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Food Insecurity Among Households With Working-Age Adults With Disabilities

Alisha Coleman-Jensen

Mark Nord

Abstract

Prior research has shown that food insecurity is more common among U.S households with an adult who has a work-limiting disability than among other households. To provide more detail on the prevalence of food insecurity by a range of types of disabilities, we analyzed data from the Current Population Survey Food Security Supplement (2009 and 2010). We focused on two groups of households that include adults with disabilities: (1) households with a working-age adult with a disability that prevented work (*not in labor force-disabled*); and (2) those with a working-age adult with a specified disability (hearing, vision, mental, physical, self-care, or going-outside-home disability) and no indication that their disability prevented them from working (*other reported disabilities*). Food insecurity was most prevalent among households with an adult who was *not in labor force-disabled* (33.5 percent), followed by those with a working-age adult with *other reported disabilities* (24.8 percent). Households with no working-age adult with a disability had a much lower prevalence of food insecurity (12.0 percent). Close to two in five households with very low food security included an adult with a disability. The study findings demonstrate the importance of disabilities as a determinant of food insecurity.

Keywords: Disability, food security, food insecurity, Current Population Survey, Food Security Supplement, labor force, working-age adult

About the Authors

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Summary

What Is the Issue?

Food-insecure households are those that lack consistent access to adequate food for one or more household members. Prior research found that households with adults with work-limiting disabilities were more likely to be food insecure. This report describes food security in two groups of households with working-age (18-64) adults who have disabilities: those with disabilities who are unable to work (*not in labor force-disabled*) and those with disabilities that are not necessarily work-limiting (*other reported disabilities*). The analysis focused on type of disability and other characteristics of working-age adults with disabilities, such as employment and education, to identify factors that may put households at greater risk for food insecurity. In addition, participation in the USDA Supplemental Nutrition Assistance Program (SNAP, formerly food stamps) and disability assistance programs was examined to determine the extent to which adults with disabilities accessed these benefits and the programs' role in preventing household food insecurity.

What Were the Study Findings?

There is a strong association between disability and food insecurity. Substantially reducing the prevalence and severity of food insecurity among households in which one or more members is affected by disabilities would reduce the overall prevalence of food insecurity.

The main study findings include:

- Food insecurity was more prevalent among households with working-age adults with disabilities: 33.5 percent of households with an adult who was *not in labor force-disabled* were food insecure; 24.8 percent of households with adults with *other reported disabilities* (adults age 18-64 who had a disability but did not indicate they were out of the labor force due to disability) were food insecure; while 12 percent of households with no adults age 18-64 with disabilities were food insecure.
- Very low food security, the more severe range of food insecurity characterized by disrupted eating patterns and reduced food intake, was also more common among households with adults with disabilities than among other households: 17.3 percent of households with a member who was *not in labor force-disabled* had very low food security and 11.8 percent of households with a working-age adult with *other reported disabilities* had very low food security. Among households with no working-age adults with disabilities, 4.6 percent had very low food security.
- Households that include working-age adults with disabilities comprise a large share of food-insecure households. An estimated 31.8 percent of households with food insecurity included a working-age adult with a disability. Nearly 38 percent of households with very low food security included a working-age adult with a disability.
- Whether disabilities prevented employment was an important factor related to food insecurity among households that included adults with disabilities. Vision, mental, and physical disabilities were related to

higher odds of food insecurity than were hearing, self-care, and going-outside-home disabilities.

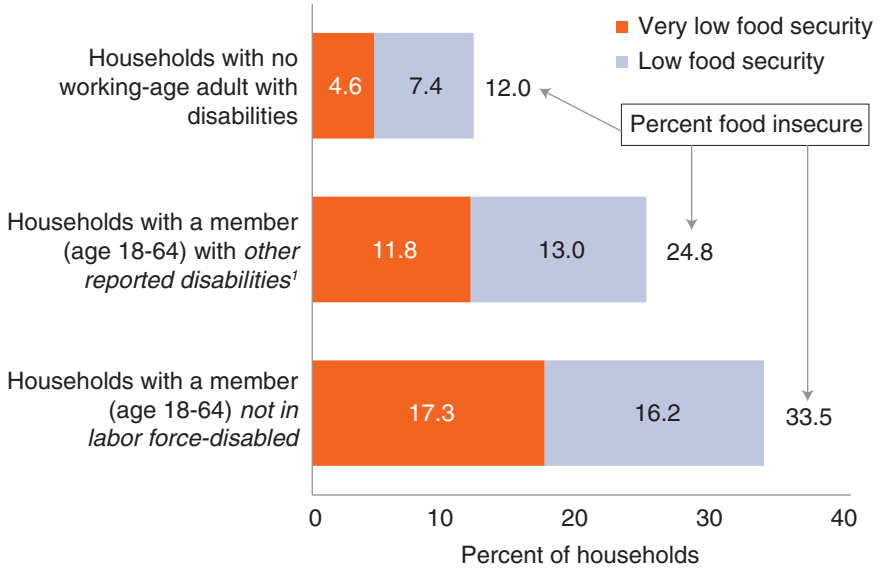
- Participation in SNAP was relatively high among households with members who were *not in labor force-disabled* and households with working-age members with *other reported disabilities* compared with those without working-age adults with disabilities. Among low-income households that participated in SNAP and with an adult who was *not in labor force-disabled*, 56.1 percent were food insecure.

How Was the Study Conducted?

We used the Current Population Survey Food Security Supplement (CPS-FSS) from 2009 and 2010 to examine the association between food insecurity and disability. The CPS is administered by the U.S. Census Bureau and is nationally representative of the civilian, noninstitutionalized population. The CPS-FSS is the source for the U.S. Department of Agriculture's annual food security statistics.

The analysis examined the prevalence and severity of household food insecurity by the presence of adults age 18-64 with disabilities. The study used multivariate logistic regression analysis to account for differences in income, education, family composition, and other characteristics between households with and without adults with disabilities. The percentage of households participating in SNAP and disability assistance programs was also examined by disability status and food security status.

Figure 1
Prevalence of food insecurity by disability status



[1]Working-age adults with *other reported disabilities* are those reported to have one or more or the following disabilities: hearing, vision, mental, physical, self-care, or going-outside-home disability, but no indication that their disability prevented them from working.

Source: USDA, Economic Research Service calculations based on 2009 and 2010 Current Population Survey Food Security Supplement data.

Food Insecurity and Disability

Introduction and Motivation

Food-insecure households are those that lack adequate food for one or more household members because they have insufficient money or other resources for food. In 2011, 14.9 percent of U.S. households were food insecure (Coleman-Jensen et al., 2012). Food insecurity was more prevalent among households with a member who had a disability—33.5 percent of households with a member who had a disability and was unable to work were food insecure. Previous research has examined the relationship between work-limiting disabilities and food insecurity. Less is known about the food security status of households with a member who has a disability but is in the labor force. Furthermore, prior research has not considered how type of disability (physical disability, mental disability, etc.) relates to food security status. There is also a lack of prior research on the extent to which food-insecure households with members with disabilities access food assistance and disability assistance programs.

Many definitions of disability exist and are used for different purposes, but in general, disability refers to limitations to participating in usual roles or activities resulting from a medical condition or health impairment (Connolly, 2009). This study expands on previous work by examining the relationship between food insecurity and type of disability, with special attention to differences among working-age persons who are unable to work due to disability and those with disabilities that do not prevent work. In this report, working-age adults (ages 18-64) classified as *not in labor force-disabled* are those who are reported to be unable to work in any paid employment due to their disability. Working-age adults with *other reported disabilities* are those who have a disability (six specific disabilities are identified: hearing, vision, mental, physical, self-care, and going-outside-home disability) but are not reported to be out of the labor force due to disability. Persons with disabilities who are unable to work due to their disability may be more severely disabled or have poorer health than persons with disabilities who are not reported to be unable to work due to disability.

Food insecurity has been shown to have effects on health and may be particularly troublesome for persons with disabilities. Lower quality diets and reduced intake of nutrients among members of food-insecure households (Bhattacharya et al., 2004; Dixon et al., 2001; Rose and Oliveira, 1997) may contribute to the poorer health and increased morbidity and mortality that have been associated with food insecurity (Siefert et al., 2004; Stuff et al., 2004; Vozoris and Tarasuk, 2003). The health effects associated with food insecurity may be even more detrimental for adults with disabling or chronic health conditions (Biros et al., 2005; Nelson et al., 1998; Nelson et al., 2001; Seligman et al., 2010; Seligman et al., 2012). Nutrition and human service agencies that are focused on the population of persons with disabilities and those with chronic disease recognize the importance of proper nutrition in treating chronic conditions (Association of Nutrition Service Agencies, 2006; New York State Department of Health, 2003; Wallace et al., 2007). Therefore, food insecurity is a particular concern among those with disabilities. Food insecurity may be more prevalent among households affected by

disabilities due to reduced earnings and higher expenses associated with disability. In addition, persons with disabilities may have difficulty shopping for food and preparing healthy meals.

Another motivation for studying the linkages between food insecurity and disabilities is the Supplemental Nutritional Assistance Program (SNAP, formerly food stamps) provisions for persons with disabilities. In determining eligibility and benefit allotments, SNAP gives special consideration for households with members who have a disability and receive government assistance related to their disability. For example, households with members who have a disability may deduct medical expenses that exceed $35 per month from household income in determining SNAP eligibility and benefit allotments; this deduction is not available to households without members who are elderly or disabled. Yet, there has been little research investigating the relationships among food security, disability, and participation in SNAP. Empirical research regarding the adequacy of SNAP adjustments for disability would be beneficial.

Several unanswered policy questions suggest the need for further research on the relationship between food security and disability and are addressed in this analysis. The answers to these questions will help to explain why households that include adult members with disabilities are more likely to be food insecure and point to ways that policy may help to reduce food insecurity among households that include adult members with disabilities.

The following questions are addressed in this report:

1. Are households with adults who have a disability but are not reported to be unable to work more likely to be food insecure than otherwise similar households with no adults with disabilities?
2. How does type of disability, such as mental disability versus physical disability, relate to food security status?
3. To what extent do households with an adult with a disability access SNAP, the Social Security Administration's Supplemental Security Income (SSI), and other disability assistance programs, and how is this related to their food security status?

Previous Research

The following section presents previous research on disabilities and economic hardship. In addition to a link between food security and disability, research has established a link between disabilities and a higher incidence of poverty. Potential causes of increased likelihood of food insecurity among households with members with disabilities are discussed. Two main mechanisms are considered in the discussion below. One such mechanism is effects on earned income. Another mechanism through which disabilities affect food security is expenses. Reduced earnings and increased costs associated with disability lead to a higher likelihood of material hardship and food insecurity. The literature review section closes with a review of assistance programs available to persons with disabilities and a discussion of important policy questions related to these programs and food insecurity.

The Relationship Between Disability and Economic Hardship

Disabilities affect a large minority of U.S. households, and a disproportionate share of those households is in poverty. The Federal poverty level in 2010 was $22,113 for a family with two adults and two children. In 2010, 21.3 percent of the U.S. population age 15 and over reported having a disability. Adults with disabilities were less likely to be employed than able-bodied adults. Among those aged 15 to 64, 28.6 percent with a severe disability lived in households with income below the Federal poverty level, while 14.3 percent of those without a disability lived in households with poverty-level incomes. Given the lower levels of employment among those with disabilities and higher poverty rates, participation in assistance programs is relatively common for this group. In 2010, among adults with a severe disability, 59 percent received public assistance (cash assistance, SSI, or Social Security) and 28.1 percent received SNAP benefits, well above the percentages for those without a disability (Brault, 2012). Other research indicates that households receiving Temporary Assistance for Needy Families (TANF) and those receiving SNAP have about twice the prevalence of disability as the general population (Loprest and Maag, 2009).

It is likely that economic hardships may result from, or be made worse by, disability. People with disabilities are more likely to live in poverty than those without disabilities (Palmer, 2011; She and Livermore, 2009; Wang, 2005), and becoming disabled is associated with entering poverty (McKernan and Ratcliffe, 2005). Among working-age men, following the onset of a disability, earnings decline along with food consumption (Meyer and Mok, 2008). People with disabilities are more likely to face economic hardships, such as housing instability, inadequate health care, and difficulty paying monthly expenses (Parish et al., 2009; She and Livermore, 2007, 2009). The relationship between economic resources and disability may be bi-directional; poverty and economic hardship may lead to or exacerbate disabling health conditions (She and Livermore, 2009), potentially leading to greater economic hardship.

