to Pantries	0.261	0.258	-0.036
Access to Food Retailers	-1.115**	-0.116	0.093
Households with Income Below Poverty Threshold			
Access to Pantries	0.040	-0.010	0.013
Access to Food Retailers	-0.152	-0.040	-0.006
Households with Income At or Above Poverty Threshold			
Access to Pantries	-1.119	-0.255	0.042
Access to Food Retailers	-0.183	-0.097*	-0.049***
Households Participates in SNAP			
Access to Pantries	0.285	0.132	0.077
Access to Food Retailers	-0.195	-0.098**	-0.005
Households Does Not Participate in SNAP			
Access to Pantries	-0.486	-0.264	-0.069
Access to Food Retailers	-0.196	-0.037	-0.024
Households Contains WIC Participant			
Access to Pantries	-0.425	-0.146	-0.083
Access to Food Retailers	-0.205	-0.193**	-0.042**
Households Does Not Contain WIC Participant			
Access to Pantries	0.398	-0.061	-0.204
Access to Food Retailers	0.168	0.028	0.055
Households Contains NSLP or SBP Participant			
Access to Pantries	-1.300**	-0.239	-0.065
Access to Food Retailers	0.117	0.005	0.012
Households Does Not Contain NSLP or SBP Participant			
Access to Pantries	-1.499*	-0.754**	-0.165
Access to Food Retailers	-0.706*	-0.252**	-0.064**

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009.

Notes: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

\*, \*\*, \*\*\* Significantly different from zero at the .10, 0.05, 0.01 level, two-tailed test.

households that are not participating in SNAP, but not households participating in SNAP; households participating in WIC, but not households with WIC eligible nonparticipants; and households participating in the NSLP or SBP, but not households without participants in these programs. These differentials by subgroup are not present when examining the relationship between food access and food insecurity with very low food security.

### 3. Food Insecurity and Food Access of Pantry Households by Retail Store Type

Because the number of food retailers in the area in which households live is not associated with a household's food insecurity, we estimated the full sample model by store type (supermarkets or superstores; medium and large groceries; small groceries; convenience stores; and other stores) to determine whether the presence of specific types of stores may be associated with reduced food insecurity. The results are generally consistent with the main set of findings, with no statistically significant associations for most store types in most regressions (Table IV.11).

**Table IV.11. Marginal Effects of Food Access on the Likelihood of a Household Being Food Insecure and the Likelihood of a Household being Food Insecure with Very Low Food Security, by Geographic Area of Food Access and by Retail Food Store Type**

	Small Access Area (0.6 miles)	Medium Access Area (1.4 miles)	Large Access Area (3.7 miles)
<b>Food Insecure</b>			
Access to Pantries	-0.426*	-0.138	0.005
Access to Supermarkets/Superstores	0.556	-0.011	-0.047
Access to Large and Medium Grocery Stores	0.145	0.062	0.105
Access to Small Grocery Stores	0.017	-0.004	-0.027
Access to Convenience Stores	-0.015	0.051	0.007
Access to Specialty Stores <sup>a</sup>	-0.258	-0.240**	-0.142***
Access to Other Stores <sup>b</sup>	-0.158	0.164	0.139**
<b>Food Insecure with Very Low Food Security</b>			
Access to Pantries	-0.411	-0.079	-0.061
Access to Supermarkets/Superstores	-0.368	0.008	0.021
Access to Large and Medium Grocery Stores	0.028	-0.066	-0.015
Access to Small Grocery Stores	0.136	0.075	0.012
Access to Convenience Stores	-0.749	-0.203	-0.162
Access to Specialty Food Stores <sup>a</sup>	-0.466	-0.008	0.189***
Access to Other Stores <sup>b</sup>	-0.426*	-0.138	0.005**

Source: Hunger in America 2009; STARS 2009; ACS 2005–2009.

Notes: Marginal effects in percentage points (all estimates have been multiplied by 100).

Estimates for each access area and dependent variable are based on separate regressions for each access area. Each regression contains the full set of demographic and economic variables as well as the full set of population characteristics variables included in Table III.6.

<sup>a</sup> "Specialty food stores" comprises stores classified as selling one of the following specialized items: bakery/bread, fruits/vegetables, meat/poultry products, or seafood products.

<sup>b</sup> "Other stores" comprises stores classified as combination grocery/other, delivery route, farmers' market, nonprofit food buying cooperative, wholesaler, or meal service providers.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

### **C. Summary of Findings**

The main finding from this chapter is that pantry households with greater access to emergency food pantries are less likely to be food insecure, but not less likely to be food insecure with very low food security. The magnitude of the estimate converges to zero and the statistical significance weakens as the geographic area in which access is measured increases in size. The relationship between access to food retailers and household food insecurity is weak and not statistically significant.

The median number of pantries is 1 in the smallest area (0.6 mile radius), 2 in the middle area (1.4 miles), and 8 in the largest area (3.7 miles). The regression findings in the smallest area suggest that we are largely measuring the difference between having one pantry nearby and having none nearby, whereas with larger areas, we are measuring the effect of having more than one pantry in the area. Thus, the association between access to pantries and household food insecurity may be due to proximity and not the number of pantries.

The inverse relationship between access to emergency food pantries and household food insecurity exists for many subgroups of interest to social welfare policy officials, but not their complements. That is, it is found for households with children (but not households without children); households with income below the federal poverty threshold (but not households with income at or above this threshold); households living in metropolitan areas (but not households living in nonmetropolitan areas); and households not participating in SNAP (but not SNAP participant households). The differences in these relationships across subgroups do not exist for most subgroups when examining the relationship between access to pantries and a household having very low food security.

## V. CONCLUSION

### A. Summary

This study characterizes access to food for emergency food pantry client households and examines how client household food security is related to food access. Food access is measured by proximity to food retailers and food pantries. Analyses are performed for the full sample of client households and for subgroups defined by demographic and economic characteristics and by participation in federal food assistance programs.

At least 50 percent of emergency food pantry households have access to a pantry within 0.6 miles of where they live and at least 75 percent of pantry households have access to a pantry within 1.4 miles. At least 75 percent of pantry households have access to a food retailer within 0.6 miles of where they live and at least 90 percent have access to a food retailer within 1.4 miles. Fewer households have a supermarket or superstore within close proximity (0.6 miles), though. The percentage of pantry households without access to a supermarket or superstore ranges from 55 percent when identifying stores within 0.6 miles of the household's residential location to 18 percent within 1.4 miles of the household's location. In terms of store composition, supermarkets and superstores make up 8 percent of food retailers within 0.6 miles of a household's location and 14 percent within 1.4 miles. The percentage of retailers that are convenience stores, however, is about 33 percent in both of these areas. Finally, access to pantries and food retailers differs only marginally by characteristics of emergency food pantry households.

Pantry households with greater access to pantries (defined by having more pantries in the area in which they live) are less likely to be food insecure. The corresponding relationship of household food insecurity with access to retail food establishments is weak and not statistically significant. Performing the analysis by household subgroup showed that the inverse relationship between access to emergency food pantries and household food insecurity exists for many subgroups of particular interest to social welfare policy officials. These subgroups include households with children, households with income below the federal poverty threshold, households living in metropolitan areas, and households not participating in SNAP. The relationship does not exist for the complements of these subgroups, such as households without children, households without elderly members, and so on. The differences in these relationships across subgroups do not exist for most subgroups when examining the relationship between access to pantries and a household having very low food security.

### B. Limitations of Study

It is important to note that the research involves several important limitations. First, this study is based only on households receiving food from emergency food pantries and not all low-income households. Because food pantry clients may differ from low-income households not receiving food pantry assistance, we do not recommend generalization of the study results to a larger population.

A second limitation is that the STARS database of SNAP-authorized food retailers identifies store types but does not include information on food quality, selection, and prices. It is possible that household food security is determined not by the availability of stores in the area but by the availability of affordable food (low prices) and greater variety and depth of stock of food items. Depth of stock is important because it affects that number of stores that households must visit in order to obtain all items on their grocery list. In addition, STARS does not contain the population of food

retailers, but only those that are authorized to accept SNAP benefits. As a result, STARS may underrepresent retailers in high income areas if retailers do not apply for SNAP authorization in areas in which there are small numbers of SNAP participants. Because most emergency food pantry households live in lower-income areas, STARS data are not likely to underrepresent their access to retailers.

Just as the number of stores in the area does not capture other dimensions of food access such as the depth of stock of items within the store, measuring access to emergency pantries using the number of pantries does not capture the potentially sizable degree of variation in the hours and days each week that pantries operate and the amount of food received from pantries. Pantries generally are open much more seldom than stores, with some operating only for a single day per month. The amount of food obtained at a pantry is also likely to vary greatly across pantries and may consist in some cases of a single grocery bag of food. Finally, there may also be regulations in areas regarding how often households may receive food from a single pantry and, in areas in which emergency food networks coordinate food distribution to households, whether households may obtain food from multiple pantry sites. Our measures of access to pantries do not account for these additional dimensions of access, but they are important for interpreting access measures and relationships between food security and access.

At the core of the study are the geocoding algorithms through which we defined food access areas and identified local population characteristics. While pantries and food retailers were identified using street addresses, client households could be identified only by residential zip code and not by street address. We believe using the population-weighted centroid of the respondents' residential zip codes helped to address this limitation, as it is the most likely place to live within the geographic boundary and, on average, correctly reflects geographic location. However, the study would be strengthened if respondents' residential addresses were known.

Emergency pantry access areas for some households may not include the pantry at which the interview was conducted. The food access measures were defined using the sample distribution of the distance from the household location and the pantry site, rather than using household-specific distances, for computational efficiency in the GIS file creation. Thus, the access area only contains the pantry site for a percentage of the sample depending on which percentile distance is used. For example, the median access area (with radius of 1.4 miles) will only include the pantry site for 50 percent of the sample.

The study also assumes that the stores and pantries identified in the area in which a household lives is a relevant set of potential sources of food. The USDA (2009) states, however, that research on food access using home and store locations ignores the potential access to food that consumers have because they travel to school and work. While the HIA 2009 data does not include information on where household members work or attend school, the study would be strengthened if we knew more about how households decide where to shop for food or where to receive food from a pantry.

Despite these limitations, this study contains findings that are nationally representative of households in Feeding America's emergency food network, whereas most studies of food access focus at the local level. In addition, the findings are robust to several spatial definitions of food access that are typically not possible to define in related studies due to a lack of information about how far consumers travel to obtain food. Finally, the large sample sizes in this study make it an ideal framework in which to examine how the relationships differ by household and population characteristics.



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## **APPENDIX A**

### **GEOCODING METHODOLOGY**

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We employed a three-step process to locate each of the pantries to a point on the map of the United States. Each step can also be thought of as a match category, where the first category is the closest match and the third category is the least precise. The first category comprises addresses that match a street address on a map with a high level of confidence. The third category comprises addresses that do not match with a street address and, therefore, are matched to the center of the zip code. This third group includes post office boxes and addresses that cannot be matched to a street address on the map using even the lowest matching criterion. Finally, the second category comprises addresses that match to a street address with a lower level of confidence; however, its matching zip code increases its precision to the level of the third category, which uses only a zip code to match the addresses. We discuss each of the steps taken to obtain the three categories and summarize the match rates below.