Mechanisms Through Which Disabilities May Affect Food Security

Prior research has established a link between work-limiting disability and food insecurity. Numerous studies have found that households with a member with a work-limiting disability (being limited in the kind or amount of work, or being unable to work due to disability) are more likely to be food insecure than households without a member with a work-limiting disability (Huang et al., 2010; Leete and Bania, 2009; Nord, 2008; Parish et al., 2009; Ribar and Hamrick, 2003; She and Livermore, 2007). There is a strong association between disability and food insecurity. One study found that half of food-insecure households included a member with a work-limiting disability (She and Livermore, 2007).

Two primary explanations for the relationship between work-limiting disability and food security status are: (1) reduced earnings and (2) higher expenses. Reductions in earnings due to disability affect household resources. Disabilities affect earnings of working-age adults with a disability as well as the earnings potential of other household members. A disability often affects a person's employment by limiting the kind or amount of work

a person can do. Persons with disabilities may have limited work experience and opportunities that result in reduced earnings if they do work. Other adults in the household may need to provide care for the household member with disabilities. Such caregiving reduces the amount of time available for the caregiver to be in paid employment. Reduced earnings due to disability are most relevant to persons with disability who are working age; therefore, this analysis focused on adults ages 18-64. Along with reductions in earnings, disabilities increase medical expenditures, including costs for adaptive equipment and services. A person with disabilities needs more income than a person without disabilities to maintain the same standard of living. This combination of lower income and higher expenses results in a higher likelihood of food insecurity for households with adults with disabilities compared with households without disabled members. The research evidence for these explanations is discussed in more detail below.

Lower earnings and income among households with a disabled member increase the likelihood of food insecurity (Huang et al., 2010). By definition, work-limiting disabilities reduce work opportunities and potential earnings (Meyer and Mok, 2008). Disabilities may affect educational attainment, the types of job the person can hold, and the number of hours the person is able to work, if at all. Further, even if work limitations are resolved, they may have persistent effects on future income and hardships (She and Livermore, 2007). Having a household member with a disability may also affect the labor force participation of able-bodied members (Porterfield, 2002), especially if the member with a disability requires significant care. Thus, disabilities can reduce household earnings in a number of ways.

In addition, households affected by disabilities are at higher risk for food insecurity due to increased expenses. Those with disabilities have higher expenses related to health care (Mitra et al., 2009; Olin and Dougherty, 2006). In addition to increased medical expenses, having a disability may require the purchase of assistive and adaptive equipment, and those with a disability may incur costs from purchasing services they cannot perform themselves (Batavia and Beaulaurier, 2001). Higher out-of-pocket medical expenditures are associated with a higher probability of food insecurity (Nielsen et al., 2010). Huang et al. (2010) find that controlling for health expenditures in multivariate models reduces the association between disability and food insecurity, suggesting that increased expenses are a factor in explaining the higher likelihood of food insecurity among those with disabilities.

Accounting for the substantial costs of disability significantly increases the poverty rate among households with adults with disabilities because households with disabled adults need more income to cover basic living expenses (Zaidi and Burchardt, 2005). Thus, even at similar income levels, households with a member with a disability are more likely to be food insecure than households without a member with a disability (Huang et al., 2010; Rose et al., 2009; She and Livermore, 2007). One study found that to have the same likelihood of food insecurity as an able-bodied person with an income of $10,160, a person with a persistent work-limiting disability would require an annual income of $26,668, more than two and half times as high (She and Livermore, 2007, p. 984).

Huang and colleagues (2010) show that higher assets (such as home equity, vehicles, savings in bank accounts, bonds, etc.) are related to a lower probability of food insecurity. Further, they find that the relationships between food insecurity, income, and assets vary by disability status. For households with adults who have a disability, the relationship between household assets and the probability of food insecurity is stronger than the relationship between income and food insecurity. Liquid assets (sum of savings in bank accounts and stocks/mutual funds/investment trusts) may be an important factor in protecting households with an adult with a disability from food insecurity because these assets help overcome the effects of unexpected increased costs associated with a disability (Huang et al., 2010). However, households affected by disabilities have fewer assets to rely on than households with no adults who are disabled, likely because of the lower earnings and higher costs associated with disability (Parish et al., 2010).

Most prior research on disability and food insecurity has focused on work-limiting disabilities. Identifying disabilities only by reported work limitation underestimates the total population of people with disabilities (Burkhauser et al., 2002; Burkhauser et al., 2012). Often those with disabilities do not report work limitations. Work limitations reflect not only the actual disability, but also the policy environment and environmental adaptations that enable employment among those with a disability. Also, persons with disabilities who have chosen not to work may identify themselves as out of the labor force, but may not identify themselves as being out of the labor force due to their disability. Understanding how disabilities other than work limitations relate to food insecurity is important for identifying ways in which policies can promote food security among households affected by either work-limiting disabilities or non-work-limiting disabilities. Further, contrasting the relationships between work disabilities and other disabilities and food insecurity informs our understanding of the underlying mechanisms by which disabilities affect food security.

Examining the relationship between food security and specific types of disability, such as mental, physical, and self-care disabilities, is also important. Some types of disability may be more detrimental to food security than others, and these patterns point to the mechanisms that link food insecurity and disability and inform policy options directed at reducing food insecurity among those with disabilities.

Disability Assistance and Food Assistance Programs

The different types of assistance available to adults with disabilities are described in the box on page 6, "Assistance Programs Available to Those With a Disability." Government assistance programs for persons with disabilities are meant to compensate for lower earnings and higher expenses. However, these programs do not always prevent food insecurity. A study of former TANF recipients in Michigan found that those who applied for and received SSI benefits were more likely to report food insufficiency than either those who applied but did not receive benefits, or those who did not apply and did not receive benefits (Schmidt and Danziger, 2009). Disability benefits do not appear to be adequate to consistently protect those with disabilities from food insecurity.

Assistance Programs Available to Those With a Disability

Supplemental Security Income. The SSI program, run by the Social Security Administration, provides income to blind, disabled, and elderly persons who have low incomes. Elderly applicants must meet certain income and asset restrictions to receive the benefit. Applicants with disabilities must meet income and asset restrictions and have a qualifying disability. The program provides income support intended to meet basic needs. In 2009, 2010, and 2011, the monthly maximum benefit levels for SSI were $674 for an individual and $1,011 for a couple (http://www.ssa.gov/OACT/COLA/SSIamts.html). An individual or couple would have an annual income below the Federal poverty level if the maximum Federal SSI benefit were the only income received. Not all SSI recipients receive the maximum benefit because countable income above a specified amount from employment, Social Security, and some other sources reduce the SSI payment. All States except Arizona, Arkansas, Mississippi, North Dakota, Tennessee, and West Virginia supplement the Federal SSI payments. The amount of these State supplements varies widely across States, and States also vary in determining which types of SSI recipients are eligible for State supplements (Social Security Administration, 2011).

Social Security Disability Insurance. Another source of disability income is SSDI, part of Social Security's Old Age, Survivors, and Disability Insurance Program. Only people who have paid Social Security taxes and have adequate work histories are eligible for SSDI. SSDI applicants must have a disability that qualifies them for the benefit. For more information, see http://www.ssa.gov/pgm/links_disability.htm. SSDI benefit levels are based on average lifetime earnings (Social Security Administration, 2012). SSDI beneficiaries do not have to meet income or asset restrictions.

Other disability payments. These payments include workers' compensation, veterans' disability, private disability insurance, payments made by employers, Federal or State disability available to Government employees, and other types of disability income.

Supplemental Nutrition Assistance Program. SNAP, formerly the USDA food stamp program, has special considerations for applicants with a disability. In States with asset limits, households that include members with disabilities are allowed $3,250 in countable resources (i.e., assets) while other households are allowed $2,000. Assets of SSI recipients are not counted in determining household SNAP eligibility, but SSI income counts toward determinations of SNAP eligibility and benefits. If all household members receive SSI, the household is categorically eligible for SNAP. Households receiving certain disability payments only have to meet the net income test, not the gross income test. In addition, out-of-pocket medical expenses of more than $35 per month are deducted from income in determining eligibility for households that include members with disabilities. These medical expenses include medical and dental expenses and some medically related expenses such as attendant care. Households with a member with a disability can also deduct all shelter costs that are more than half the household income after other deductions. For SNAP purposes, generally persons are considered disabled if they are receiving disability benefits based on SSI rules or the Social Security Act, such as SSI or blindness payments. Veterans with disabilities also fall under the special SNAP rules for households with members with disabilities (http://www.fns.usda.gov/snap/applicant_recipients/eligibility.htm#special). Some people who self-identify as having a disability are not considered disabled for SNAP benefit calculations if they are not receiving disability benefits.

Aside from Federal disability programs and other disability payments, receipt of cash assistance (TANF) and SNAP are also means by which households affected by disabilities meet their basic needs. It is common for households that qualify for SNAP and SSI to utilize both programs (USDA/FNS, 2012; Trenkamp and Wiseman, 2007).

A policy question is whether food-insecure households with a member who has a disability are receiving assistance from programs meant to provide for those with disabilities, such as SSI or Social Security Disability Insurance (SSDI) from the Social Security Administration. If households with an adult who has a disability are receiving assistance from one of these programs, but are food insecure, it may suggest that the programs do not provide enough income support to overcome the effects of disability. If low-income food-insecure households with a member with a disability are not participating in any of these programs, it may suggest that there are barriers to application and receipt of benefits. If households with a member who has a disability and with incomes above the eligibility cutoffs for disability assistance are food insecure, it may suggest that eligibility cutoffs do not take full account of the greater expenses that are incurred by households affected by disabilities. A policy question for USDA's SNAP program is whether eligibility and benefit provisions for households with a member who has a disability adjust adequately for the additional expenses and limitations associated with the disability.

Study Contribution

This report contributes to the established research on food security and disability. By using a recent nationally representative sample, the analysis provides basic information about the extent to which food-insecure households included working-age adults with disabilities, and the extent to which such households were food insecure. It expands on prior research by considering how different types of disability relate to food security. Finally, the research contributes to the understanding of how well SNAP benefit allotments and disability benefits adjust for the costs associated with disability. The recent inclusion in the Current Population Survey of questions on disabilities among adults enabled this research. The next section describes the data, measures, and methods used for the study.

Data, Measures and Methods

Current Population Survey

Data for the study were primarily from the Current Population Survey Food Security Supplement (CPS-FSS) conducted in December 2009 and 2010. The Current Population Survey is administered by the U.S. Census Bureau and is State and nationally representative of the civilian, noninstitutionalized population. The monthly CPS includes about 54,000 households and is the source for Federal unemployment and poverty statistics. The CPS-FSS is the source for Federal food security statistics. This study combines 2 years of data to improve the precision of estimates. Households are included in the CPS-FSS sample for 2 consecutive years, but including only one interview per household in the analysis is important for ensuring that all observations are independent. Therefore, households interviewed in both the 2009 and 2010 FSS were deleted from the 2009 data file. This study focused on disabilities among working-age adults (age 18-64), and households with no working-age adults were excluded from the sample (11,602 households included only elderly adults age 65 and over). In addition, households that did not respond to any of the food-security-scale questions were excluded (185 households). The final sample included all households meeting these criteria interviewed in the 2010 CPS-FSS and about half of households interviewed in the 2009 CPS-FSS (total sample is 55,383 households).

Identifying Households With a Disabled Member

Due to data constraints, earlier research on food security and disability using the CPS only identified disability if adults indicated they were not in the labor force due to disability. Six additional questions about disability were recently added to the monthly CPS. These questions enabled the identification of individuals with specific types of disabilities—hearing, vision, mental, physical, self-care, or going-outside-home disability—whether or not they affected paid employment (see box, "What Types of Disability Are Identified?" p. 9). Individuals can be identified as having more than one specific limitation (i.e., an individual may have both a physical disability and a self-care disability). The six specific disability questions in the CPS do not include a measure of work-limiting disability and as a result underestimate the total population of adults with disabilities (Burkhauser et al., 2012). Therefore, in addition to the six specific disability questions, we also utilized the labor-force status variable to identify individuals who were not in the labor force due to disability.

In this study, working-age adults who were identified as unable to work due to disability were classified as *not in labor force-disabled*. Some of these individuals also reported one of the six specific disabilities. Individuals who were classified as having *other reported disabilities* are those who were identified as having one of the six disabilities (hearing, vision, mental, physical, self-care, or going-outside-home disability) but gave no indication of being out of the labor force due to disability. These individuals may have been working or out of the labor force for reasons other than their disability, such as retirement. The categories of *not in labor force-disabled* and *other reported disabilities* are mutually exclusive. If household respondents

What Types of Disability Are Identified?

The Current Population Survey uses a series of six standard questions to identify persons with conditions or disabilities that cause serious difficulty with daily activities.

The following six types of specified disability were identified:[1]

- Hearing disability: Deaf or serious difficulty hearing
- Vision disability: Blind or serious difficulty seeing even when wearing glasses
- Mental disability: Serious difficulty concentrating, remembering, or making decisions because of a physical, mental, or emotional condition
- Physical disability: Serious difficulty walking or climbing stairs
- Self-care disability: Difficulty dressing or bathing
- Going-outside-home disability: Difficulty doing errands alone such as visiting a doctor's office or shopping because of a physical, mental, or emotional condition

In addition to the six types of specified disabilities, adults were classified by whether or not they were unable to work due to disability:

Not in labor force-disabled:

- The individual was identified as being out of the labor force due to disability (unable to work)[2]
- The individual may or may not have been identified as having one or more of the six specified disabilities listed above

Other reported disabilities:

- The individual was identified as having one or more of the six specified disabilities listed above
- The individual (or household member responding for the individual) did NOT indicate that he or she was out of the labor force due to disability
- Individuals in this category may have been working, looking for work, or out of the labor force for reasons other than disability.

CPS questions on hearing, vision, physical, and self-care disabilities were formatted as follows: "Is (household member) deaf or does (household member) have serious difficulty hearing?" Questions on mental and going-outside-home disabilities were formatted as: "Because of a physical, mental, or emotional condition, does (household member) have serious difficulty concentrating, remembering, or making decisions?" One knowledgeable household member may provide responses for all household members.

What About "Work-Limiting Disability"?

Work-limiting disability encompasses being out of the labor force due to disability *or* being limited in the kind or amount of work a person is able to do due to disability. The U.S. Census Bureau has a specific methodology for identifying persons with a work disability (sometimes referred to as a work-limiting disability or work-related disability) using the CPS Annual Social and Economic Supplement. This methodology relies on a number of survey questions that are not included in the monthly CPS.[3] The CPS-FSS data do not enable identification of individuals who are limited in the kind or amount of work they can do. Therefore, only the more severe work disability category, being unable to work due to disability (*not in labor force-disabled*), is examined in this study.

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[1]In this report, the categories and naming conventions used for the specific types of disability are those the U.S. Census Bureau has used in reports on disability. See Waldrop and Stern, 2003; and Wang, 2005.

[2]*Not in labor force-disabled* is based on the labor force status variable available in the CPS (variable name is PEMLR). If a respondent was not working or looking for work and the individual (or household member responding for the individual) said that he or she had a disability in response to questions about employment, he or she was defined as *not in labor force-disabled.* A limitation of this approach for identifying respondents with work disabilities is that the labor force questions were not designed to identify individuals with work disabilities. Respondents were not asked directly whether they were unable to work due to disability and were only classified in this category if they offered this as a reason for not working.

[3]For more information, see http://www.census.gov/hhes/www/disability/cps/cpsworkd.html.

indicated that they or another adult in the household were out of the labor force due to disability and also indicated they had a physical disability, they were classified as *not in labor force-disabled*. If they identified a physical disability or other specific disability but were not out of the labor force due to disability, they were classified as having *other reported disabilities*.[1]

The two general categories of disability distinguished in this study, *not in labor force-disabled* and with *other reported disabilities* with no indication of being unable to work due to disability, pertain to working-age adults.[2] The boundaries of "working age" can vary, but was defined for this study as ages 18-64. As mentioned in the literature review, reduced earnings are a likely factor leading to increased food insecurity among households affected by disability. Reduced earnings are most relevant to those individuals who are working-age. Preliminary analysis showed that disabilities among working-age adults (18-64) were much more detrimental to household food security than disabilities among the elderly (age 65 and over).

Household disability status was determined by the presence of a working-age adult with a disability. A household was coded as having a member *not in labor force-disabled* or with *other reported disabilities* if any working-age household member (age 18-64) reported (or was reported to have) one of these conditions. Households with both a member who was *not in labor force-disabled* and a member with *other reported disabilities* were classified as *not in labor force-disabled*.

For descriptive statistics shown in figures 1, 2, and 3 and tables 1, 2, 3a, and 3b, households were classified in three mutually exclusive categories according to disability status:

- *Households with a working-age adult who was not in labor force-disabled*. These households included a member who was reported to be out of the labor force due to a disability (age 18-64).
- *Households with a working-age adult with other reported disabilities.* In these households, a member aged 18-64 was identified as having a specific disability (hearing, vision, mental, physical, self-care, or going-outside-home disability) but neither that person nor any other adult was reported to be out of the labor force due to disability.
- *Households with no working-age adult with disabilities.* These households had no adults age 18-64 who were reported to be not in labor force-disabled or to have any of the six specific disabilities.

Additional variables were used to characterize households with a member with a disability in the logistic regression analysis. These included a set of dummy variables for household employment that indicated the presence of a member who was *not in labor force-disabled* and dummy variables that indicated the presence or absence of each of the specific types of disability (i.e., hearing disability). A dummy variable distinguished households with two or more adults with disabilities from other households.

[1]A limitation of this approach is that the labor-force questions were not developed with the intention of identifying individuals with work disabilities. Respondents are not asked directly whether or not they are unable to work because of a disability. Respondents classified as *not in labor force-disabled*, indicated to the interviewer that they were not working because they were disabled. Some persons with disabilities may not have thought to indicate that a disability prevented them from working and so their labor-force status would be categorized as not in labor force-other or retired. However, results show that there are important measureable differences between those *not in labor-disabled* and other persons with disabilities.

[2]The CPS asks the six disability questions about all household members age 16 and over. Persons age 16 and 17 are considered children for the purposes of household food security measurement. We do not consider disability status of 16- and 17-year-old youths because the CPS does not contain information on disability for children of younger ages. Further, we focus on employment and earnings as a key pathway by which disabilities affect food security. Therefore, we focus on disabilities among adult household members.

Measuring Food Insecurity

USDA monitors household food security in the U.S. and publishes an annual report on food insecurity.[3] Household food security—access by all household members at all times to enough food for active healthy living—is assessed by household responses to the Household Food Security Survey Module in the CPS-FSS (Bickel et al., 2000; Coleman-Jensen et al., 2012; Hamilton et al., 1997a and 1997b). These questions vary in severity from anxiety about running out of food to not eating for a whole day and only refer to problems obtaining food that are a result of lacking money or other resources, not to such conditions as dieting for health or to lose weight.

USDA determines household food security status based on responses to an 18-item questionnaire about food-insecure conditions experienced by household members in the prior 12 months. The first 10 items refer to food-insecure conditions among adults and an additional 8 items refer to food-insecure conditions among children. For this study, food security was measured by the adult food security scale consisting of the 10 items referring to food-insecure conditions among adults and the household as a whole. The household-level adult food security scale provides a more comparable measure of food security status for households with and without children. Based on the adult scale, households responding affirmatively to three or more questions were categorized as food insecure. Households responding affirmatively to six or more questions were classified as having very low food security. Very low food security is a severe form of food insecurity characterized by reductions in food intake and disrupted eating of one or more adult household members (Bickel et al., 2000; Coleman-Jensen et al., 2012).

Other Variables Used in the Analysis

Household Employment. A household employment variable was created that combined information on the employment status of all adult household members. Eight mutually exclusive employment categories were identified.

- *Not in labor force-disabled, none employed* households had no members working in the paid labor force and at least one member age 18-64 who was out of the labor force due to a disability.
- *Full-time employed member and not in labor force-disabled* households had at least one full-time working member and a working-age member who was out of the labor force due to disability.
- *Part-time employed member and not in labor force-disabled* households had a part-time worker and a working-age member who was out of the labor force due to disability (and no full-time worker).

The five remaining categories differentiated households that had no working-age adult member who was classified *not in labor force-disabled*.

- *Full-time employed* households had one or more members employed full-time.
- *Part-time employed* households had one or more members employed part-time and no full-time workers.

[3]For the most recent food security statistics and report see: http://ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx.

- *Retired* households indicated one or more members were out of the labor force due to retirement and no household members were employed.
- *Unemployed* households had one or more members unemployed and looking for work and no members employed or retired.
- *Other not in labor force* households had no member who was working, looking for work, or retired.

Veteran With Disabilities. Veterans were identified as individuals who indicated they had served on active duty in the U.S. Armed Forces. Veterans with disabilities were those who were classified *not in labor force-disabled* or had *other reported disabilities*. It cannot be determined in these data whether or not a veteran with disabilities sustained his or her disability during military service.

Household Income-to-Poverty Ratio. The income-to-poverty ratio is a measure of income-to-needs and compares annual income of the primary family in the household with the U.S. poverty threshold for families of that size and composition. (As noted earlier, the Federal poverty level for a family with two adults and two children in 2010 was $22,113.)

Household Composition. Households were classified in six categories by the age, gender, and marital status of household members. Households with children were identified in one of three categories: *married with children*, *single mother*, and *other household with children*. The *other household with children* included single-father households and households with children in complex living arrangements. Three categories of households containing only adults were distinguished: *multiple adults*, *male alone,* and *female alone.*

Educational Attainment of Highest Educated Adult. Households were identified by the highest educational level achieved by any adult household member: *less than high school, high school or GED, some college or associate's degree,* and *bachelor's degree or more.*

Race/Ethnicity of Reference Person. The race and ethnicity of the household reference person were assigned to the household. Those of Hispanic origin are in the *Hispanic* category regardless of race. The three remaining categories do not include those of Hispanic origin: *White non-Hispanic, Black non-Hispanic,* and *Other non-Hispanic.*

Analytic Procedures

The analysis was guided by the research questions listed in the introduction and proceeded as follows. First, a descriptive analysis was conducted showing the percentage of households that were food insecure and the distribution of food-insecure households by disability status and selected household characteristics. Logistic regression models were then used to identify significant correlates of food insecurity including disability status. These analyses assessed the extent to which disability characteristics were important predictors of food insecurity, net of other characteristics such as income. Disability may affect household food insecurity through employment and income. These factors were controlled in the logistic regression models. Therefore, the strong positive effects of disability on food insecurity in the logistic regression analyses may reflect the effects of higher costs associated

with disability. Pseudo R-squared values estimated for logistic regression models by SAS statistical software are reported in the tables (Allison, 1999).[4] Food Security Supplement sample weights were applied to all analyses so that estimates are nationally representative.

The last parts of the analysis focused on SNAP receipt and participation in disability assistance programs by disability status. Participation in SNAP by food security status and presence of an adult with disabilities was estimated for low-income households (households with incomes below 185 percent of the Federal poverty line).[5] Enrollment in disability assistance programs and public health insurance were examined to determine the extent to which food-insecure households with adults who were disabled accessed these benefits. The analysis of disability assistance programs and health insurance used a subsample of the CPS-FSS. This subsample consisted of households in the CPS-FSS that were also interviewed in the CPS Annual Social and Economic Supplement (ASEC) in 2010 or 2011. About one-third of households interviewed for the FSS were also interviewed for the subsequent ASEC. The advantage gained by matching to the CPS-ASEC is that it included more detailed income information, such as whether or not households received income from disability assistance programs, and information on receipt of public health insurance in the previous year.[6] See the appendix for a full description of how household data from the two supplements were matched.

[4]Collinearity diagnostics were performed on all logistic regression models to ensure that multicollinearity did not distort the results (using the PROC REG procedure in SAS with the TOL and VIF options to identify variance inflation). This procedure identifies variables in which the estimated variance is larger than expected due to correlation with other variables in the model.

[5]The Federal poverty line was $22,113 for a family with two adults and two children in 2010. For a family of four, 185 percent of the poverty line was $40,909.