The first step was to run the entire set of pantry street addresses through the geocoding tool in Esri's ArcMap software version 10 with a match score threshold of 80. The software assigns the match scores based on how well the input street address (the pantry address) matches a candidate street address in the ArcMap database of addresses in the United States. The closer the input address is to the candidate address, the higher the match score will be. For example, a candidate address with a city, state, and zip code identical to the input address but with the street suffix spelled differently (Ave. versus Avenue) will receive a relatively high (though not perfect) match score. We targeted a threshold for this first step to be confident that the matches were the correct point on the map. We chose a threshold of 80 after carefully reviewing a random sample of matches at a variety of scores and conversing with Esri technical support. In general, candidate addresses with match scores equal to or greater than 80 have trivial differences with the input addresses and refer to the same point on the map.

The second step was to locate the addresses that did not meet the match score threshold of 80 using a lower threshold and ensure that, at a minimum, the zip codes on the input addresses match the candidate address zip codes. We ran the addresses that did not match at a threshold of 80 through the geocoding tool at a threshold of zero. This method returned a wide range of match scores from 0 to 79, and therefore a wide range of quality matches. Because of this variation, we imposed the secondary criterion that the candidate matches had to at least match the zip codes for the input addresses. Thus, it is likely that the matches are more precise than in the third category, where we matched pantries to the center of the zip codes. Furthermore, we are certain that the candidate match is at least within the boundaries of the correct zip code.

The final step in locating pantries was to assign unmatched addresses to the population-weighted centroids of the appropriate zip codes. The group of unmatched addresses comprises street addresses that did not match in the first two steps and post office boxes (none of which match to a street address). We merged the addresses with a data set of zip codes that included the coordinates for the population-weighted centroids of each zip code.<sup>16</sup> The population-weighted centroids represent the center of the populations in zip codes and are calculated using detailed census populations within each zip code. We used population-weighted centroids rather than the

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<sup>16</sup>The Missouri Census Data Center (<http://mcdc.missouri.edu/>) provided the set of population-weighted centroids.

geographic center of the zip codes because the pantries are more likely to be located in the area of the zip code where people live than in the zip code's center.

Table A.1 summarizes the match rates for each of the three categories. All 28,812 pantries were matched using one of the three steps. In the first step, we matched 23,751 of the 25,723 addresses not assigned to post office boxes at a threshold of 80 in the ArcMap geocoding tool (92.3 percent). In addition, 21,628 (84.1 percent) were identical matches (match score equal to 100). Conversely, 1,972 (7.7 percent) of the pantries had a match score below 80. Of the 1,972 addresses that did not match in step one, 704 matched at a threshold of zero, and the input zip code matched the candidate zip code (35.7 percent). Of the 1,268 addresses that did not match in step two, 411 matched an address but the zip code did not match; 857 did not match any candidate address even at a threshold of zero. The final step was to combine the 1,268 unmatched addresses with the 3,089 post office boxes and match the total 4,357 addresses to the population-weighted centroids. In the end, 24,455 of the 28,812 pantries were matched to a street address (84.9 percent) and 4,357 were matched to a zip code centroid (15.2 percent).

We employed the same three-step process to locate the 195,897 retail food establishments. The only difference was that the set of food retailers did not contain post office boxes. Thus, the percentage of addresses matched to zip code centroids was much lower than for pantries, and the match rate to street addresses was much higher. Table A2 summarizes the results of each step of the geocoding process.

All of the 195,897 retail food establishments were matched to either a street address or a zip code centroid. First, 189,943 retail food establishments (96.5 percent) were matched to a street address using the geocoding tool in ArcMap and a threshold of 80. Most of the addresses received a match score of 100 (84.7 percent of all food retailers). On the other hand, 6,954 retail food establishments (3.5 percent) did not match a candidate street address using a threshold of 80. Of the 6,954 unmatched addresses, 1,832 food retailers matched a street address using a threshold of zero, and the input zip code matched the candidate zip code (26.3 percent). Of the 5,122 addresses that did not match in step two, 1,881 matched an address, but the zip code did not match, and 3,241 did not match any candidate address even at a threshold of zero. The final step was to match the 5,122 addresses to population-weighted zip code centroids. In the end, 191,775 of the 196,897 pantries were matched to a street address (97.4 percent), and 5,122 were matched to a zip code centroid (2.6 percent).

**Table A.1. Summary of Emergency Food Pantry Geocoding Procedure**

Address Category	Number	Percent Matched and Unmatched
Total Pantries	28,812	--
Street Addresses	25,723	
Matched (Threshold = 80)	23,751	92.3
100	21,628	84.1
95 to 100	815	3.2
90 to 94	948	3.7
85 to 89	135	0.5
80 to 84	225	0.9
Unmatched (Threshold = 80)	1,972	7.7
Matched (Threshold = 0) <sup>a</sup>	704	35.7
75 to 79	28	1.4
70 to 74	204	10.3
65 to 69	229	11.6
60 to 65	124	6.3
50 to 59	79	4.0
0 to 49	40	2.0
Unmatched (Threshold = 0)	1,268	64.3
Matched zip not the same as pantry zip	411	32.4
No candidate address	857	67.6
PO Boxes	3,089	-
Total Matches to Street Addresses	24,455	84.9
Total Matches to Zip Code Centroid (Unmatched + PO Boxes) <sup>b</sup>	4,357	15.1

Source: Hunger in America 2009

<sup>a</sup> We consider addresses with match scores between 0 and 79 to be matches if the matched address zip code is the same as the pantry's zip code.

<sup>b</sup> All unmatched addresses (3,089 PO Boxes and 1,268 unmatched street addresses) were matched to a population weighted or geographic zip code centroid.

**Table A.2. Summary of Retail Food Establishment Geocoding Procedure**

Address Category	Number	Percent Matched and Unmatched
Total Stores	196,897	-
Matched (Threshold = 80)	189,943	96.5
100	166,722	84.7
95 to 100	4,519	2.3
90 to 94	13,940	7.1
85 to 89	2,234	1.1
80 to 84	2,528	1.3
Unmatched (Threshold = 80)	6,954	3.5
Matched (Threshold = 0) <sup>a</sup>	1,832	26.3
75 to 79	28	0.4
70 to 74	377	5.4
65 to 69	341	4.9
60 to 65	305	4.4
50 to 59	547	7.9
0 to 49	234	3.4
Unmatched (Threshold = 0)	5,122	73.7
Matched zip not the same as store zip	1,881	36.7
No candidate address	3,241	63.3
PO Boxes		
Total Matches to Street Addresses	191,775	97.4
Total Matches to Zip Code Centroid (Unmatched + PO Boxes) <sup>b</sup>	5,122	2.6

Source: Hunger in America 2009

<sup>a</sup> We consider addresses with match scores between 0 and 79 to be matches if the matched address zip code is the same as the store's zip code.

<sup>b</sup> All unmatched addresses (5,405 unmatched street addresses) were matched to a population weighted or geographic zip code centroid.



**APPENDIX B**

**ADDITIONAL TABLES FOR HOUSEHOLD FOOD INSECURITY AND FOOD  
ACCESS REGRESSION COEFFICIENTS**

Table B.1: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.026	0.014	-0.009	0.017	-0.008	0.005	-0.003	0.004	0.000	0.002	0.001	0.002
Access to Food Retailers	0.001	0.004	-0.007	0.004	-0.001	0.001	-0.002	0.001	0.000	0.001	-0.001	0.000
Female	0.188	0.062	-0.179	0.056	0.189	0.063	-0.184	0.056	0.191	0.063	-0.180	0.056
Age	-0.015	0.003	-0.010	0.003	-0.015	0.003	-0.011	0.003	-0.015	0.003	-0.011	0.003
Married	-0.063	0.083	-0.181	0.071	-0.061	0.084	-0.179	0.072	-0.065	0.084	-0.183	0.072
Number of Children 0 to 5 in Household	-0.179	0.050	-0.039	0.049	-0.180	0.050	-0.043	0.049	-0.179	0.050	-0.040	0.049
Number of Children 6 to 17 in Household	-0.037	0.054	0.024	0.050	-0.036	0.054	0.027	0.048	-0.036	0.053	0.029	0.049
Number of Adults in Household	0.106	0.041	0.069	0.033	0.106	0.041	0.071	0.033	0.106	0.041	0.072	0.033
Elderly Member in Household	-0.758	0.087	-0.871	0.092	-0.752	0.087	-0.866	0.092	-0.757	0.087	-0.873	0.093
Completed High School (compared to Less than High School)	-0.152	0.066	-0.133	0.062	-0.152	0.066	-0.138	0.063	-0.153	0.067	-0.136	0.063
Completed More than High School (Compared to Less than High School)	-0.274	0.077	-0.096	0.071	-0.281	0.077	-0.108	0.073	-0.281	0.076	-0.104	0.073
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.003	0.000	-0.003	0.001	-0.003	0.000	-0.003	0.001	-0.003	0.000
Employed Part-Time (compared to not employed)	-0.243	0.117	-0.298	0.086	-0.244	0.117	-0.300	0.086	-0.243	0.118	-0.303	0.086
Employed Full-Time (compared to not employed)	-0.300	0.124	-0.428	0.094	-0.297	0.124	-0.431	0.093	-0.299	0.125	-0.437	0.096
White, non-Hispanic (compared to Hispanic)	0.047	0.106	0.187	0.097	0.056	0.104	0.192	0.096	0.051	0.104	0.188	0.096
Black, non-Hispanic (compared to Hispanic)	-0.157	0.122	-0.192	0.123	-0.159	0.120	-0.203	0.124	-0.164	0.121	-0.196	0.122
Other, non-Hispanic (compared to Hispanic)	-0.205	0.221	0.173	0.109	-0.201	0.224	0.173	0.107	-0.205	0.224	0.175	0.109
Citizen	-0.113	0.137	0.375	0.108	-0.103	0.136	0.383	0.109	-0.104	0.136	0.378	0.107
SNAP Participant	0.059	0.067	-0.004	0.062	0.063	0.067	-0.003	0.063	0.057	0.067	-0.010	0.062
WIC Participant	-0.398	0.115	-0.553	0.124	-0.394	0.114	-0.546	0.122	-0.394	0.115	-0.548	0.122
NSLP/SBP Participant	0.022	0.102	-0.071	0.098	0.024	0.102	-0.074	0.096	0.026	0.101	-0.076	0.096
Household Lives in Metro Area (compared to non-metro area)	0.314	0.105	0.284	0.085	0.304	0.105	0.275	0.085	0.301	0.105	0.281	0.086
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.004	0.003	0.004	0.002	0.004	0.003	0.004	0.002	0.004	0.003	0.003	0.002
Percentage of Non-White Individuals	0.002	0.002	-0.002	0.002	0.001	0.002	-0.002	0.002	0.001	0.002	-0.002	0.002
Percentage of Individuals of Hispanic Origin	0.000	0.003	0.003	0.002	0.000	0.003	0.003	0.002	0.000	0.003	0.003	0.002
Percentage of Individuals with At Most High School Education	0.001	0.005	-0.004	0.004	0.001	0.005	-0.004	0.004	0.001	0.005	-0.005	0.004
Percentage of Households Headed by Female with Children	-0.002	0.004	0.001	0.004	-0.002	0.004	0.002	0.004	-0.002	0.004	0.001	0.004
Percentage of Households without Access to a Vehicle	-0.002	0.013	-0.006	0.010	-0.002	0.013	-0.007	0.010	-0.002	0.012	-0.004	0.010
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.122	0.257	-0.047	0.210	2.083	0.260	-0.048	0.212	2.106	0.260	-0.014	0.212
Sample Size	35,959		35,959		35,959		35,959		35,959		35,959	
Dependent Variable	Food Insecure		Food Insecure with Very Low Food Security		Food Insecure		Food Insecure with Very Low Food Security		Food Insecure		Food Insecure with Very Low Food Security	
Access Area	(0.6 Miles)		(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.2: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households with Children