[6]The food security questions refer to food security experienced in the prior 12 months. ASEC data on income and program participation refers to the previous calendar year. So for example, the December 2009 FSS data referred to food security in calendar year 2009. The 2010 ASEC data, to which household data from the 2009 FSS was matched, referred to program participation and income received in 2009. Therefore, data on food security and disability program participation refer to the same time period even though they come from different supplement interviews.

Findings

Percentage of Households With Working-Age Adults With Disabilities

About 16 percent of all U.S. households with working-age adults included a working-age adult who was *not in labor force-disabled* or had *other reported disabilities* (table 1). Nine percent of households included a member who was *not in labor force-disabled* and 6 percent included a working-age adult with *other reported disabilities*. The majority of those *not in labor force-disabled* also had a specified disability (70.6 percent). The most commonly identified specific disability among those with any disability was physical disability (51.2 percent of adults *not in labor force-disabled* and 47.4 percent of adults with *other reported disabilities*).

Prevalence of Household-Level Adult Food Insecurity by Presence of an Adult With Disabilities

Food insecurity was more prevalent among households with working-age adults with disabilities than among those with no working-age adults with disabilities (table 2). One-third of households with a member who was *not in labor force-disabled* were food insecure (33.5 percent) (fig. 1). About a quarter of households with a working-age member with *other reported disabilities* were food insecure (24.8 percent). Twelve percent of households

Table 1
Distribution of households with a working-age adult member with a disability by type of disability

	Households with a member *not in labor force-disabled*	Households with a member with *other reported disabilities*[1]
	Percent of households	
Percentage of U.S. households with working-age adults in disability category	9.4	6.3
Member *not in labor force-disabled* with no specified disability	29.4	--
Member with both a specified disability and *not in labor force-disabled*	70.6	--
Type of specified disability		
Hearing disability	9.5	27.9
Vision disability	9.7	15.1
Mental disability	31.6	28.9
Physical disability	51.2	47.4
Self-care disability	17.3	8.4
Going-outside-home disability	34.0	16.8
Member with more than one specified disability	42.8	26.8
Household includes two or more working-age adults with a disability	15.6	6.7
Number of households in sample[2]	5,021	3,764

Estimates are weighted to represent the U.S. population.
[1]Working-age adults with *other reported disabilities* are those with one or more of the six specified disabilities and no indication that their disability prevented them from working.
[2]Total number of households in sample with working-age adults (ages 18-64) is 55,383.
-- = No households in this category with the selected characteristics.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

with no working-age adult with disabilities were food insecure. Food insecurity was less prevalent among households that included only elderly adults compared with those with working-age adults (elderly refers to age 65 and above; results not shown in table). Of households with only elderly members, 8.7 percent that included an elderly person with *other reported disabilities* were food insecure, far lower than the prevalence of food insecurity among working-age adults with disabilities. Households with only elderly members

Table 2

Household-level adult food insecurity and Supplemental Nutrition Assistance Program (SNAP) participation by presence of a working-age adult with a disability

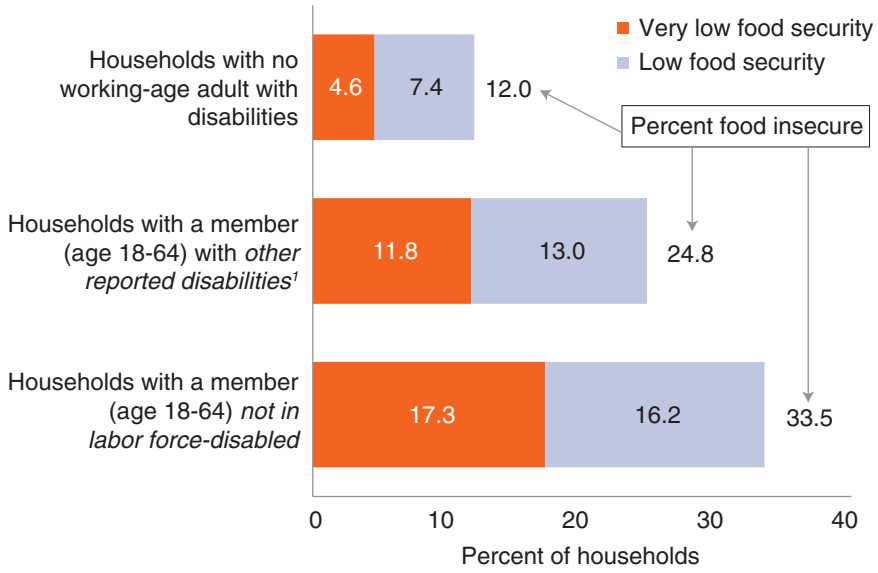
	Households with a member *not in labor force-disabled*	Households with a member with *other reported disabilities*[1]	Households with no working-age adult with disabilities
		Percent of households	
Share of all households with working-age adults	9.4	6.3	84.3
Prevalence of food insecurity	33.5	24.8	12.0
Share of food-insecure households	21.2	10.6	68.2
Prevalence of very low food security	17.3	11.8	4.6
Share of households with very low food security	26.0	11.9	62.1
Percentage of households receiving SNAP	31.5	16.0	7.7
Share of SNAP recipient households	28.2	9.6	62.2
Number of households in sample	5,021	3,764	46,598

Estimates are weighted to represent the U.S. population.
[1]Working-age adults (age 18-64) with *other reported disabilities* are those with a specified disability (hearing, vision, mental, physical, self-care or going-outside-home disability) and no indication that their disability prevented them from working.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

Figure 1

Prevalence of food insecurity by disability status



[1]Working-age adults with *other reported disabilities* are those reported to have one or more or the following disabilities: hearing, vision, mental, physical, self-care, or going-outside-home disability, but no indication that their disability prevented them from working.

Source: USDA, Economic Research Service calculations based on 2009 and 2010 Current Population Survey Food Security Supplement data.

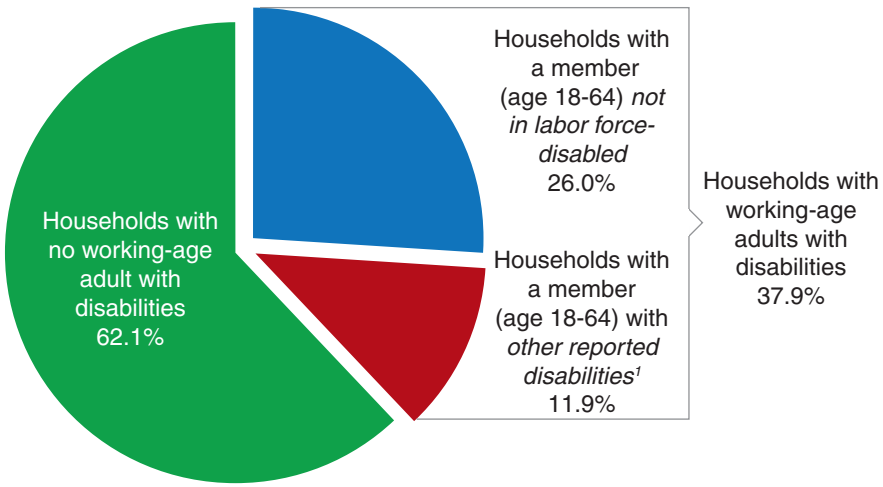
and no reported disabilities had an even lower prevalence of food insecurity (4.3 percent).

A large share of food-insecure households contained adults with disabilities. Over one-fifth of food-insecure households (21.2 percent) included a working-age adult who was *not in labor force-disabled*. An estimated 10.6 percent of food-insecure households had an adult with *other reported disabilities*. Together, 31.8 percent of food-insecure households included a working-age adult with disabilities. Examining disability as a risk factor for food insecurity is clearly important.

Very low food security was also more prevalent among households with a working-age adult with a disability than other households. Some 17.3 percent of households with a member who was *not in labor force-disabled* and 11.8 percent of households with a working-age member with *other reported disabilities* were very low food secure. Very low food security affected a much smaller percentage of households with no working-age adults with disabilities (4.6 percent). Households that included working-age adults with disabilities comprised an even larger share of households with very low food security than they did of food-insecure households. Households with a member who was *not in labor force-disabled* comprised 26 percent of households with very low food security and those with a working-age member with *other reported disabilities* comprised an additional 11.9 percent. Together, 37.9 percent of households with very low food security included a working-age adult with a disability (fig. 2).

Thirty-eight percent of SNAP-participant households included a working-age adult with a disability.[7] About 32 percent of households with a member who was *not in labor force-disabled* received SNAP benefits, and they comprised 28 percent of all SNAP recipient households.[8] Among households with a working-age member with *other reported disabilities*, 16 percent participated in SNAP and comprised about 10 percent of all SNAP households.

Figure 2
Disability status of households with very low food security



[1]Working-age adults with *other reported disabilities* are those reported to have one or more or the following disabilities: hearing, vision, mental, physical, self-care, or going-outside-home disability, but no indication that their disability prevented them from working.

Source: USDA, Economic Research Service calculations based on 2009 and 2010 Current Population Survey Food Security Supplement data.

[7]Not all of these households would be considered disabled by SNAP eligibility rules. While this is a self-identified measure of disability, SNAP applicants must be receiving government assistance for those with disabilities (such as SSI) to be defined as disabled for SNAP eligibility and benefit determination.

[8]These are not participation rates among eligible households. Not all households included here would be eligible for SNAP.

Household-Level Adult Food Insecurity Prevalence and Distribution by Characteristics of Adult With Disabilities and by Household Characteristics

The prevalence of household-level adult food insecurity varied considerably by disability status and characteristics of disabled persons (table 3a) and other household characteristics (table 3b).[9] The prevalence of food insecurity by employment status of working-age adults with *other reported disabilities* demonstrates the importance of employment in understanding the relationship between disability and food insecurity. The rates of food insecurity among those who were *not in labor force-disabled* (33.5 percent, table 3a, column 1) and those with *other reported disabilities* who were not in the labor force for other reasons (33.2 percent, column 3), were nearly equivalent. It is possible that some adults with *other reported disabilities* who were classified as not in the labor force for other reasons were, in actuality, not working because of their disability but did not specify so. An even higher percentage of households with an adult with *other reported disabilities* who was unemployed were food insecure, 42.7 percent. Meanwhile, about 21 percent of households with adults who had *other reported disabilities* and were working full-time were food insecure. Households including adults with *other reported disabilities* who were working full-time comprised nearly one-third of all food-insecure households with adults with *other reported disabilities*.

The percentage of households with someone *not in labor force-disabled* that were food insecure varied somewhat by the type of disability. Households were included in more than one category for specific type of disability if they had more than one member with different disabilities or if one adult had multiple disabilities. Among households with an adult who was *not in labor force-disabled*, those with a vision disability had the highest prevalence of food insecurity at 48.2 percent, while those with a physical disability comprised the largest share of food-insecure households (57.1 percent). Among households with an adult with *other reported disabilities*, those with a mental disability had the highest prevalence of food insecurity at 34.1 percent, while those with a physical disability again comprised the largest share of food-insecure households (52.5 percent).

Food insecurity was somewhat less prevalent among households with a disabled adult who was a veteran. This finding is consistent with prior research showing that work-related disabilities result in a higher likelihood of poverty and material hardship for nonveterans than for veterans (Heflin et al., 2011; London et al., 2011).

The prevalence of food insecurity was higher among households with a female member who had a disability than households with a male member with a disability. Food insecurity was more common among households with persons with disabilities who had lower levels of education than those with higher levels.

[9]Columns 1, 3, and 5 in tables 3a and 3b show the prevalence of food insecurity for households with given characteristics. Columns 2, 4, and 6 show the distribution of food-insecure households across characteristics. The statistics in the prevalence column should be interpreted as follows: 37.8 percent of households with a member *not in labor force-disabled* who had a hearing disability were food insecure (see column 1, table 3a). Statistics in the share column should be interpreted as: 10.7 percent of food-insecure households with a member *not in labor force-disabled* had a hearing disability (see column 2, table 3a).