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.067	0.022	-0.065	0.025	-0.018	0.009	-0.019	0.009	-0.007	0.004	-0.006	0.003
Access to Food Retailers	0.003	0.007	0.002	0.006	-0.002	0.003	-0.001	0.002	0.000	0.001	0.000	0.001
Female	0.263	0.097	-0.068	0.091	0.267	0.099	-0.070	0.090	0.256	0.097	-0.068	0.090
Age	-0.007	0.004	-0.003	0.004	-0.007	0.004	-0.003	0.004	-0.007	0.004	-0.003	0.004
Married	-0.135	0.111	-0.137	0.091	-0.141	0.113	-0.134	0.091	-0.150	0.113	-0.142	0.092
Number of Children 0 to 5 in Household	-0.131	0.056	0.048	0.058	-0.136	0.055	0.041	0.058	-0.132	0.055	0.046	0.057
Number of Children 6 to 17 in Household	-0.029	0.052	0.074	0.041	-0.027	0.051	0.079	0.040	-0.022	0.047	0.080	0.040
Number of Adults in Household	0.111	0.053	0.079	0.048	0.112	0.053	0.078	0.047	0.114	0.053	0.081	0.048
Elderly Member in Household	-0.734	0.168	-0.836	0.173	-0.716	0.173	-0.827	0.172	-0.729	0.170	-0.833	0.173
Completed High School (compared to Less than High School)	-0.159	0.108	-0.247	0.102	-0.179	0.110	-0.260	0.102	-0.166	0.108	-0.254	0.102
Completed More than High School (Compared to Less than High School)	-0.360	0.123	-0.262	0.103	-0.382	0.123	-0.283	0.105	-0.365	0.124	-0.270	0.104
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001
Employed Part-Time (compared to not employed)	-0.138	0.163	-0.247	0.110	-0.153	0.159	-0.249	0.110	-0.147	0.163	-0.248	0.111
Employed Full-Time (compared to not employed)	-0.331	0.137	-0.351	0.121	-0.341	0.135	-0.362	0.120	-0.332	0.136	-0.350	0.121
White, non-Hispanic (compared to Hispanic)	0.506	0.140	0.387	0.128	0.516	0.139	0.409	0.126	0.521	0.139	0.407	0.127
Black, non-Hispanic (compared to Hispanic)	-0.044	0.153	0.019	0.149	-0.056	0.154	0.023	0.150	-0.034	0.152	0.040	0.148
Other, non-Hispanic (compared to Hispanic)	-0.026	0.209	0.463	0.161	0.012	0.207	0.489	0.158	-0.010	0.203	0.477	0.160
Citizen	-0.060	0.186	0.494	0.174	-0.039	0.183	0.499	0.171	-0.057	0.181	0.479	0.171
SNAP Participant	-0.174	0.095	-0.074	0.077	-0.169	0.095	-0.072	0.077	-0.189	0.095	-0.086	0.077
WIC Participant	-0.381	0.127	-0.511	0.131	-0.368	0.126	-0.502	0.129	-0.376	0.125	-0.509	0.129
NSLP/SBP Participant	0.026	0.104	0.035	0.095	0.030	0.103	0.035	0.095	0.022	0.101	0.031	0.095
Household Lives in Metro Area (compared to non-metro area)	0.359	0.123	0.316	0.127	0.332	0.120	0.293	0.124	0.342	0.119	0.310	0.124
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	-0.002	0.004	0.002	0.004	-0.001	0.005	0.002	0.004	-0.002	0.005	0.002	0.004
Percentage of Non-White Individuals	0.007	0.003	-0.001	0.002	0.006	0.002	-0.002	0.002	0.006	0.002	-0.002	0.002
Percentage of Individuals of Hispanic Origin	0.004	0.003	0.005	0.003	0.003	0.003	0.005	0.003	0.003	0.003	0.005	0.003
Percentage of Individuals with At Most High School Education	0.001	0.006	-0.009	0.006	0.001	0.006	-0.008	0.006	0.001	0.006	-0.008	0.006
Percentage of Households Headed by Female with Children	-0.001	0.008	0.001	0.007	-0.001	0.007	0.002	0.007	0.000	0.007	0.002	0.006
Percentage of Households without Access to a Vehicle	-0.024	0.016	-0.016	0.016	-0.024	0.017	-0.016	0.017	-0.024	0.016	-0.017	0.016
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.577	0.323	-0.754	0.334	1.542	0.325	-0.789	0.331	1.550	0.323	-0.762	0.329
Sample Size	15,482		15,482		15,482		15,482		15,482		15,482	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.3: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households without Children

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.005	0.018	0.020	0.022	-0.003	0.006	0.005	0.006	0.004	0.003	0.005	0.003
Access to Food Retailers	0.001	0.004	-0.013	0.005	0.000	0.001	-0.003	0.002	-0.001	0.001	-0.001	0.000
Female	0.152	0.073	-0.196	0.069	0.153	0.073	-0.201	0.069	0.153	0.072	-0.197	0.070
Age	-0.022	0.005	-0.017	0.004	-0.021	0.005	-0.018	0.004	-0.022	0.005	-0.018	0.004
Married	0.069	0.100	-0.140	0.095	0.071	0.099	-0.142	0.095	0.075	0.100	-0.144	0.095
Number of Children 0 to 5 in Household	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of Children 6 to 17 in Household	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of Adults in Household	0.026	0.057	0.032	0.044	0.024	0.057	0.036	0.044	0.020	0.057	0.031	0.045
Elderly Member in Household	-0.659	0.102	-0.796	0.112	-0.663	0.102	-0.791	0.112	-0.663	0.102	-0.799	0.111
Completed High School (compared to Less than High School)	-0.171	0.095	-0.057	0.085	-0.169	0.095	-0.060	0.085	-0.175	0.094	-0.063	0.085
Completed More than High School (Compared to Less than High School)	-0.228	0.098	0.024	0.091	-0.229	0.098	0.019	0.093	-0.242	0.097	0.009	0.095
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001
Employed Part-Time (compared to not employed)	-0.327	0.166	-0.349	0.108	-0.325	0.167	-0.356	0.108	-0.316	0.168	-0.351	0.107
Employed Full-Time (compared to not employed)	-0.330	0.207	-0.537	0.153	-0.324	0.206	-0.540	0.153	-0.339	0.207	-0.566	0.164
White, non-Hispanic (compared to Hispanic)	-0.288	0.140	0.014	0.117	-0.283	0.139	0.005	0.118	-0.280	0.137	0.010	0.112
Black, non-Hispanic (compared to Hispanic)	-0.296	0.163	-0.355	0.148	-0.287	0.160	-0.372	0.152	-0.295	0.157	-0.358	0.141
Other, non-Hispanic (compared to Hispanic)	-0.353	0.245	-0.074	0.132	-0.349	0.244	-0.085	0.133	-0.343	0.248	-0.058	0.141
Citizen	-0.193	0.214	0.082	0.168	-0.208	0.210	0.107	0.176	-0.192	0.211	0.106	0.168
SNAP Participant	0.225	0.087	0.054	0.084	0.226	0.086	0.048	0.083	0.226	0.087	0.045	0.083
WIC Participant	0.378	0.364	-0.285	0.387	0.380	0.364	-0.292	0.385	0.392	0.362	-0.278	0.392
NSLP/SBP Participant	0.319	0.435	-0.855	0.404	0.317	0.432	-0.848	0.400	0.304	0.437	-0.884	0.411
Household Lives in Metro Area (compared to non-metro area)	0.328	0.129	0.274	0.099	0.330	0.130	0.265	0.101	0.305	0.129	0.258	0.100
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.008	0.004	0.004	0.003	0.008	0.004	0.003	0.003	0.008	0.004	0.003	0.003
Percentage of Non-White Individuals	-0.003	0.002	-0.003	0.002	-0.003	0.002	-0.002	0.002	-0.003	0.002	-0.002	0.002
Percentage of Individuals of Hispanic Origin	-0.002	0.003	0.001	0.002	-0.002	0.003	0.001	0.002	-0.002	0.003	0.001	0.002
Percentage of Individuals with At Most High School Education	0.001	0.006	0.000	0.005	0.001	0.006	0.000	0.005	0.002	0.006	0.000	0.005
Percentage of Households Headed by Female with Children	-0.001	0.005	0.000	0.005	-0.001	0.005	0.002	0.005	-0.002	0.005	0.001	0.004
Percentage of Households without Access to a Vehicle	0.020	0.018	0.004	0.018	0.021	0.018	0.004	0.018	0.018	0.017	0.006	0.017
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.746	0.403	0.638	0.248	2.739	0.398	0.671	0.246	2.764	0.401	0.716	0.244
Sample Size	20,477		20,477		20,477		20,477		20,477		20,477	
Dependent Variable	Food Insecure		Food Insecure with Very Low Food Security		Food Insecure		Food Insecure with Very Low Food Security		Food Insecure		Food Insecure with Very Low Food Security	
Access Area	(0.6 Miles)		(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.4: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households with Elderly