Table 3a

Prevalence and distribution of household-level adult food insecurity by disability status of working-age adults and selected characteristics of adult with disabilities

	Column 1 Prevalence of food insecurity among households with a member *not in labor force-disabled*	Column 2 Share of food-insecure households with a member *not in labor force-disabled*	Column 3 Prevalence of food insecurity among households with a member with *other reported disabilities*[1]	Column 4 Share of food-insecure households with a member with *other reported disabilities*[1]	Column 5 Prevalence of food insecurity among households with no working-age adult with disabilities	Column 6 Share of food-insecure households with no working-age adult with disabilities
			Percent of households			
Food insecurity overall	33.5	100.0	24.8	100.0	12.0	100.0
Characteristics of adult with disabilities						
Employment of adult with disabilities						
Not in labor force-disabled	33.5	100.0	--	--	--	--
Full-time	--	--	20.8	32.0	--	--
Part-time	--	--	26.1	18.0	--	--
Retired	--	--	13.8	9.7	--	--
Unemployed	--	--	42.7	16.3	--	--
Other not in labor force	--	--	33.2	24.0	--	--
Type of specified disability						
Hearing disability	37.8	10.7	18.5	20.8	--	--
Vision disability	48.2	13.9	28.5	17.3	--	--
Mental disability	40.2	37.9	34.1	39.8	--	--
Physical disability	37.4	57.1	27.5	52.5	--	--
Self-care disability	38.1	19.7	28.3	9.6	--	--
Going-outside-home disability	37.4	37.9	30.5	20.6	--	--
With two or more specified disabilities	38.6	49.2	33.7	36.4	--	--
Educational attainment of adult with disabilities						
Less than high school	37.1	28.3	35.2	21.3	--	--
High school/GED	31.8	39.4	25.5	33.2	--	--
Some college/associate's	35.0	25.9	27.6	35.3	--	--
Bachelor's or more	26.8	6.4	12.1	10.2	--	--
Veteran with disabilities	30.2	10.3	17.4	9.6	--	--
Sex of adult with disabilities						
Male	30.7	44.1	21.0	40.6	--	--
Female	36.2	55.9	28.4	59.4	--	--
Two or more working-age adults with disabilities	43.4	20.2	24.5	6.6	--	--
Number of households in sample	5,021	1,690	3,764	923	46,598	5,295

Percentages are weighted to represent the U.S. population.

[1]Working-age adults (age 18-64) with *other reported disabilities* are those with a specified disability (hearing, vision, mental, physical, self-care or going-outside-home disability) and no indication that their disability prevented them from working.

-- = No households in this category with the selected characteristics.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

Table 3b

Prevalence and distribution of household-level adult food insecurity by disability status of working-age adults and selected household characteristics

	Column 1 Prevalence of food insecurity among households with a member *not in labor force-disabled*	Column 2 Share of food-insecure households with a member *not in labor force-disabled*	Column 3 Prevalence of food insecurity among households with a member with *other reported disabilities*[1]	Column 4 Share of food-insecure households with a member with *other reported disabilities*[1]	Column 5 Prevalence of food insecurity among households with no working-age adult with disabilities	Column 6 Share of food-insecure households with no working-age adult with disabilities
			Percent of households			
Food insecurity overall	33.5	100.0	24.8	100.0	12.0	100.0
Household employment						
Not in labor force-disabled, none employed	40.2	69.0	--	--	--	--
Full-time employed and *not in labor force-disabled*	22.0	22.8	--	--	--	--
Part-time employed and *not in labor force-disabled*	35.7	8.2	--	--	--	--
Full-time employed	--	--	20.0	51.8	9.5	64.2
Part-time employed	--	--	35.4	17.1	23.5	15.9
Retired	--	--	16.8	8.4	8.3	3.0
Unemployed	--	--	47.3	10.9	37.8	11.8
Other not in labor force	--	--	51.0	11.8	24.2	5.1
Household income-to-poverty ratio						
0 - 1.0	49.7	49.2	51.2	38.0	34.9	30.3
1.0 - 1.49	46.4	16.0	39.7	14.3	28.2	14.7
1.5 - 1.99	31.9	9.9	33.7	13.9	21.8	13.3
2.0 - 2.99	22.0	5.7	20.4	11.2	13.9	13.7
3.0 +	13.0	5.1	8.7	11.7	3.7	13.3
Income missing	20.7	14.1	17.3	10.9	8.3	14.7
Household composition						
Married with children	31.5	12.4	24.4	17.1	10.1	23.8
Single mother	43.7	12.9	49.4	19.9	28.2	23.4
Other household with children	36.7	3.8	32.6	4.5	18.8	5.7
Multiple adults	27.8	40.6	15.5	28.1	7.7	24.2
Male alone	36.4	13.4	30.1	14.7	13.5	12.6
Female alone	47.0	16.9	32.3	15.7	13.5	10.3
Educational attainment of highest educated adult						
Less than high school	41.6	16.7	42.2	11.8	30.8	12.7
High school/GED	34.8	38.6	28.5	29.7	18.0	30.9
Some college/associate's	34.0	34.5	30.0	43.5	14.9	38.5
Bachelor's or more	22.3	10.2	12.0	15.0	4.9	17.9

continued—

Table 3b

Prevalence and distribution of household-level adult food insecurity by disability status of working-age adults and selected household characteristics—continued

	Column 1 Prevalence of food insecurity among households with a member *not in labor force-disabled*	Column 2 Share of food-insecure households with a member *not in labor force-disabled*	Column 3 Prevalence of food insecurity among households with a member with *other reported disabilities*[1]	Column 4 Share of food-insecure households with a member with *other reported disabilities*[1]	Column 5 Prevalence of food insecurity among households with no working-age adult with disabilities	Column 6 Share of food-insecure households with no working-age adult with disabilities
			Percent of households			
Race/ethnicity of reference person						
White non-Hispanic	31.3	59.0	21.3	62.0	8.7	49.2
Black non-Hispanic	38.7	23.0	32.7	15.5	20.7	21.3
Hispanic	36.6	13.1	36.0	16.0	21.8	24.1
Other non-Hispanic	33.4	4.9	32.2	6.5	9.6	5.4
Residence						
Unidentified metropolitan	38.6	18.0	23.8	15.4	12.2	13.9
Suburban metropolitan	32.2	32.7	23.4	36.3	10.8	38.2
Principal city metropolitan	34.3	27.0	28.3	29.2	14.1	34.0
Nonmetropolitan	31.3	22.3	23.8	19.1	11.3	13.9
Census region						
Northeast	32.7	17.4	21.1	13.0	9.7	14.6
Midwest	34.5	20.5	27.1	26.7	10.9	20.2
South	33.9	43.3	24.3	34.5	13.2	40.4
West	32.6	18.9	25.6	25.8	13.0	24.8
Number of households in sample	5,021	1,690	3,764	923	46,598	5,295

Percentages are weighted to represent the U.S. population.

[1]Working-age adults (age 18-64) with *other reported disabilities* are those with a specified disability (hearing, vision, mental, physical, self-care or going-outside-home disability) and no indication that their disability prevented them from working.

-- = No households in this category with the selected characteristics.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

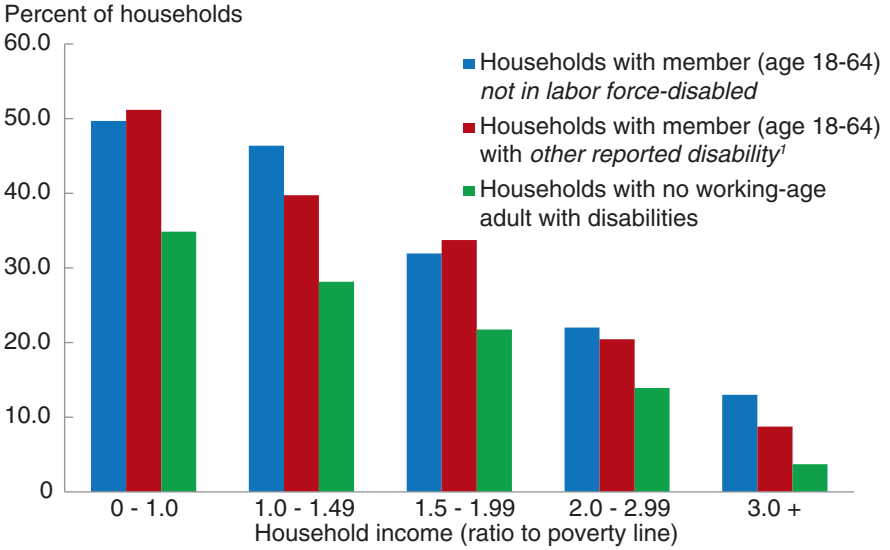
Across each of the household characteristics considered in table 3b, food insecurity was more prevalent among households with members who were *not in labor force-disabled* or had *other reported disabilities* than among those with no working-age adult members who had disabilities. For example, even within the same income categories, food insecurity was much more prevalent among households that included a member who was *not in labor force-disabled* (see table 3b, column 1) than among households with no adult with disabilities (see table 3b, column 5). About half of households with incomes below poverty that included someone *not in labor force-disabled* or with *other reported disabilities* were food insecure. About 35 percent of households with no adults with disabilities with incomes below poverty were food insecure. Food insecurity was common even in households with an adult who had a disability and income above the poverty level. Thirteen percent of households with someone *not in labor force-disabled* with an income three times the poverty level were

food insecure, while only 3.7 percent of households with no working-age adults with disabilities were food insecure in this income category.

Comparing the prevalence of food insecurity across income categories provides a picture of the additional income households need to cover costs associated with disabilities (fig. 3). The prevalence of food insecurity for households with no working-age adults with disabilities is lower than or similar to the prevalence for households with a member *not in labor force-disabled* in the next-higher income group. Likewise in all but the highest income category, the prevalence of food insecurity for households with no working-age adults with disabilities is lower than the prevalence for households with members with *other reported disabilities* in the next-higher income.

Household employment (see table 3b) differs from employment status of person with a disability (shown in table 3a) by taking into account the employment status of all adult household members. Households with a member *not in labor force-disabled* with no one else employed had a much higher prevalence of food insecurity (40.2 percent) than households with someone *not in labor force-disabled* and someone working full-time (22 percent; column 1). Households with no one employed comprised 69 percent of food-insecure households with someone *not in labor force-disabled*. The prevalence of food insecurity varied widely across household employment categories for households with an adult with *other reported disabilities*. About 17 percent of households that included an adult with *other reported disabilities* and where all adults were retired were food insecure, while 51 percent of households with an adult with *other reported disabilities* and no one in the labor force or retired were food insecure. Households with a full-time worker comprised nearly 52 percent of food-insecure households with an adult with *other reported disabilities*. Among households without

Figure 3
Prevalence of food insecurity by disability status and household income



[1]Working-age adults with *other reported disabilities* are those reported to have one or more or the following disabilities: hearing, vision, mental, physical, self-care, or going-outside-home disability, but no indication that their disability prevented them from working.

Source: USDA, Economic Research Service calculations based on 2009 and 2010 Current Population Survey Food Security Supplement data.

a working-age adult with a disability, 37.8 percent with no one working and someone unemployed were food insecure, a statistic that reiterates the importance of employment as a correlate of food insecurity. Over two-thirds of food-insecure households with no working-age adult with a disability included a full-time worker.

The findings regarding the prevalence of food insecurity by household characteristics are consistent with prior research. Food insecurity is more prevalent among low-income households, single mother households, households with lower educational attainment, Hispanic, and Black, non-Hispanic households.

Multivariate Logistic Regression Models Exploring the Association Between Disability Characteristics and Household-Level Adult Food Insecurity

The results of logistic regression models examining the likelihood of household-level adult food insecurity while accounting for income and other household characteristics are presented in table 4. A logistic regression model shown in table 5 explored how types of disability and characteristics of working-age adults with disabilities related to food insecurity. This model was estimated only for households that included a working-age adult with a disability.

Multivariate Logistic Regression Models for all Households

Households with a member who was *not in labor force-disabled* and with no employed member were 1.58 times as likely to be food insecure as otherwise similar households with a full-time employed member and with no member *not in labor force-disabled* (table 4). This model accounted for the effects of household income, family composition, education, and other household characteristics that might vary between households with and without members who were *not in labor force-disabled*. The unadjusted odds ratio, based on prevalence rates from table 3b, was 6.4 (40.2 percent versus 9.5 percent), so it is clear that income and employment mediate effects of disability on food insecurity to a considerable extent. Yet, even among households with similar levels of income, education, and family composition, those households with an adult with a disability were more likely to be food insecure. This suggests that expenses and other factors associated with disability also reduce food security. Having an adult *not in labor forced-disabled* was associated with higher odds of food insecurity even when another household member was working full-time (odds ratio of 1.27) or part-time (odds ratio 1.53).

Having a vision disability, mental disability, or physical disability was associated with higher odds of food insecurity. The effects of having a specified disability and the effects of being *not in labor force-disabled* are additive (thus odds ratios are multiplicative). For example, for a household with no one working and someone *not in labor force-disabled* who had a physical disability, the odds ratio of food insecurity would be 2.50, compared with the reference category of a household with a full-time worker and no adult with disabilities.[10] In analyses not shown, an interaction term between *not in labor force-disabled* and working-age adult with one of the six specified disabilities was added. The coefficient for the interaction was

[10]Obtained by multiplying the odds ratios for *not in labor force-disabled, none employed* (odds ratio 1.58) and *physical disability* (odds ratio 1.58).

Table 4

Logistic regression model examining the association between disability in working-age adults and household-level adult food insecurity among all households

Variable	Model 1 (overall model) all households with working-age adults			
	Parameter estimate	Standard error	p	Odds ratio
Intercept	-3.64	0.06	<.0001	
Household employment				
Not in labor force-disabled, none employed	0.46	0.06	<.0001	1.58
Full-time employed and *not in labor force-disabled*	0.24	0.07	<.001	1.27
Part-time employed and *not in labor force-disabled*	0.42	0.12	<.001	1.53
Full-time employed (reference)				
Part-time employed	0.39	0.04	<.0001	1.48
Retired	-0.32	0.07	<.0001	0.73
Unemployed	0.84	0.06	<.0001	2.32
Other not in labor force	0.14	0.07	0.04	1.15
Type of specified disability				
Hearing disability	0.10	0.07	0.18	1.11
Vision disability	0.38	0.08	<.0001	1.46
Mental disability	0.47	0.06	<.0001	1.60
Physical disability	0.46	0.05	<.0001	1.58
Self-care disability	-0.06	0.08	0.46	0.94
Going-outside-home disability	0.07	0.07	0.30	1.07
Veteran with disabilities	-0.04	0.08	0.65	0.96
Two or more adults with disabilities	0.27	0.08	<.001	1.31
Income-to-poverty ratio				
0 - 1.0	1.81	0.05	<.0001	6.10
1.0 - 1.5	1.72	0.05	<.0001	5.60
1.5 - 2.0	1.46	0.05	<.0001	4.29
2.0 - 3.0	1.03	0.05	<.0001	2.80
3.0 + (reference)				
Income not reported	0.59	0.05	<.0001	1.80
Household composition				
Married with children (reference)				
Single mother	0.45	0.04	<.0001	1.57
Other household with children	0.19	0.07	<.01	1.21
Multiple adults	-0.08	0.04	0.03	0.92
Male alone	0.14	0.05	<.01	1.15
Female alone	0.24	0.05	<.0001	1.27
Educational attainment of highest educated adult				
Less than high school	0.77	0.05	<.0001	2.16
High school/GED	0.63	0.04	<.0001	1.88
Some college/associate's	0.66	0.04	<.0001	1.93
Bachelor's or more (reference)				

continued—

Table 4

Logistic regression model examining the association between disability in working-age adults and household-level adult food insecurity among all households—continued

Variable	Model 1 (overall model) all households with working-age adults			
	Parameter estimate	Standard error	p	Odds ratio
Race/ethnicity of reference person				
White non-Hispanic (reference)				
Black non-Hispanic	0.31	0.04	<.0001	1.37
Hispanic	0.28	0.04	<.0001	1.33
Other non-Hispanic	0.00	0.06	0.93	1.00
Residence				
Unidentified metropolitan	0.01	0.04	0.75	1.01
Suburban metropolitan	0.03	0.03	0.35	1.03
Principal city metropolitan (reference)				
Nonmetropolitan	-0.21	0.04	<.0001	0.81
Census region				
Northeast (reference)				
Midwest	0.02	0.04	0.70	1.02
South	0.09	0.04	0.02	1.10
West	0.14	0.04	<.01	1.15
-2LL		38077.00		
Likelihood ratio		8404.58		
df		37		
Pseudo R^2		0.2479		
Number of households		55,383		

Estimates are weighted to represent the U.S. population.
Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

small and negative indicating that the effects were only slightly less directly additive than suggested by the main model.

Having a working-age veteran with disabilities in the household was not significantly related to food insecurity over and above the significant effects of the veteran with disabilities being *not in labor force-disabled* or having *other reported disabilities*. That is to say, any protective effect of veteran status for those with disabilities is not statistically significant once the characteristics of the disability and other household characteristics are taken into account.

Households with two or more adults with disabilities were significantly more likely to be food insecure than those with only one adult with disabilities. Again, this effect does not reflect lower income or employment, as these were controlled. Rather, households with multiple adults with disabilities may have higher medical costs and other expenses due to disability. Having multiple adults with disabilities in the household may make food provisioning an especially difficult task.

The logistic regression results for other household characteristics were consistent with prior research. Households where someone was unemployed looking for work, but no household members were employed, had especially high odds of food insecurity relative to households with a full-time worker (odds ratio of 2.32). Lower income-to-poverty ratios were related to a higher probability of food insecurity. Households with incomes below the Federal poverty level were 6.10 times as likely to be food insecure as those with incomes more than three times the Federal poverty level.[11] Married couples with children and multiple adult households were less likely to be food insecure than other types of households. Lower education was associated with a higher probability of food insecurity. Non-Hispanic Black and Hispanic households were more likely to be food insecure than non-Hispanic White households.

Multivariate Logistic Regression Models for Households That Include Working-Age Adults With Disabilities

The final logistic regression models estimated the relationship between food insecurity and disability characteristics in the subsample of households that included a working-age adult with a disability (table 5). These models included additional variables describing characteristics, such as educational attainment, age, and sex, of persons with disabilities.[12] Model 2 includes employment status of the adult with disabilities, and model 3 takes account of employment status of all adults in the household. Both models are included to contrast the association between food insecurity and employment of the adult with disabilities versus the association between food insecurity and employment of all adults. Employment of all adults has a greater effect on food insecurity than employment of only the adult with disabilities, indicating that the situation of the household as a whole, rather than the person with disabilities in isolation, is important for understanding how disabilities affect food insecurity.

Among all households that included an adult with a disability, those in which the adult with a disability was unemployed had a higher likelihood of food insecurity than those with a full-time working adult with a disability (odds ratio of 1.39; see table 5, model 2). Households where the adult with disabilities was retired were less likely to be food-insecure than households where the adult with disabilities was working full-time. When other characteristics of the adult with disabilities were controlled, those who were *not in labor force-disabled* were not more likely to be food insecure than households with an adult with a disability working full-time. That is to say, when other characteristics of the adult with disabilities were accounted for—such as type of specified disabilities, education, age and gender—being unable to work due to disabilities did not have an additional effect on the likelihood of food insecurity.

Considering the employment status of adults with disabilities along with the employment of other adult household members in households that include adults with disabilities highlights the protective effect on food insecurity of having another adult employed and the detrimental effect of having no one employed or retired (see table 5, model 3). Households with an adult *not in labor force-disabled* and no one working were more likely to be food insecure than households that included someone working full-time. Households

[11]Two alternative models were specified. In one alternative model, the household-income-to-poverty ratio was categorized into many more dummy variables (17 total) that encompassed smaller income ranges than those reported here. This model more adequately controlled for income by separating households into smaller income-to-poverty ranges while also including a dummy variable for households with missing income information. Including the more detailed income dummies had little effect on the other coefficients in the model, including disability. Therefore, the more parsimonious model is shown.

The second alternative model is shown in the appendix. In this model, households with missing income information were excluded from the analysis. The household income-to-poverty ratio was included in the model as a continuous measure, and a squared term for the income-to-poverty ratio was also included. As shown in appendix table 1, the coefficients for disability were considerably smaller in this model (though still significant and quite strong). The odds ratio for *not in labor force-disabled,* none employed was 1.58 in the model that included all households (see table 4) and 1.33 in the model that included only households with valid income data (see appendix table 1). The difference in the disability coefficients between the two models indicates that income explains much, but not all, of the relationship between disability and food insecurity.

[12]For households with more than one member with disabilities, the characteristics of the person with disabilities included in the model were assigned from the disabled person with the lowest number on the CPS relationship to reference person variable.

Table 5

Logistic regression models examining the association between household-level adult food insecurity and disability characteristics among households with working-age adults with disabilities

	Model 2 controlling for employment status of adult with disabilities				Model 3 controlling for employment status of all adults			
Variable	Parameter Estimate	Standard Error	p	Odds Ratio	Parameter Estimate	Standard Error	p	Odds Ratio
Intercept	-4.63	0.37	<.0001		-4.74	0.36	<.0001	
Household employment								
Not in labor force-disabled, none employed	--	--	--	--	0.30	0.08	<.001	1.34
Full-time employed and *not in labor force-disabled*	--	--	--	--	-0.06	0.09	0.46	0.94
Part-time employed and *not in labor force-disabled*	--	--	--	--	0.20	0.13	0.12	1.22
Full-time employed (reference)	--	--	--	--				
Part-time employed	--	--	--	--	0.19	0.13	0.14	1.20
Retired	--	--	--	--	-0.32	0.15	0.04	0.73
Unemployed	--	--	--	--	0.41	0.16	0.01	1.51
Other not in labor force	--	--	--	--	0.53	0.17	<.01	1.70
Employment of adult with disabilities								
Not in labor force-disabled	-0.01	0.09	0.91	0.99	--	--	--	--
Full-time (reference)					--	--	--	--
Part-time	-0.22	0.13	0.08	0.81	--	--	--	--
Retired	-0.60	0.15	<.0001	0.55	--	--	--	--
Unemployed	0.33	0.14	0.02	1.39	--	--	--	--
Other not in labor force	-0.03	0.12	0.80	0.97	--	--	--	--
Type of specified disability								
Hearing disability	-0.05	0.08	0.50	0.95	-0.02	0.08	0.76	0.98
Vision disability	0.32	0.08	<.0001	1.38	0.33	0.08	<.0001	1.40
Mental disability	0.35	0.06	<.0001	1.42	0.35	0.06	<.0001	1.42
Physical disability	0.29	0.06	<.0001	1.33	0.29	0.06	<.0001	1.34
Self-care disability	-0.03	0.08	0.73	0.97	-0.03	0.08	0.70	0.97
Going-outside-home disability	0.08	0.07	0.21	1.09	0.07	0.07	0.26	1.08
Educational attainment of adult with disabilities								
Less than high school	0.28	0.10	0.01	1.32	0.27	0.10	<.01	1.32
High school/GED	0.22	0.10	0.02	1.25	0.22	0.10	0.02	1.24
Some college/associate's	0.42	0.10	<.0001	1.52	0.42	0.10	<.0001	1.52
Bachelor's or more (reference)								
Veteran with disabilities	-0.05	0.09	0.58	0.95	-0.07	0.09	0.41	0.93
Female with disabilities	0.22	0.05	<.0001	1.25	0.20	0.05	<.001	1.22
Age of adult with disabilities	0.09	0.02	<.0001	1.09	0.09	0.02	<.0001	1.10
Age squared	-0.001	0.00	<.0001	1.00	-0.001	0.00	<.0001	1.00

continued—

Table 5

Logistic regression models examining the association between household-level adult food insecurity and disability characteristics among households with working-age adults with disabilities—continued

Variable	Model 2 controlling for employment status of adult with disabilities				Model 3 controlling for employment status of all adults			
	Parameter Estimate	Standard Error	p	Odds Ratio	Parameter Estimate	Standard Error	p	Odds Ratio
Two or more adults with disabilities	0.28	0.08	<.001	1.32	0.25	0.08	<.01	1.28
Income-to-poverty ratio								
0 - 1.0	1.89	0.10	<.0001	6.63	1.73	0.10	<.0001	5.63
1.0 - 1.5	1.72	0.11	<.0001	5.58	1.62	0.11	<.0001	5.03
1.5 - 2.0	1.31	0.11	<.0001	3.70	1.22	0.11	<.0001	3.40
2.0 - 3.0	0.78	0.11	<.0001	2.17	0.73	0.11	<.0001	2.07
3.0 + (Reference)								
Income not reported	0.67	0.10	<.0001	1.95	0.57	0.10	<.0001	1.77
Household composition								
Household with children	0.17	0.07	<.01	1.19	0.19	0.07	<.01	1.21
Multiple adults (reference)								
Single person	0.30	0.07	<.0001	1.35	0.20	0.07	<.01	1.22
Race/ethnicity of reference person								
White non-Hispanic (reference)								
Black non-Hispanic	0.17	0.07	0.02	1.19	0.16	0.07	0.03	1.17
Hispanic	0.07	0.08	0.38	1.08	0.10	0.08	0.23	1.11
Other non-Hispanic	0.11	0.12	0.34	1.12	0.13	0.12	0.27	1.14
Residence								
Unidentified metropolitan	0.09	0.08	0.29	1.09	0.09	0.08	0.28	1.09
Suburban metropolitan	0.08	0.07	0.26	1.08	0.08	0.07	0.25	1.08
Principal city metropolitan (reference)								
Nonmetropolitan	-0.16	0.08	0.04	0.85	-0.16	0.08	0.05	0.86
Census region								
Northeast (reference)								
Midwest	0.10	0.08	0.22	1.11	0.12	0.08	0.15	1.13
South	0.07	0.08	0.34	1.08	0.10	0.08	0.20	1.10
West	0.14	0.08	0.11	1.15	0.16	0.09	0.06	1.17
-2LL	9,369.39				9,359.74			
Likelihood ratio	1,368.92				1,378.57			
df	35				37			
Pseudo R^2	0.2045				0.2059			
Number of households	8,785				8,785			

Estimates are weighted to represent the U.S. population.
-- = No households in this category with the selected characteristics.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

that included no employed or retired members and someone unemployed or out of the labor force for other reasons were also more likely to be food insecure than households with an adult with disabilities and someone working full-time. Households with an adult who was retired (age 18-64) and no one working were less likely to be food-insecure than households with a full-time worker. Households with retired adults may have a steady source of income that helps them to maintain food security.