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.012	0.020	-0.031	0.037	-0.003	0.008	-0.006	0.010	0.002	0.003	0.006	0.004
Access to Food Retailers	-0.004	0.006	-0.016	0.011	0.001	0.002	-0.001	0.002	0.000	0.001	-0.001	0.001
Female	0.088	0.101	-0.273	0.138	0.080	0.101	-0.282	0.142	0.079	0.101	-0.293	0.141
Age	-0.030	0.005	-0.032	0.006	-0.030	0.006	-0.031	0.007	-0.030	0.006	-0.031	0.006
Married	0.149	0.125	-0.144	0.158	0.152	0.125	-0.148	0.159	0.151	0.126	-0.150	0.159
Number of Children 0 to 5 in Household	-0.324	0.194	0.233	0.214	-0.319	0.197	0.240	0.232	-0.324	0.196	0.238	0.239
Number of Children 6 to 17 in Household	-0.044	0.108	-0.003	0.105	-0.034	0.108	0.003	0.105	-0.046	0.109	-0.008	0.108
Number of Adults in Household	0.098	0.065	0.021	0.083	0.098	0.065	0.027	0.080	0.100	0.065	0.033	0.079
Elderly Member in Household	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Completed High School (compared to Less than High School)	-0.380	0.115	-0.035	0.165	-0.368	0.117	-0.020	0.166	-0.371	0.115	-0.010	0.165
Completed More than High School (Compared to Less than High School)	-0.435	0.132	-0.126	0.171	-0.416	0.130	-0.092	0.168	-0.425	0.130	-0.085	0.168
Household Income as a Percentage of Federal Poverty Threshold	-0.006	0.001	-0.005	0.001	-0.006	0.001	-0.005	0.001	-0.006	0.001	-0.005	0.001
Employed Part-Time (compared to not employed)	0.149	0.205	-0.427	0.278	0.147	0.205	-0.456	0.279	0.143	0.206	-0.449	0.278
Employed Full-Time (compared to not employed)	-0.142	0.301	0.357	0.406	-0.131	0.301	0.428	0.419	-0.133	0.304	0.424	0.426
White, non-Hispanic (compared to Hispanic)	-0.188	0.163	-0.311	0.221	-0.198	0.163	-0.299	0.221	-0.193	0.165	-0.324	0.221
Black, non-Hispanic (compared to Hispanic)	0.014	0.170	-0.480	0.215	0.005	0.170	-0.484	0.214	0.004	0.171	-0.501	0.217
Other, non-Hispanic (compared to Hispanic)	-0.076	0.185	-0.294	0.230	-0.074	0.188	-0.243	0.237	-0.071	0.188	-0.282	0.239
Citizen	0.314	0.298	0.594	0.338	0.306	0.290	0.622	0.327	0.311	0.293	0.611	0.342
SNAP Participant	0.342	0.139	0.202	0.162	0.346	0.141	0.222	0.167	0.346	0.141	0.240	0.167
WIC Participant	-0.188	0.367	-1.563	0.405	-0.176	0.371	-1.558	0.424	-0.172	0.373	-1.527	0.427
NSLP/SBP Participant	-0.176	0.218	-0.224	0.251	-0.197	0.216	-0.233	0.247	-0.170	0.219	-0.207	0.255
Household Lives in Metro Area (compared to non-metro area)	0.331	0.146	-0.063	0.182	0.355	0.148	-0.011	0.183	0.342	0.148	-0.009	0.182
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.003	0.005	0.009	0.006	0.003	0.005	0.008	0.007	0.003	0.005	0.008	0.006
Percentage of Non-White Individuals	-0.001	0.003	-0.002	0.003	0.000	0.003	-0.001	0.003	0.000	0.003	0.000	0.003
Percentage of Individuals of Hispanic Origin	-0.004	0.003	-0.010	0.004	-0.004	0.003	-0.009	0.004	-0.004	0.003	-0.008	0.004
Percentage of Individuals with At Most High School Education	0.001	0.007	0.012	0.010	0.001	0.007	0.010	0.010	0.001	0.007	0.010	0.009
Percentage of Households Headed by Female with Children	-0.003	0.008	-0.004	0.009	-0.004	0.007	-0.003	0.009	-0.005	0.007	-0.007	0.008
Percentage of Households without Access to a Vehicle	0.028	0.022	-0.030	0.025	0.032	0.020	-0.028	0.027	0.028	0.021	-0.036	0.026
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.376	0.524	0.761	0.680	2.373	0.526	0.673	0.712	2.391	0.534	0.722	0.707
Sample Size	8,103		8,103		8,103		8,103		8,103		8,103	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.5: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households without Elderly

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.027	0.015	-0.005	0.017	-0.008	0.005	-0.002	0.004	-0.001	0.002	0.000	0.002
Access to Food Retailers	0.001	0.004	-0.006	0.004	-0.002	0.001	-0.003	0.001	-0.001	0.001	-0.001	0.000
Female	0.244	0.073	-0.150	0.061	0.241	0.074	-0.157	0.061	0.246	0.075	-0.152	0.061
Age	-0.006	0.004	-0.005	0.003	-0.006	0.004	-0.006	0.003	-0.006	0.004	-0.006	0.003
Married	-0.097	0.102	-0.170	0.074	-0.096	0.104	-0.167	0.075	-0.102	0.104	-0.171	0.075
Number of Children 0 to 5 in Household	-0.138	0.050	-0.031	0.053	-0.138	0.050	-0.034	0.053	-0.135	0.050	-0.032	0.053
Number of Children 6 to 17 in Household	-0.028	0.054	0.025	0.052	-0.028	0.054	0.028	0.050	-0.028	0.053	0.031	0.050
Number of Adults in Household	0.051	0.048	0.046	0.038	0.050	0.049	0.047	0.038	0.050	0.048	0.047	0.038
Elderly Member in Household	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Completed High School (compared to Less than High School)	-0.045	0.078	-0.143	0.069	-0.045	0.079	-0.147	0.070	-0.048	0.078	-0.148	0.070
Completed More than High School (Compared to Less than High School)	-0.239	0.094	-0.113	0.077	-0.250	0.093	-0.126	0.077	-0.251	0.092	-0.128	0.078
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.003	0.000	-0.003	0.001	-0.003	0.000	-0.003	0.001	-0.003	0.001
Employed Part-Time (compared to not employed)	-0.292	0.125	-0.299	0.089	-0.290	0.125	-0.298	0.089	-0.292	0.126	-0.302	0.089
Employed Full-Time (compared to not employed)	-0.339	0.131	-0.476	0.094	-0.331	0.132	-0.477	0.093	-0.336	0.133	-0.483	0.095
White, non-Hispanic (compared to Hispanic)	0.141	0.120	0.254	0.110	0.153	0.116	0.258	0.109	0.147	0.116	0.257	0.108
Black, non-Hispanic (compared to Hispanic)	-0.227	0.139	-0.179	0.137	-0.237	0.135	-0.194	0.138	-0.235	0.136	-0.183	0.135
Other, non-Hispanic (compared to Hispanic)	-0.259	0.267	0.231	0.124	-0.258	0.269	0.226	0.122	-0.254	0.270	0.234	0.126
Citizen	-0.168	0.147	0.380	0.116	-0.155	0.147	0.390	0.118	-0.157	0.146	0.387	0.116
SNAP Participant	-0.060	0.076	-0.060	0.065	-0.050	0.077	-0.056	0.066	-0.060	0.078	-0.063	0.066
WIC Participant	-0.360	0.121	-0.496	0.126	-0.353	0.119	-0.488	0.123	-0.358	0.119	-0.492	0.124
NSLP/SBP Participant	0.047	0.098	-0.055	0.101	0.053	0.098	-0.056	0.099	0.053	0.098	-0.060	0.098
Household Lives in Metro Area (compared to non-metro area)	0.312	0.107	0.357	0.084	0.292	0.105	0.340	0.084	0.295	0.105	0.348	0.084
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.004	0.004	0.003	0.003	0.005	0.004	0.003	0.003	0.004	0.004	0.002	0.003
Percentage of Non-White Individuals	0.002	0.002	-0.002	0.002	0.001	0.002	-0.002	0.002	0.001	0.002	-0.002	0.002
Percentage of Individuals of Hispanic Origin	0.003	0.003	0.005	0.002	0.002	0.003	0.004	0.002	0.002	0.003	0.005	0.002
Percentage of Individuals with At Most High School Education	0.000	0.005	-0.007	0.005	0.001	0.005	-0.006	0.005	0.000	0.005	-0.007	0.005
Percentage of Households Headed by Female with Children	-0.001	0.005	0.001	0.004	-0.001	0.005	0.002	0.004	-0.001	0.005	0.002	0.004
Percentage of Households without Access to a Vehicle	-0.015	0.014	-0.001	0.012	-0.018	0.014	-0.004	0.012	-0.015	0.014	0.001	0.012
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.799	0.278	-0.280	0.225	1.736	0.286	-0.292	0.226	1.780	0.284	-0.264	0.226
Sample Size	27,586		27,586		27,586		27,586		27,586		27,586	
Dependent Variable	Food Insecure		Food Insecure with Very Low Food Security		Food Insecure		Food Insecure with Very Low Food Security		Food Insecure		Food Insecure with Very Low Food Security	
Access Area	(0.6 Miles)		(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.6: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Living in Metropolitan Areas

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.025	0.014	-0.010	0.017	-0.006	0.005	-0.003	0.004	0.000	0.002	0.001	0.002
Access to Food Retailers	0.002	0.004	-0.006	0.004	0.000	0.001	-0.002	0.001	0.000	0.001	-0.001	0.000
Female	0.178	0.073	-0.183	0.063	0.180	0.073	-0.188	0.063	0.181	0.073	-0.184	0.063
Age	-0.013	0.004	-0.009	0.003	-0.013	0.004	-0.009	0.003	-0.013	0.004	-0.009	0.003
Married	-0.022	0.097	-0.212	0.079	-0.020	0.098	-0.209	0.079	-0.024	0.098	-0.214	0.079
Number of Children 0 to 5 in Household	-0.163	0.057	-0.059	0.054	-0.162	0.057	-0.063	0.054	-0.161	0.058	-0.060	0.054
Number of Children 6 to 17 in Household	-0.055	0.059	0.016	0.057	-0.055	0.061	0.019	0.055	-0.055	0.060	0.021	0.055
Number of Adults in Household	0.097	0.047	0.072	0.040	0.095	0.047	0.074	0.040	0.096	0.047	0.075	0.040
Elderly Member in Household	-0.781	0.098	-1.010	0.095	-0.774	0.099	-1.004	0.095	-0.779	0.098	-1.012	0.096
Completed High School (compared to Less than High School)	-0.086	0.073	-0.055	0.071	-0.087	0.073	-0.061	0.072	-0.087	0.073	-0.060	0.072
Completed More than High School (Compared to Less than High School)	-0.212	0.088	-0.074	0.083	-0.218	0.089	-0.087	0.085	-0.219	0.087	-0.084	0.085
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001
Employed Part-Time (compared to not employed)	-0.198	0.137	-0.229	0.097	-0.198	0.136	-0.232	0.097	-0.198	0.137	-0.235	0.097
Employed Full-Time (compared to not employed)	-0.277	0.141	-0.398	0.107	-0.274	0.142	-0.401	0.105	-0.276	0.143	-0.407	0.109
White, non-Hispanic (compared to Hispanic)	-0.010	0.111	0.185	0.106	0.002	0.109	0.192	0.105	-0.003	0.108	0.186	0.105
Black, non-Hispanic (compared to Hispanic)	-0.211	0.134	-0.209	0.134	-0.210	0.132	-0.219	0.135	-0.215	0.133	-0.212	0.133
Other, non-Hispanic (compared to Hispanic)	-0.267	0.262	0.216	0.128	-0.264	0.266	0.217	0.127	-0.269	0.266	0.219	0.128
Citizen	-0.030	0.132	0.380	0.110	-0.023	0.132	0.388	0.110	-0.024	0.132	0.384	0.109
SNAP Participant	0.031	0.077	0.009	0.068	0.036	0.078	0.009	0.069	0.031	0.078	0.001	0.069
WIC Participant	-0.330	0.133	-0.506	0.134	-0.326	0.132	-0.499	0.131	-0.326	0.132	-0.502	0.132
NSLP/SBP Participant	0.029	0.111	-0.068	0.112	0.033	0.113	-0.071	0.110	0.037	0.113	-0.073	0.110
Household Lives in Metro Area (compared to non-metro area)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.007	0.003	0.004	0.003	0.007	0.003	0.004	0.003	0.007	0.003	0.003	0.003
Percentage of Non-White Individuals	0.002	0.002	-0.001	0.002	0.002	0.002	-0.001	0.002	0.002	0.002	-0.001	0.002
Percentage of Individuals of Hispanic Origin	0.004	0.002	0.004	0.002	0.003	0.002	0.004	0.002	0.003	0.002	0.004	0.002
Percentage of Individuals with At Most High School Education	-0.007	0.005	-0.006	0.005	-0.007	0.005	-0.006	0.005	-0.007	0.005	-0.007	0.005
Percentage of Households Headed by Female with Children	-0.004	0.004	0.000	0.004	-0.005	0.004	0.001	0.004	-0.005	0.004	0.001	0.004
Percentage of Households without Access to a Vehicle	0.010	0.015	-0.001	0.011	0.008	0.015	-0.002	0.011	0.009	0.014	0.001	0.011
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.338	0.263	0.136	0.210	2.289	0.267	0.124	0.212	2.309	0.268	0.166	0.212
Sample Size	26,575		26,575		26,575		26,575		26,575		26,575	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.7: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Living in Non-Metropolitan Areas

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	0.036	0.061	0.012	0.055	0.005	0.044	0.012	0.038	-0.015	0.027	-0.002	0.024
Access to Food Retailers	-0.010	0.019	-0.053	0.020	0.003	0.011	-0.006	0.012	0.000	0.009	0.004	0.007
Female	0.254	0.109	-0.135	0.112	0.249	0.109	-0.143	0.112	0.241	0.109	-0.141	0.111
Age	-0.021	0.006	-0.018	0.006	-0.021	0.006	-0.018	0.006	-0.021	0.006	-0.018	0.006
Married	-0.238	0.129	-0.107	0.156	-0.233	0.129	-0.101	0.156	-0.237	0.129	-0.095	0.158
Number of Children 0 to 5 in Household	-0.245	0.108	0.093	0.109	-0.250	0.108	0.084	0.108	-0.249	0.109	0.084	0.108
Number of Children 6 to 17 in Household	0.053	0.083	0.038	0.067	0.060	0.083	0.051	0.067	0.060	0.083	0.053	0.067
Number of Adults in Household	0.175	0.073	0.084	0.065	0.174	0.073	0.085	0.066	0.175	0.073	0.086	0.065
Elderly Member in Household	-0.679	0.167	-0.379	0.229	-0.676	0.168	-0.368	0.230	-0.681	0.167	-0.367	0.230
Completed High School (compared to Less than High School)	-0.387	0.136	-0.471	0.125	-0.382	0.137	-0.463	0.125	-0.384	0.137	-0.461	0.125
Completed More than High School (Compared to Less than High School)	-0.477	0.127	-0.136	0.116	-0.472	0.129	-0.127	0.116	-0.475	0.129	-0.122	0.115
Household Income as a Percentage of Federal Poverty Threshold	-0.002	0.001	-0.002	0.001	-0.002	0.001	-0.002	0.001	-0.002	0.001	-0.002	0.001
Employed Part-Time (compared to not employed)	-0.403	0.174	-0.713	0.125	-0.397	0.175	-0.697	0.126	-0.397	0.175	-0.696	0.126
Employed Full-Time (compared to not employed)	-0.272	0.193	-0.516	0.169	-0.268	0.193	-0.506	0.168	-0.266	0.193	-0.508	0.169
White, non-Hispanic (compared to Hispanic)	0.065	0.160	-0.062	0.186	0.060	0.162	-0.051	0.189	0.057	0.162	-0.052	0.189
Black, non-Hispanic (compared to Hispanic)	-0.085	0.191	-0.291	0.237	-0.107	0.191	-0.303	0.235	-0.104	0.192	-0.308	0.237
Other, non-Hispanic (compared to Hispanic)	0.028	0.188	-0.073	0.202	0.029	0.188	-0.064	0.204	0.016	0.187	-0.057	0.203
Citizen	-0.106	0.286	0.767	0.322	-0.096	0.289	0.770	0.325	-0.095	0.289	0.772	0.328
SNAP Participant	0.168	0.107	-0.067	0.130	0.167	0.107	-0.070	0.131	0.170	0.107	-0.072	0.131
WIC Participant	-0.578	0.200	-0.822	0.266	-0.570	0.202	-0.795	0.265	-0.572	0.203	-0.794	0.267
NSLP/SBP Participant	-0.054	0.191	-0.063	0.151	-0.065	0.191	-0.086	0.151	-0.067	0.190	-0.091	0.150
Household Lives in Metro Area (compared to non-metro area)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	-0.007	0.005	0.005	0.005	-0.007	0.005	0.003	0.005	-0.008	0.005	0.002	0.005
Percentage of Non-White Individuals	-0.004	0.003	-0.009	0.004	-0.004	0.003	-0.008	0.004	-0.004	0.003	-0.008	0.004
Percentage of Individuals of Hispanic Origin	-0.013	0.005	-0.010	0.007	-0.012	0.005	-0.009	0.006	-0.012	0.005	-0.010	0.006
Percentage of Individuals with At Most High School Education	0.025	0.008	0.002	0.007	0.027	0.008	0.006	0.007	0.027	0.008	0.007	0.007
Percentage of Households Headed by Female with Children	0.018	0.009	0.003	0.007	0.019	0.009	0.001	0.007	0.021	0.009	-0.001	0.007
Percentage of Households without Access to a Vehicle	-0.019	0.016	-0.027	0.022	-0.021	0.016	-0.027	0.023	-0.021	0.016	-0.028	0.023
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.004	0.499	0.116	0.427	1.933	0.504	-0.018	0.434	1.973	0.513	-0.043	0.448
Sample Size	9,384		9,384		9,384		9,384		9,384		9,384	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area			(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009



Table B.8: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households with Annual Income At or Above 100 Percent of Federal Poverty Threshold

	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Access to Pantries	-0.006	0.035	-0.057	0.035	-0.009	0.012	-0.013	0.010	0.003	0.005	0.002	0.004
Access to Food Retailers	0.003	0.008	-0.009	0.009	0.002	0.004	-0.005	0.003	0.000	0.001	-0.003	0.001
Female	0.205	0.112	0.012	0.112	0.218	0.110	0.008	0.111	0.214	0.113	0.026	0.111
Age	-0.027	0.009	-0.013	0.006	-0.026	0.008	-0.013	0.006	-0.026	0.008	-0.012	0.006
Married	-0.079	0.150	-0.138	0.151	-0.071	0.151	-0.144	0.149	-0.079	0.153	-0.141	0.149
Number of Children 0 to 5 in Household	-0.308	0.124	-0.049	0.131	-0.309	0.123	-0.037	0.132	-0.306	0.123	-0.024	0.130
Number of Children 6 to 17 in Household	0.039	0.097	0.121	0.082	0.046	0.097	0.117	0.085	0.033	0.096	0.114	0.085
Number of Adults in Household	0.108	0.078	0.005	0.073	0.104	0.078	0.009	0.072	0.106	0.077	0.007	0.071
Elderly Member in Household	-0.852	0.161	-1.142	0.176	-0.862	0.158	-1.131	0.180	-0.859	0.160	-1.129	0.180
Completed High School (compared to Less than High School)	-0.194	0.129	-0.262	0.148	-0.170	0.127	-0.269	0.146	-0.186	0.128	-0.277	0.145
Completed More than High School (Compared to Less than High School)	-0.323	0.144	-0.147	0.149	-0.300	0.142	-0.183	0.151	-0.316	0.142	-0.200	0.148
Household Income as a Percentage of Federal Poverty Threshold	-0.004	0.001	-0.001	0.001	-0.003	0.001	-0.001	0.001	-0.004	0.001	-0.001	0.001
Employed Part-Time (compared to not employed)	-0.405	0.186	-0.350	0.149	-0.405	0.183	-0.369	0.149	-0.401	0.180	-0.355	0.150
Employed Full-Time (compared to not employed)	-0.311	0.181	-0.221	0.146	-0.299	0.178	-0.218	0.147	-0.313	0.180	-0.217	0.147
White, non-Hispanic (compared to Hispanic)	-0.043	0.196	0.146	0.159	-0.015	0.196	0.146	0.162	-0.033	0.194	0.155	0.162
Black, non-Hispanic (compared to Hispanic)	-0.274	0.212	-0.362	0.199	-0.242	0.209	-0.404	0.199	-0.264	0.205	-0.399	0.199
Other, non-Hispanic (compared to Hispanic)	-0.316	0.396	0.170	0.263	-0.306	0.396	0.165	0.271	-0.302	0.390	0.172	0.274
Citizen	0.156	0.175	0.051	0.305	0.109	0.185	0.106	0.297	0.119	0.182	0.097	0.285
SNAP Participant	0.256	0.189	0.451	0.168	0.258	0.189	0.455	0.165	0.261	0.193	0.444	0.164
WIC Participant	-0.459	0.246	-0.937	0.289	-0.458	0.244	-0.940	0.290	-0.449	0.245	-0.922	0.289
NSLP/SBP Participant	-0.016	0.168	-0.268	0.190	-0.024	0.167	-0.260	0.194	-0.009	0.170	-0.264	0.195
Household Lives in Metro Area (compared to non-metro area)	0.442	0.155	0.212	0.136	0.434	0.156	0.215	0.135	0.428	0.157	0.213	0.135
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.010	0.005	0.010	0.004	0.010	0.005	0.010	0.004	0.011	0.005	0.010	0.004
Percentage of Non-White Individuals	-0.001	0.003	-0.002	0.003	-0.001	0.003	-0.003	0.003	-0.001	0.003	-0.003	0.003
Percentage of Individuals of Hispanic Origin	-0.003	0.004	-0.003	0.003	-0.003	0.004	-0.003	0.003	-0.002	0.004	-0.003	0.003
Percentage of Individuals with At Most High School Education	-0.003	0.008	0.003	0.007	-0.002	0.008	0.004	0.007	-0.002	0.008	0.004	0.007
Percentage of Households Headed by Female with Children	-0.004	0.006	-0.006	0.007	-0.005	0.006	-0.005	0.007	-0.006	0.006	-0.007	0.007
Percentage of Households without Access to a Vehicle	0.046	0.030	-0.007	0.023	0.048	0.029	-0.014	0.025	0.037	0.028	-0.017	0.023
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.474	0.649	-0.096	0.386	2.416	0.633	-0.179	0.405	2.488	0.630	-0.188	0.410
Sample Size	9,908		9,908		9,908		9,908		9,908		9,908	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.9: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households with Annual Income Below 100 Percent of Federal Poverty Threshold