Coefficients for the other variables were similar in table 5, models 2 and 3. Vision, mental, and physical disabilities were associated with higher odds of food insecurity than other types of disability. Households with an adult with a disability who was a college graduate were less likely to be food insecure than those with less education. Veterans with disabilities were not more or less likely to be food insecure than those with similar disability characteristics who were not veterans. Age was significantly related to food insecurity, and age squared was significant as well indicating that the relationship was curvilinear. The likelihood of food insecurity increased with age of working-age adult with disabilities to about age 45, then declined with further increases in age (to age 65). Households containing women with disabilities were more likely to be food insecure than households with men who had a disability. Households with two or more working-age adults with disabilities were more likely to be food insecure than households with one working-age adult with disabilities.

Similar to the models for all households, households with adults with disabilities with lower income-to-poverty ratios were more likely to be food insecure. Household composition was simplified in this model because there were multicollinearity concerns when the full set of household composition dummies was included with the dummy variable for sex of disabled person. Both households with children and single persons were more likely to be food insecure than multiple-adult households with no children. Non-Hispanic Black households had higher odds of food insecurity than non-Hispanic White households. Households with adults with disabilities residing in principal cities were more likely to be food insecure than those in nonmetropolitan areas.

Participation in SNAP and Disability Assistance by Presence of a Working-Age Adult With Disabilities and Food Security Status

The extent of participation in food assistance and disability assistance programs among households with adults with disabilities by food security status sheds light on potential explanations for and solutions to the higher prevalence of food insecurity among households affected by disabilities. The sample for statistics on participation of food-insecure households in SNAP by disability status is restricted to households with incomes below 185 percent of the Federal poverty line.

Participation in SNAP

Participation in SNAP was more common among low-income households that included an adult with a disability than among households with no adults

with disabilities (table 6). About 47 percent of low-income households with a member who was *not in labor force-disabled* received SNAP. One-third of low-income households with a working-age member with *other reported disabilities* received SNAP. Twenty-four percent of low-income households with no working-age adults with disabilities received SNAP. About 56 percent of low-income households that were food insecure and had a member who was *not in labor force-disabled* received SNAP. Thirty-nine percent of low-income food-insecure households with a working-age member with *other reported disabilities* received SNAP.[13] Increasing participation in SNAP among households with disabled members may help to reduce food insecurity.

Over half of SNAP participant households that included an adult who was *not in labor force-disabled* (56.1 percent) or with a working-age member with *other reported disabilities* (53.2 percent) were food insecure. About 42 percent of SNAP participant households with no adults with disabilities were food-insecure. Thirty-one percent of low-income SNAP households with a member who was *not in labor force-disabled* and 27.7 percent of those with a working-age member with *other reported disabilities* had very low food security, compared with 16.3 percent of those without an adult with disabilities. The high prevalence of food insecurity and very low food security among SNAP households affected by disabilities suggests that SNAP policies geared toward adjusting benefits for households that include adults with disabilities may not fully adjust for the additional costs these households incur.

[13]These statistics may be biased downward. It is known from comparisons between household survey data and administrative records that food program participation is underreported by household survey respondents, including those in the CPS (Meyer et al., 2009). This is probably true for food-insecure households as well, although the extent of underreporting by these households is not known.

Table 6

Participation of low-income households in the Supplemental Nutrition Assistance Program (SNAP) by presence of a working-age adult with disabilities and household-level adult food security status

	Households with a member *not in labor force-disabled*	Households with a member with *other reported disabilities*[1]	Households with no working-age adult with disabilities
		Percent of households	
Share of all low-income households with working-age adults	19.6	8.4	72.0
Percentage of all low-income households receiving SNAP	46.9	33.5	24.0
Percentage of low-income food-secure households receiving SNAP	38.7	28.8	19.8
Percentage of low-income food-insecure households receiving SNAP	56.1	39.0	33.7
Percentage of low-income households with very low food security receiving SNAP	58.5	41.2	32.3
Prevalence of food insecurity among SNAP recipients	56.1	53.2	42.8
Prevalence of very low food security among SNAP recipients	31.0	27.7	16.3

Note: Analysis is restricted to households with annual incomes less than 185 percent of the poverty line because most households with incomes above that range were not asked whether they participated in food and nutrition assistance programs. (Number of households in low-income sample = 13,592)
Estimates are weighted to represent the U.S. population.
[1]Working-age adults (age 18-64) with *other reported disabilities* are those with a specified disability (hearing, vision, mental, physical, self-care or going-outside-home disability) and no indication that their disability prevented them from working.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.

Participation in Disability Assistance Programs

In addition to SNAP, disability assistance programs may help households that include adults with disabilities to maintain food security. The extent of participation in disability assistance programs and the prevalence of food insecurity among recipients by disability status were examined in a subsample of households with data on participation in disability assistance (table 7). It is important to note that participation in disability assistance programs is related to severity of disability; those with more severe disabilities are more likely to be eligible for assistance. Accordingly, participation in disability assistance was most common among households with a member who was *not in labor force-disabled*, followed by working-age members with *other reported disabilities*. Participation in disability assistance programs was relatively uncommon for households with no adults with disabilities.[14] Those with more severe disabilities may be more likely to be food insecure because they have high costs associated with disability or require significant assistance and care. Thus, higher food insecurity rates among those who are eligible for disability assistance may be expected.

The majority of households with a member who was *not in labor force-disabled* received some type of cash disability assistance (72.6 percent). About 74 percent of food-insecure households with a member who was *not in labor force-disabled* received SSI, SSDI or other disability assistance. About 30 percent of households with a member who was *not in labor force-disabled* received SSI. About 43 percent of these recipient households were food insecure, higher than the prevalence of food insecurity for all households with someone *not in labor force-disabled*. It is likely that the higher prevalence of food insecurity reflects in large part that those who qualify for SSI are more severely disabled. If so, it also suggests that the SSI benefit does not fully compensate for the lower income and higher expenses associated with those more severe levels of disability. About 43 percent of households with a member who was *not in labor force-disabled* received SSDI; 32.3 percent of these households were food insecure. SSDI beneficiaries were likely better off than SSI beneficiaries because SSDI benefits are usually higher than SSI benefits since SSDI benefits are based on the individual's work history. In addition, SSI benefits are means tested, while SSDI benefits are not. SSDI beneficiaries who receive very low benefits due to their work history are also able to receive SSI benefits.

One-quarter of households with a working-age member with *other reported disabilities* received SSI, SSDI, or other disability assistance. Persons with *other reported disabilities* that did not prevent them from working may not have qualified for SSI or SSDI. Persons with *other reported disabilities* that did receive SSI or SSDI were likely more severely disabled. The prevalence of food insecurity was higher among households with working-age members with *other reported disabilities* who were receiving SSI and SSDI than among those receiving other disability assistance.

[14]Households with no working-age adults with disabilities may have been receiving disability assistance for an elderly adult or a child with a disability. They may also have had a working-age adult with a medical condition or disability that was not captured by the CPS questions on disability.

Table 7

Participation in disability assistance and health insurance programs and prevalence of household-level adult food insecurity by presence of working-age adults with disabilities

	Households with a member *not in labor force-disabled*	Households with a member with *other reported disabilities*[1]	Households with no working-age adult with disabilities	Number of households in sample participating in program
	Percent of households			
Share of all households [2]	8.7	6.4	84.9	
Prevalence of adult food insecurity [2]	33.7	28.6	12.4	
Share of adult food-insecure households [2]	19.3	11.9	68.8	
Disability assistance				
Percentage of households receiving SSI	29.5	7.9	1.4	749
Prevalence of food insecurity among SSI recipients	42.9	35.8	25.8	
Share of food-insecure households receiving SSI	37.5	9.9	2.9	
Percentage of households receiving SSDI	42.5	12.0	1.5	1,061
Prevalence of food insecurity among SSDI recipients	32.3	29.1	18.2	
Share of food-insecure households receiving SSDI	40.7	12.3	2.3	
Percentage of households receiving any other disability[3] assistance	13.2	8.2	2.0	670
Prevalence of food insecurity among other disability[3] recipients	22.1	20.1	8.7	
Share of food-insecure households receiving other disability[3]	8.7	5.8	1.4	
Percentage of households receiving SSI, SSDI, or other disability assistance	72.6	25.0	4.5	2,180
Prevalence of food insecurity among SSI, SSDI, or other disability-assistance recipients	34.5	29.0	16.3	
Share of food-insecure households receiving SSI, SSDI, or other disability assistance	74.4	25.4	6.0	
Health insurance				
Percentage of households enrolled in Medicaid or Medicare[4]	78.7	43.0	26.4	5,826
Prevalence of food insecurity among Medicaid and Medicare enrollees[4]	35.4	36.6	21.4	
Share of food insecure households enrolled in Medicaid or Medicare[4]	82.7	55.1	45.6	
Percentage of households with no health insurance[6]	5.8	8.7	10.2	1,667[5]
Prevalence of food insecurity among households with no health Insurance[6]	31.7	33.9	21.9	
Share of food-insecure households with no health insurance[6]	5.5	10.4	18.0	
Number of households in sample (total= 19,175)	1,583	1,297	16,295	

Estimates are weighted to represent the U.S. population.

SSI = Supplemental Security Income. SSDI = Social Security Disability Insurance.

[1]Working-age adults (age 18-64) with *other reported disabilities* are those with a specified disability (hearing, vision, mental, physical, self-care or going-outside-home disability) and no indication that their disability prevented them from working.

[2]The share of households by disability status and prevalence of food insecurity differs slightly between the percentages shown in Tables 2, 3a, and 3b due to the reduced sample of households that are included in this analysis with data in both the Current Population Survey Food Security Supplement (CPS-FSS) and Current Population Survey Annual Social and Economic Supplement (CPS-ASEC).

[3]Other disability refers to workers compensation; veterans disability benefits; company or union disability; Federal, State or local government employee disability; U.S. military retirement disability; U.S. railroad retirement disability; accident or disability insurance; black lung miner's disability; State temporary sickness; or unspecified other.

[4]One or more household member is enrolled in Medicaid or Medicare. There may be members within the household who are not enrolled in Medicaid or Medicare.

[5]Number of households with no insurance.

[6]These households have no health insurance from any source for any household members.

Source: Calculated by USDA, Economic Research Service using data from households in the December 2009 (MIS 5-8) and December 2010 CSP-FSS and the 2010 and 2011 CPS-ASEC.