	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Access to Pantries	-0.036	0.012	0.002	0.018	-0.008	0.005	0.000	0.004	-0.002	0.002	0.001	0.002
Access to Food Retailers	0.001	0.005	-0.006	0.004	-0.002	0.001	-0.002	0.001	-0.001	0.001	0.000	0.000
Female	0.173	0.082	-0.233	0.070	0.167	0.082	-0.236	0.070	0.166	0.081	-0.232	0.071
Age	-0.010	0.003	-0.009	0.003	-0.010	0.003	-0.009	0.003	-0.010	0.003	-0.009	0.003
Married	-0.069	0.087	-0.193	0.073	-0.064	0.087	-0.191	0.072	-0.072	0.088	-0.194	0.073
Number of Children 0 to 5 in Household	-0.142	0.055	-0.040	0.054	-0.146	0.054	-0.042	0.053	-0.144	0.054	-0.039	0.053
Number of Children 6 to 17 in Household	-0.052	0.067	0.009	0.054	-0.051	0.067	0.012	0.053	-0.047	0.064	0.013	0.054
Number of Adults in Household	0.096	0.041	0.079	0.034	0.097	0.041	0.080	0.034	0.098	0.041	0.081	0.034
Elderly Member in Household	-0.703	0.111	-0.754	0.108	-0.693	0.112	-0.753	0.108	-0.703	0.111	-0.757	0.108
Completed High School (compared to Less than High School)	-0.133	0.082	-0.080	0.075	-0.142	0.082	-0.083	0.076	-0.135	0.082	-0.080	0.075
Completed More than High School (Compared to Less than High School)	-0.246	0.093	-0.066	0.080	-0.263	0.093	-0.072	0.080	-0.259	0.090	-0.066	0.081
Household Income as a Percentage of Federal Poverty Threshold	-0.001	0.001	-0.003	0.001	-0.001	0.001	-0.003	0.001	-0.001	0.001	-0.003	0.001
Employed Part-Time (compared to not employed)	-0.192	0.129	-0.267	0.112	-0.192	0.129	-0.268	0.112	-0.193	0.131	-0.272	0.111
Employed Full-Time (compared to not employed)	-0.365	0.158	-0.542	0.125	-0.365	0.159	-0.548	0.124	-0.365	0.157	-0.556	0.126
White, non-Hispanic (compared to Hispanic)	0.103	0.114	0.232	0.107	0.111	0.114	0.235	0.107	0.105	0.113	0.232	0.106
Black, non-Hispanic (compared to Hispanic)	-0.103	0.140	-0.136	0.137	-0.113	0.140	-0.140	0.138	-0.114	0.140	-0.133	0.136
Other, non-Hispanic (compared to Hispanic)	-0.103	0.142	0.178	0.103	-0.099	0.141	0.182	0.104	-0.106	0.145	0.180	0.105
Citizen	-0.178	0.156	0.441	0.144	-0.156	0.156	0.444	0.143	-0.161	0.155	0.437	0.143
SNAP Participant	-0.001	0.079	-0.123	0.067	0.004	0.079	-0.124	0.067	-0.003	0.079	-0.130	0.067
WIC Participant	-0.363	0.130	-0.451	0.130	-0.355	0.128	-0.446	0.128	-0.362	0.129	-0.448	0.129
NSLP/SBP Participant	0.035	0.129	-0.029	0.107	0.038	0.129	-0.032	0.104	0.034	0.125	-0.035	0.105
Household Lives in Metro Area (compared to non-metro area)	0.305	0.108	0.312	0.091	0.283	0.106	0.305	0.091	0.285	0.106	0.316	0.092
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.002	0.003	0.002	0.003	0.002	0.003	0.002	0.003	0.001	0.003	0.001	0.003
Percentage of Non-White Individuals	0.002	0.002	-0.002	0.002	0.002	0.002	-0.001	0.002	0.002	0.002	-0.001	0.002
Percentage of Individuals of Hispanic Origin	0.002	0.002	0.004	0.002	0.001	0.002	0.004	0.002	0.001	0.002	0.004	0.002
Percentage of Individuals with At Most High School Education	0.002	0.006	-0.006	0.005	0.002	0.006	-0.006	0.005	0.002	0.006	-0.006	0.005
Percentage of Households Headed by Female with Children	-0.001	0.004	0.002	0.004	0.000	0.004	0.002	0.004	0.000	0.004	0.002	0.004
Percentage of Households without Access to a Vehicle	-0.020	0.013	-0.004	0.011	-0.021	0.014	-0.005	0.012	-0.016	0.013	-0.003	0.012
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.899	0.270	-0.085	0.235	1.869	0.270	-0.081	0.237	1.897	0.271	-0.054	0.235
Sample Size	26,051		26,051		26,051		26,051		26,051		26,051	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.10: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Participating in SNAP

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.005	0.018	0.012	0.022	0.003	0.007	0.006	0.007	0.002	0.003	0.003	0.002
Access to Food Retailers	0.000	0.005	-0.008	0.005	-0.004	0.002	-0.004	0.002	-0.001	0.000	0.000	0.001
Female	0.073	0.087	-0.272	0.092	0.068	0.086	-0.269	0.092	0.070	0.087	-0.269	0.093
Age	-0.010	0.004	-0.003	0.004	-0.011	0.004	-0.004	0.004	-0.010	0.004	-0.003	0.004
Married	-0.021	0.108	-0.040	0.111	-0.008	0.109	-0.031	0.112	-0.020	0.108	-0.043	0.111
Number of Children 0 to 5 in Household	-0.171	0.071	-0.046	0.070	-0.181	0.070	-0.056	0.068	-0.171	0.071	-0.036	0.069
Number of Children 6 to 17 in Household	0.137	0.050	0.060	0.047	0.135	0.049	0.059	0.047	0.137	0.050	0.062	0.048
Number of Adults in Household	0.083	0.057	0.095	0.046	0.077	0.057	0.092	0.045	0.083	0.057	0.101	0.045
Elderly Member in Household	-0.601	0.137	-0.766	0.159	-0.587	0.137	-0.764	0.159	-0.601	0.135	-0.766	0.160
Completed High School (compared to Less than High School)	-0.040	0.111	-0.096	0.093	-0.048	0.109	-0.097	0.095	-0.039	0.109	-0.093	0.092
Completed More than High School (Compared to Less than High School)	-0.145	0.114	0.014	0.100	-0.162	0.115	-0.001	0.099	-0.145	0.114	0.027	0.101
Household Income as a Percentage of Federal Poverty Threshold	-0.001	0.001	-0.001	0.001	-0.001	0.001	-0.001	0.001	-0.001	0.001	-0.001	0.001
Employed Part-Time (compared to not employed)	-0.526	0.182	-0.312	0.158	-0.520	0.184	-0.325	0.156	-0.529	0.186	-0.336	0.160
Employed Full-Time (compared to not employed)	-0.484	0.209	-0.422	0.183	-0.490	0.214	-0.432	0.184	-0.481	0.214	-0.432	0.184
White, non-Hispanic (compared to Hispanic)	0.217	0.133	0.338	0.132	0.230	0.133	0.341	0.133	0.217	0.133	0.343	0.132
Black, non-Hispanic (compared to Hispanic)	-0.176	0.155	-0.206	0.173	-0.166	0.155	-0.218	0.177	-0.171	0.153	-0.193	0.171
Other, non-Hispanic (compared to Hispanic)	0.019	0.163	0.470	0.128	0.034	0.166	0.488	0.131	0.023	0.168	0.482	0.129
Citizen	-0.100	0.204	0.614	0.181	-0.083	0.205	0.627	0.179	-0.097	0.203	0.591	0.177
SNAP Participant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIC Participant	-0.565	0.176	-0.552	0.164	-0.556	0.174	-0.534	0.156	-0.566	0.177	-0.544	0.162
NSLP/SBP Participant	-0.332	0.126	-0.037	0.123	-0.325	0.126	-0.034	0.121	-0.327	0.127	-0.038	0.123
Household Lives in Metro Area (compared to non-metro area)	0.202	0.123	0.340	0.105	0.161	0.121	0.310	0.105	0.182	0.122	0.346	0.107
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.004	0.004	0.000	0.004	0.004	0.004	0.000	0.004	0.004	0.004	0.000	0.004
Percentage of Non-White Individuals	0.004	0.002	-0.001	0.002	0.002	0.002	-0.002	0.002	0.003	0.002	-0.001	0.002
Percentage of Individuals of Hispanic Origin	0.004	0.003	0.006	0.003	0.004	0.003	0.005	0.002	0.004	0.003	0.006	0.003
Percentage of Individuals with At Most High School Education	-0.003	0.007	-0.001	0.006	-0.002	0.007	-0.001	0.006	-0.003	0.007	-0.002	0.006
Percentage of Households Headed by Female with Children	-0.003	0.006	0.000	0.006	-0.003	0.006	0.002	0.006	-0.004	0.006	-0.001	0.006
Percentage of Households without Access to a Vehicle	-0.001	0.020	-0.007	0.019	-0.002	0.020	-0.008	0.019	-0.002	0.020	-0.014	0.018
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.877	0.357	-0.977	0.300	1.875	0.355	-0.957	0.298	1.884	0.356	-0.940	0.300
Sample Size	15,220		15,220		15,220		15,220		15,220		15,220	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.11: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Not Participating in SNAP

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.041	0.020	-0.021	0.034	-0.015	0.007	-0.011	0.009	-0.002	0.003	-0.003	0.003
Access to Food Retailers	-0.002	0.005	-0.008	0.007	-0.001	0.001	-0.002	0.002	-0.001	0.001	-0.001	0.001
Female	0.169	0.091	-0.211	0.074	0.160	0.091	-0.226	0.074	0.161	0.092	-0.231	0.074
Age	-0.015	0.004	-0.013	0.004	-0.015	0.004	-0.013	0.004	-0.014	0.004	-0.013	0.004
Married	-0.141	0.113	-0.237	0.084	-0.139	0.114	-0.238	0.084	-0.145	0.113	-0.245	0.084
Number of Children 0 to 5 in Household	-0.096	0.074	0.025	0.075	-0.097	0.074	0.025	0.075	-0.096	0.074	0.028	0.075
Number of Children 6 to 17 in Household	-0.165	0.078	-0.012	0.068	-0.156	0.074	-0.001	0.065	-0.148	0.069	0.010	0.061
Number of Adults in Household	0.145	0.055	0.033	0.045	0.146	0.055	0.034	0.046	0.145	0.055	0.033	0.046
Elderly Member in Household	-0.811	0.127	-0.862	0.132	-0.802	0.128	-0.857	0.131	-0.808	0.128	-0.857	0.131
Completed High School (compared to Less than High School)	-0.209	0.113	-0.150	0.094	-0.211	0.113	-0.161	0.095	-0.225	0.112	-0.168	0.096
Completed More than High School (Compared to Less than High School)	-0.341	0.113	-0.222	0.104	-0.355	0.113	-0.236	0.107	-0.378	0.108	-0.258	0.109
Household Income as a Percentage of Federal Poverty Threshold	-0.001	0.001	-0.005	0.001	-0.002	0.001	-0.005	0.001	-0.002	0.001	-0.005	0.001
Employed Part-Time (compared to not employed)	0.227	0.150	-0.268	0.125	0.228	0.148	-0.260	0.124	0.251	0.148	-0.250	0.123
Employed Full-Time (compared to not employed)	-0.315	0.168	-0.419	0.143	-0.316	0.169	-0.426	0.141	-0.311	0.167	-0.414	0.144
White, non-Hispanic (compared to Hispanic)	-0.013	0.148	0.143	0.123	0.001	0.143	0.157	0.120	-0.004	0.142	0.165	0.119
Black, non-Hispanic (compared to Hispanic)	0.023	0.162	-0.109	0.147	0.016	0.158	-0.107	0.147	0.009	0.157	-0.099	0.143
Other, non-Hispanic (compared to Hispanic)	-0.084	0.176	0.036	0.156	-0.083	0.170	0.036	0.155	-0.087	0.170	0.046	0.154
Citizen	-0.098	0.159	0.300	0.135	-0.084	0.161	0.304	0.133	-0.078	0.160	0.303	0.133
SNAP Participant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIC Participant	0.082	0.178	-0.458	0.163	0.086	0.178	-0.459	0.162	0.089	0.176	-0.464	0.161
NSLP/SBP Participant	0.270	0.153	-0.083	0.140	0.256	0.149	-0.097	0.138	0.251	0.142	-0.107	0.135
Household Lives in Metro Area (compared to non-metro area)	0.499	0.143	0.263	0.131	0.486	0.140	0.257	0.128	0.473	0.138	0.251	0.128
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.001	0.004	0.004	0.004	0.001	0.004	0.004	0.004	0.000	0.004	0.003	0.004
Percentage of Non-White Individuals	0.001	0.002	-0.002	0.002	0.001	0.002	-0.002	0.002	0.002	0.002	-0.001	0.002
Percentage of Individuals of Hispanic Origin	-0.002	0.003	0.001	0.002	-0.002	0.003	0.001	0.002	-0.002	0.003	0.001	0.002
Percentage of Individuals with At Most High School Education	0.007	0.007	-0.008	0.006	0.007	0.007	-0.009	0.006	0.007	0.006	-0.008	0.006
Percentage of Households Headed by Female with Children	-0.001	0.006	0.001	0.005	0.001	0.005	0.003	0.005	0.000	0.005	0.004	0.005
Percentage of Households without Access to a Vehicle	-0.009	0.014	0.000	0.020	-0.011	0.014	-0.001	0.019	-0.004	0.015	0.007	0.018
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.817	0.326	0.578	0.285	1.784	0.340	0.582	0.284	1.794	0.331	0.567	0.284
Sample Size	16,066		16,066		16,066		16,066		16,066		16,066	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.12: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Participating in WIC

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.080	0.042	-0.022	0.044	-0.030	0.013	-0.007	0.014	-0.012	0.004	-0.004	0.005
Access to Food Retailers	0.006	0.011	-0.010	0.010	-0.003	0.003	-0.010	0.004	0.001	0.001	-0.002	0.001
Female	0.546	0.219	-0.033	0.225	0.531	0.217	-0.074	0.212	0.561	0.213	-0.059	0.211
Age	0.002	0.009	0.015	0.007	0.002	0.009	0.016	0.007	0.002	0.009	0.016	0.007
Married	-0.047	0.201	-0.120	0.149	-0.043	0.201	-0.101	0.148	-0.055	0.199	-0.107	0.149
Number of Children 0 to 5 in Household	-0.273	0.085	-0.137	0.077	-0.281	0.084	-0.131	0.076	-0.267	0.087	-0.132	0.078
Number of Children 6 to 17 in Household	0.168	0.074	0.172	0.086	0.166	0.071	0.181	0.083	0.166	0.072	0.174	0.082
Number of Adults in Household	0.171	0.095	0.101	0.069	0.172	0.097	0.101	0.069	0.166	0.095	0.103	0.071
Elderly Member in Household	-0.814	0.475	-1.436	0.279	-0.882	0.487	-1.546	0.299	-0.847	0.476	-1.456	0.282
Completed High School (compared to Less than High School)	-0.353	0.170	-0.131	0.141	-0.400	0.173	-0.172	0.142	-0.381	0.174	-0.174	0.145
Completed More than High School (Compared to Less than High School)	-0.712	0.271	-0.087	0.176	-0.760	0.273	-0.151	0.181	-0.719	0.282	-0.127	0.179
Household Income as a Percentage of Federal Poverty Threshold	-0.005	0.002	-0.007	0.002	-0.005	0.002	-0.007	0.002	-0.004	0.002	-0.007	0.002
Employed Part-Time (compared to not employed)	-0.150	0.224	-0.637	0.185	-0.152	0.220	-0.635	0.187	-0.159	0.221	-0.645	0.192
Employed Full-Time (compared to not employed)	-0.310	0.253	0.068	0.218	-0.308	0.252	0.037	0.212	-0.300	0.250	0.076	0.214
White, non-Hispanic (compared to Hispanic)	0.535	0.218	0.447	0.193	0.572	0.214	0.531	0.202	0.558	0.216	0.515	0.187
Black, non-Hispanic (compared to Hispanic)	0.000	0.254	-0.095	0.336	0.070	0.258	-0.012	0.345	0.047	0.267	-0.032	0.331
Other, non-Hispanic (compared to Hispanic)	-0.593	0.277	0.201	0.333	-0.564	0.283	0.317	0.308	-0.582	0.284	0.287	0.305
Citizen	-0.368	0.261	0.451	0.254	-0.345	0.258	0.493	0.246	-0.334	0.249	0.518	0.246
SNAP Participant	-0.656	0.174	-0.344	0.154	-0.638	0.170	-0.320	0.149	-0.669	0.170	-0.350	0.148
WIC Participant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NSLP/SBP Participant	-0.493	0.182	-0.263	0.186	-0.487	0.181	-0.257	0.185	-0.496	0.181	-0.256	0.185
Household Lives in Metro Area (compared to non-metro area)	0.469	0.233	0.337	0.187	0.431	0.229	0.267	0.189	0.460	0.230	0.281	0.188
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.008	0.008	-0.003	0.007	0.007	0.007	-0.003	0.007	0.008	0.008	-0.003	0.007
Percentage of Non-White Individuals	0.004	0.005	-0.008	0.004	0.003	0.004	-0.010	0.004	0.003	0.004	-0.009	0.004
Percentage of Individuals of Hispanic Origin	-0.003	0.005	0.007	0.005	-0.004	0.005	0.007	0.005	-0.004	0.005	0.006	0.005
Percentage of Individuals with At Most High School Education	-0.011	0.011	-0.004	0.009	-0.007	0.010	0.000	0.009	-0.009	0.011	-0.002	0.009
Percentage of Households Headed by Female with Children	0.008	0.011	0.034	0.012	0.009	0.011	0.033	0.012	0.008	0.011	0.034	0.012
Percentage of Households without Access to a Vehicle	-0.025	0.033	0.014	0.025	-0.016	0.029	0.009	0.026	-0.021	0.036	0.014	0.025
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.581	0.501	-1.564	0.589	1.507	0.492	-1.715	0.544	1.486	0.487	-1.733	0.542
Sample Size	3,565		3,565		3,565		3,565		3,565		3,565	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.13: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Not Participating in WIC

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.014	0.051	0.017	0.045	0.000	0.016	-0.003	0.017	-0.008	0.006	-0.008	0.006
Access to Food Retailers	-0.013	0.018	0.007	0.013	-0.005	0.005	0.001	0.004	0.001	0.001	0.002	0.001
Female	0.175	0.217	0.056	0.209	0.211	0.213	0.062	0.202	0.221	0.215	0.063	0.205
Age	-0.011	0.008	-0.001	0.007	-0.010	0.008	-0.002	0.007	-0.011	0.008	-0.001	0.007
Married	-0.484	0.236	-0.010	0.150	-0.453	0.237	-0.011	0.149	-0.452	0.235	-0.010	0.148
Number of Children 0 to 5 in Household	0.107	0.134	0.145	0.122	0.118	0.134	0.141	0.123	0.129	0.135	0.153	0.120
Number of Children 6 to 17 in Household	0.070	0.082	0.114	0.068	0.059	0.081	0.108	0.068	0.056	0.080	0.105	0.067
Number of Adults in Household	0.064	0.092	0.054	0.077	0.078	0.088	0.052	0.076	0.063	0.088	0.043	0.075
Elderly Member in Household	-0.836	0.358	-0.802	0.296	-0.890	0.372	-0.772	0.304	-0.875	0.367	-0.781	0.300
Completed High School (compared to Less than High School)	-0.468	0.224	-0.664	0.212	-0.484	0.226	-0.679	0.211	-0.448	0.227	-0.661	0.211
Completed More than High School (Compared to Less than High School)	-0.692	0.281	-0.510	0.224	-0.731	0.278	-0.530	0.220	-0.679	0.265	-0.506	0.223
Household Income as a Percentage of Federal Poverty Threshold	-0.004	0.002	-0.001	0.002	-0.004	0.002	-0.001	0.002	-0.004	0.002	-0.001	0.002
Employed Part-Time (compared to not employed)	-0.463	0.237	-0.294	0.240	-0.436	0.235	-0.280	0.244	-0.488	0.234	-0.342	0.251
Employed Full-Time (compared to not employed)	-0.364	0.225	-0.722	0.234	-0.352	0.224	-0.712	0.231	-0.363	0.221	-0.724	0.232
White, non-Hispanic (compared to Hispanic)	0.327	0.275	0.657	0.232	0.275	0.278	0.648	0.235	0.294	0.276	0.638	0.232
Black, non-Hispanic (compared to Hispanic)	0.189	0.277	0.516	0.278	0.130	0.282	0.503	0.276	0.194	0.274	0.526	0.266
Other, non-Hispanic (compared to Hispanic)	0.638	0.306	0.426	0.246	0.624	0.307	0.432	0.244	0.623	0.305	0.422	0.243
Citizen	0.551	0.297	0.638	0.219	0.618	0.303	0.649	0.221	0.533	0.296	0.606	0.219
SNAP Participant	-0.334	0.187	-0.300	0.185	-0.359	0.185	-0.307	0.182	-0.359	0.190	-0.293	0.181
WIC Participant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
NSLP/SBP Participant	0.054	0.211	-0.163	0.183	0.070	0.210	-0.158	0.182	0.049	0.212	-0.166	0.181
Household Lives in Metro Area (compared to non-metro area)	-0.026	0.255	0.002	0.239	-0.020	0.257	-0.022	0.237	0.066	0.265	0.030	0.236
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	-0.025	0.008	-0.023	0.007	-0.024	0.008	-0.023	0.007	-0.023	0.008	-0.022	0.007
Percentage of Non-White Individuals	0.006	0.004	-0.003	0.004	0.004	0.004	-0.004	0.004	0.006	0.004	-0.003	0.004
Percentage of Individuals of Hispanic Origin	0.005	0.007	0.012	0.005	0.004	0.007	0.011	0.005	0.003	0.007	0.010	0.005
Percentage of Individuals with At Most High School Education	0.030	0.013	0.002	0.011	0.031	0.013	0.003	0.010	0.027	0.013	0.001	0.010
Percentage of Households Headed by Female with Children	0.004	0.012	0.003	0.012	0.005	0.012	0.003	0.012	0.004	0.012	0.003	0.013
Percentage of Households without Access to a Vehicle	-0.029	0.030	0.077	0.035	-0.028	0.031	0.078	0.036	-0.029	0.030	0.075	0.034
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.903	0.614	-0.400	0.546	1.708	0.615	-0.395	0.556	1.811	0.619	-0.343	0.536
Sample Size	2,647		2,647		2,647		2,647		2,647		2,647	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.14: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Participating in NSLP or SBP

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.047	0.027	-0.057	0.024	-0.014	0.009	-0.010	0.007	-0.006	0.003	-0.003	0.003
Access to Food Retailers	-0.001	0.009	0.005	0.006	-0.002	0.002	0.000	0.002	0.000	0.001	0.001	0.001
Female	0.155	0.126	-0.060	0.115	0.143	0.126	-0.068	0.115	0.143	0.125	-0.061	0.116
Age	-0.002	0.006	-0.006	0.005	-0.002	0.006	-0.006	0.005	-0.002	0.006	-0.006	0.005
Married	0.123	0.105	0.046	0.100	0.122	0.105	0.039	0.100	0.114	0.106	0.035	0.100
Number of Children 0 to 5 in Household	-0.116	0.060	-0.022	0.064	-0.125	0.061	-0.025	0.064	-0.121	0.060	-0.022	0.063
Number of Children 6 to 17 in Household	0.022	0.051	0.081	0.046	0.023	0.051	0.083	0.046	0.022	0.051	0.082	0.046
Number of Adults in Household	0.028	0.053	0.080	0.052	0.030	0.053	0.085	0.051	0.036	0.053	0.085	0.052
Elderly Member in Household	-0.976	0.214	-0.882	0.167	-0.978	0.214	-0.882	0.169	-0.975	0.213	-0.877	0.170
Completed High School (compared to Less than High School)	-0.154	0.122	-0.251	0.108	-0.174	0.124	-0.264	0.106	-0.176	0.123	-0.261	0.107
Completed More than High School (Compared to Less than High School)	-0.346	0.135	-0.230	0.113	-0.358	0.137	-0.232	0.114	-0.349	0.135	-0.226	0.114
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001	-0.003	0.001
Employed Part-Time (compared to not employed)	-0.186	0.172	-0.198	0.120	-0.185	0.174	-0.188	0.121	-0.193	0.179	-0.196	0.122
Employed Full-Time (compared to not employed)	-0.295	0.167	-0.392	0.131	-0.303	0.166	-0.403	0.133	-0.295	0.165	-0.401	0.133
White, non-Hispanic (compared to Hispanic)	0.426	0.174	0.280	0.159	0.446	0.175	0.299	0.157	0.445	0.174	0.294	0.158
Black, non-Hispanic (compared to Hispanic)	-0.100	0.191	0.036	0.184	-0.100	0.190	0.037	0.184	-0.095	0.190	0.042	0.183
Other, non-Hispanic (compared to Hispanic)	-0.325	0.281	0.282	0.158	-0.293	0.268	0.296	0.159	-0.295	0.268	0.293	0.159
Citizen	0.191	0.226	0.780	0.221	0.191	0.226	0.767	0.217	0.188	0.225	0.756	0.218
SNAP Participant	-0.282	0.116	-0.074	0.095	-0.273	0.114	-0.070	0.096	-0.287	0.115	-0.080	0.097
WIC Participant	-0.397	0.159	-0.427	0.144	-0.382	0.157	-0.417	0.143	-0.395	0.157	-0.419	0.142
NSLP/SBP Participant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Household Lives in Metro Area (compared to non-metro area)	0.188	0.147	0.270	0.151	0.167	0.143	0.257	0.150	0.181	0.145	0.274	0.150
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	0.000	0.006	0.001	0.005	0.000	0.006	0.001	0.005	0.000	0.006	0.001	0.005
Percentage of Non-White Individuals	0.002	0.003	-0.001	0.002	0.002	0.003	-0.001	0.002	0.002	0.003	-0.001	0.002
Percentage of Individuals of Hispanic Origin	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.003
Percentage of Individuals with At Most High School Education	0.002	0.010	-0.004	0.007	0.003	0.009	-0.004	0.007	0.002	0.009	-0.005	0.007
Percentage of Households Headed by Female with Children	0.000	0.008	-0.004	0.007	0.000	0.008	-0.004	0.007	-0.001	0.008	-0.005	0.007
Percentage of Households without Access to a Vehicle	0.008	0.021	0.007	0.017	0.005	0.020	0.005	0.018	0.010	0.021	0.006	0.017
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	1.357	0.482	-0.927	0.398	1.336	0.471	-0.924	0.394	1.364	0.468	-0.888	0.391
Sample Size	10,279		10,279		10,279		10,279		10,279		10,279	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009

Table B.15: Logistic Regression of Food Insecurity (and Very Low Food Security) on Access to Emergency Food Pantries and Retail Food Establishments, Among Households Not Participating in NSLP or SBP

	Standard		Standard		Standard		Standard		Standard		Standard	
	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error	Coefficient	Error
Access to Pantries	-0.056	0.045	-0.065	0.035	-0.006	0.015	-0.033	0.014	0.001	0.006	-0.007	0.006
Access to Food Retailers	0.002	0.014	-0.030	0.017	0.000	0.005	-0.011	0.005	-0.001	0.002	-0.003	0.001
Female	0.383	0.201	0.048	0.199	0.419	0.201	0.044	0.189	0.414	0.204	0.018	0.187
Age	-0.020	0.008	-0.008	0.007	-0.021	0.008	-0.007	0.006	-0.021	0.008	-0.008	0.006
Married	-0.276	0.204	-0.500	0.196	-0.283	0.211	-0.491	0.191	-0.302	0.209	-0.490	0.192
Number of Children 0 to 5 in Household	-0.110	0.124	0.133	0.107	-0.100	0.125	0.117	0.107	-0.094	0.126	0.129	0.106
Number of Children 6 to 17 in Household	-0.194	0.092	-0.054	0.073	-0.215	0.100	-0.032	0.072	-0.201	0.088	-0.020	0.071
Number of Adults in Household	0.032	0.087	0.050	0.077	0.036	0.088	0.047	0.074	0.041	0.088	0.045	0.075
Elderly Member in Household	-0.226	0.250	-0.562	0.251	-0.198	0.255	-0.543	0.251	-0.224	0.255	-0.551	0.253
Completed High School (compared to Less than High School)	0.042	0.175	-0.346	0.213	0.015	0.178	-0.360	0.212	0.038	0.179	-0.328	0.206
Completed More than High School (Compared to Less than High School)	-0.107	0.231	-0.374	0.234	-0.116	0.238	-0.453	0.234	-0.133	0.234	-0.448	0.234
Household Income as a Percentage of Federal Poverty Threshold	-0.003	0.001	-0.001	0.001	-0.003	0.001	-0.001	0.001	-0.003	0.001	-0.001	0.001
Employed Part-Time (compared to not employed)	0.431	0.400	-0.269	0.243	0.382	0.386	-0.263	0.232	0.366	0.375	-0.243	0.237
Employed Full-Time (compared to not employed)	-0.299	0.236	-0.519	0.228	-0.294	0.239	-0.508	0.223	-0.290	0.242	-0.493	0.231
White, non-Hispanic (compared to Hispanic)	0.588	0.240	0.566	0.214	0.578	0.244	0.617	0.214	0.583	0.249	0.666	0.216
Black, non-Hispanic (compared to Hispanic)	0.223	0.248	0.115	0.257	0.197	0.246	0.122	0.257	0.204	0.248	0.219	0.256
Other, non-Hispanic (compared to Hispanic)	0.625	0.353	1.059	0.346	0.697	0.365	1.087	0.338	0.687	0.366	1.100	0.358
Citizen	-0.527	0.277	-0.102	0.306	-0.497	0.267	-0.140	0.306	-0.484	0.268	-0.188	0.296
SNAP Participant	0.346	0.172	0.183	0.171	0.361	0.180	0.188	0.171	0.338	0.174	0.166	0.170
WIC Participant	-0.301	0.337	-0.448	0.287	-0.295	0.337	-0.449	0.287	-0.283	0.338	-0.448	0.277
NSLP/SBP Participant	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Household Lives in Metro Area (compared to non-metro area)	0.253	0.215	0.416	0.181	0.245	0.217	0.373	0.178	0.227	0.219	0.372	0.177
Percentage of Households with Income Under 200 Percent of the Federal Poverty Threshold	-0.004	0.007	0.007	0.007	-0.001	0.007	0.008	0.007	-0.001	0.007	0.006	0.007
Percentage of Non-White Individuals	0.011	0.006	-0.001	0.004	0.009	0.005	-0.003	0.004	0.008	0.005	-0.002	0.004
Percentage of Individuals of Hispanic Origin	0.010	0.005	0.008	0.005	0.009	0.005	0.006	0.005	0.009	0.005	0.005	0.005
Percentage of Individuals with At Most High School Education	-0.017	0.009	-0.019	0.011	-0.020	0.009	-0.018	0.011	-0.019	0.009	-0.019	0.011
Percentage of Households Headed by Female with Children	0.011	0.012	0.001	0.010	0.006	0.013	0.004	0.010	0.006	0.012	0.004	0.011
Percentage of Households without Access to a Vehicle	-0.045	0.025	-0.029	0.029	-0.059	0.028	-0.031	0.029	-0.066	0.028	-0.033	0.028
Total Population of Access Area	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Constant	2.885	0.564	0.079	0.566	2.953	0.573	0.049	0.555	2.929	0.584	0.100	0.561
Sample Size	3,785		3,785		3,785		3,785		3,785		3,785	
Dependent Variable			Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security		Food Insecure with Very Low Food Security	
Access Area		(0.6 Miles)	(0.6 Miles)		(1.4 Miles)		(1.4 Miles)		(3.7 Miles)		(3.7 Miles)	

Source: Hunger in America 2009; STARS 2009; ACS 2005-2009



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