Access to Health Insurance

Access to health insurance is particularly important for households with adults with disabilities as high medical expenditures associated with disability may contribute to the higher likelihood of food insecurity. Often enrollment in Medicaid or Medicare is linked to receipt of SSI or SSDI. Enrollment in Medicaid or Medicare was high among households with members who were *not in labor force-disabled* (78.7 percent). About 83 percent of food-insecure households with someone *not in labor force-disabled* were enrolled in Medicaid or Medicare. About 55 percent of food-insecure households with a working-age member with *other reported disabilities* were enrolled in Medicaid or Medicare.

In each disability status, a small percentage of households had no access to health insurance. About 6 percent of households with someone *not in labor force-disabled* and 9 percent of households with working-age members with *other reported disabilities* had no health insurance.

Discussion and Conclusions

There is a large overlap between food insecurity and disability. The prevalence of food insecurity was much higher among households with a working-age adult who was classified as *not in labor force-disabled* (33.5 percent) or those with a working-age adult with *other reported disabilities* (24.8 percent) than among households with no working-age adults with disabilities (12 percent). About 32 percent of food-insecure households included a working-age adult with a disability, and 38 percent of households with very low food security included a working-age adult with a disability.

In this report, the relationship between disability and food insecurity is discussed in causal terms. It is likely that disability status has a causal effect on household food security status. The analysis does not provide definitive evidence for this directional relationship. There is probably some reverse causation in which household food insecurity exacerbates poor health conditions and disabilities. This reverse causation is thought to be small compared with the main effect that disabilities have on food insecurity. The analysis may also be biased by omitted variables. However, the relationship between food insecurity and disability found in these analyses is quite strong and has been documented in previous studies with other data. Therefore, the conclusion that disabilities lead to a higher likelihood of household food insecurity is well supported.

Disabilities that resulted in adults being unable to work (*not in labor force-disabled*) were more detrimental to food insecurity than *other reported disabilities* that did not prevent work, but the latter were also associated with an elevated risk of food insecurity. The influence of disability on earnings and income appear to have especially detrimental effects on food security. Lower capacity for employment and lower income are large parts of the reason that households with adults who have disabilities are more likely to experience food insecurity. Even among households that included adults with disabilities who did not indicate being unable to work due to disability, reduced earnings and savings may be a result of disability as many of these persons with disabilities indicated they were early retirees or not in the labor force for other reasons. The employment of household members without disabilities may have been reduced as well due to caregiving responsibilities for the member with a disability.

However, even with annual income accounted for in the multivariate models, disability was associated with a substantially higher likelihood of food insecurity. This suggests that other factors, such as higher expenses, lower savings, or diminished household management capabilities also contribute to the higher prevalence of food insecurity among households that include an adult with a disability.

Lower earnings and higher costs due to disability have long-term effects on household budgeting, savings, and asset accumulation and thereby increase the likelihood of food insecurity among households that include adult members with a disability. Savings and asset information was not available in the CPS and was not accounted for. Prior research found that savings and assets were important predictors of food insecurity among households that include members with disabilities (Huang et al., 2010).

The findings provide evidence for the theoretical mechanisms underlying the relationship between food insecurity and disability. Households with adults who were *not in labor force-disabled* or had *other reported disabilities* and were unemployed or not in the labor force were more likely to be food insecure than households with adults with disabilities who were working. These findings were consistent with the theoretical mechanisms through which disabilities may affect food insecurity, especially lower earnings and reduced asset accumulation. In addition to effects on earnings, ability to work likely reflects severity of disability, need for assistance or care, and overall level of functioning.

The descriptive results support the hypothesis that costs associated with disability are an important factor affecting food insecurity. Households that included adults with disabilities and with incomes three times the Federal poverty line had a much higher prevalence of food insecurity than households without adults who had disabilities. The prevalence of food insecurity among households with a member *not in the labor-force disabled* and income more than three times the poverty line was equivalent to the prevalence of food insecurity in households with no adults with disabilities and with incomes twice the poverty line. These statistics suggest that households with adults who have disabilities face high expenses that reduce resources available for the household food budget. Thus, even households with moderate incomes face a high likelihood of food insecurity due to costs associated with disability. Food assistance and disability assistance may not adequately adjust for the costs associated with disability.

The relationship between disability and food insecurity differed by type of disability. Vision, mental, and physical disabilities were associated with higher odds of food insecurity than other types of disabilities. There are several explanations for higher odds of food insecurity for these types of disability in particular. Persons with vision and physical disabilities incur high costs for assistive and adaptive equipment. Mental disabilities are the most prevalent disabilities among children (Waldrop and Stern, 2003). Age of onset of disability, or duration of the disabling condition, may be related to food insecurity. Those with disabilities since childhood are disadvantaged in terms of educational attainment, earnings potential, and asset accumulation and have accrued the greatest long-term costs related to disability. These factors suggest that those with long-term disabilities may be at the highest risk for food insecurity.

The findings indicate that among households that included adults with disabilities, the prevalence of food insecurity was higher for those receiving SSI than for other households. Receipt of disability income acts as a proxy for severity of disability. Applicants of disability benefits must document a certain degree of disability in order to qualify for benefits. Persons with disabilities who are more likely to receive disability income have lower capacity for earned income, due to disability constraints. Difficulty in obtaining and preparing healthful food may also be a factor that increases costs and contributes to food insecurity in households with more severe disabilities.

With regard to food and nutrition assistance, this study showed that over half of food-insecure households with adults who were *not in labor force-disabled* received SNAP. However, in households that included adults with

disabilities, food insecurity was highly prevalent both among SNAP recipients and nonrecipients.[15] The high prevalence of food insecurity among SNAP recipients suggests that higher benefits would reduce food insecurity; the high prevalence among nonrecipients suggests that increasing eligibility and outreach and reducing barriers to receipt among those with disabilities would reduce food insecurity. These findings indicate that the adjustments made by the SNAP program in determining benefit allotments for households that include members with disabilities do not adequately adjust for the costs of disability. Some enhancements to SNAP could be considered to help persons with disability maintain greater household food security. In particular, expanding deductions for disability-related expenses and allowing deductions for the costs of adaptive equipment and assistance care would increase the SNAP allotment for some households that include members who have a disability. In States with asset limits for SNAP recipients, increasing the asset limits for households with members with a disability would enable these households to have more savings without losing SNAP. Such households would be better equipped to cope with sudden increases in medical expenses or other costs while still maintaining food security. Those with disabilities require more resources on hand to weather sudden medical or other disability-related expenditures. Outreach efforts focused specifically at helping those with disabilities access SNAP more easily could also improve food security.

Some households that include members with disabilities receive special considerations with regard to allotment of SNAP benefits under current policies. However, only certain persons with disabilities qualify for these special considerations. SNAP disability rules generally apply to persons with disabilities who are already receiving some type of Government disability assistance such as SSI.[16] Households identified in these analyses as including adults with disabilities may not be considered "disabled" for SNAP benefit purposes if they were not receiving disability benefits. Therefore, special SNAP considerations for households with members with a disability do not apply to all such households.

Disabilities have effects on income and expenditures that in turn affect food insecurity. Disabilities or health impairments have direct effects on food insecurity as well. Some individuals with disabilities require assistance to get to the store and to purchase and prepare food. Functional limitations limit ability of some individuals with disabilities to make good use of food assistance resources (Wallace et al., 2007). Food assistance programs tailored specifically to households affected by disabilities could help overcome these challenges. Given the relatively large proportion of food-insecure households that include an adult with a disability, policies or programs focused specifically on reducing food insecurity among these households may be necessary.

The findings in this report indicate that disability and food insecurity are closely linked. To be successful, policies or programs to reduce food insecurity will require attention to the special circumstances of households that include persons with disabilities. Substantially reducing the prevalence and severity of food insecurity among households affected by disabilities would reduce the overall prevalence of food insecurity.

[15]The prevalence of food insecurity among SNAP recipients and nonrecipients may seem to suggest that SNAP does not reduce food insecurity as intended. However, this is not the case because households that are in the greatest need of food assistance, and the most likely to be food insecure, choose to apply for SNAP benefits. Numerous studies that account for this selection effect find that SNAP benefits do indeed reduce food insecurity among recipients (DePolt et al., 2009; Gundersen and Oliveira, 2001; Nord, 2012; Nord and Golla, 2009; Ratcliffe et al., 2011; Wilde and Nord, 2005; Yen et al., 2008).

[16]See http://www.fns.usda.gov/snap/applicant_recipients/eligibility.htm#special for more information.

Future Research

Findings from this study suggest several avenues for future research. It would be useful to know more about the extent to which households that include adults with disabilities are considered disabled for SNAP administrative purposes. Further research on the adequacy of SNAP benefits for all persons with disabilities and on the characteristics of disabilities that result in greater need for resources is also warranted.

Future research should further examine factors that may explain the association between disabilities in adults and household food insecurity. Questions that could not be addressed with the CPS-FSS data, such as the influence of other health impairments on food insecurity, asset accumulation and medical expenditures among those with disabilities and their effects on food insecurity, and the effects of disabilities among children, should be explored with other data sources. Other data sources, such as the National Health Interview Survey (NHIS), the Survey of Income and Program Participation (SIPP), and the Early Childhood Longitudinal Study-Kindergarten Cohort (ECLS-K), would be well suited to address these research questions. The NHIS began including USDA's 10-item adult food security questionnaire in 2011 and also includes more detailed information on health, disability, and health care utilization. The NHIS is a rich data source for future research on the relationship between disabilities and other health impairments and food security. The SIPP might be analyzed to consider issues related to asset accumulation, disabilities, and food insecurity. The ECLS-K could be examined to understand how special needs among children relate to household food security. It would also be informative to examine disability among children and adults jointly to gain a complete picture of the overlap between food insecurity and disability at the household level.

Finally, in 2009, the six questions identifying the specific types of disabilities considered in these analyses were included in the CPS-FSS data file. This addition allows for annual monitoring of the prevalence of food insecurity among households with adults who have disabilities. Given the high prevalence of food insecurity among households that include adults with disabilities, and the large share of food-insecure households that include adults with disabilities, regular monitoring of food insecurity trends among the population with disabilities is important. Adding a table on these relationships to USDA's annual food security report could provide this monitoring function.

References

Allison, P.D. 1999. *Logistic Regression Using SAS: Theory and Application*. Cary, NC: SAS Institute Inc.

Association of Nutrition Service Agencies. 2006. *The Power of Nutrition*, White Paper. Washington, D.C. Available at: http://www.ansanutrition.org/userfiles/file/The%20Power%20of%20Nutrition.pdf

Batavia, A.I., and R.L. Beaulaurier. 2001. "The Financial Vulnerability of People with Disabilities: Assessing Poverty Risks," *Journal of Sociology and Social Welfare* 28(1):139-162.

Bhattacharya, J., J. Currie, and S. Haider. 2004. "Poverty, Food Insecurity, and Nutritional Outcomes in Children and Adults," *Journal of Health Economics* 23(4):839-862.

Bickel, G., M. Nord, C. Price, W.L. Hamilton, and J.T. Cook. 2000. *Guide to Measuring Household Food Security, Revised 2000,* USDA, Food and Nutrition Service. Available at: http://www.fns.usda.gov/fsec/files/fsguide.pdf

Biros, M.H., P.L. Hoffman, and K. Resch. 2005. "The Prevalence and Perceived Health Consequences of Hunger in Emergency Department Patient Populations," *Academic Emergency Medicine* 12(4):310-317.

Brault, M.W. 2012. *Americans with Disabilities: 2010*. Current Population Reports, P70-131, U.S. Census Bureau.

Burkhauser, R.V., M.C. Daly, A.J. Houtenville, and N. Nargis. 2002. "Self-Reported Work-Limitation Data: What They Can and Cannot Tell Us," *Demography* 39(3):541-555.

Burkhauser, R.V., A.J. Houtenville, and J.R. Tennant. 2012. "Capturing the Elusive Working-Age Population with Disabilities: Reconciling Conflicting Social Success Estimates from the Current Population Survey and American Community Survey," *Journal of Disability Policy Studies* OnlineFirst:1-11.

Coleman-Jensen, A., M. Nord, M. Andrews, and S. Carlson. 2012. *Household Food Security in the United States in 2011*, ERR-141, USDA, Economic Research Service. Available at: http://ers.usda.gov/publications/err-economic-research-report/err141.aspx

Connolly, M. 2009. "Disability: It's Complicated," *Chance* 22(1):22-26.

DePolt, R.A., R.A. Moffitt, and D.C. Ribar. 2009. "Food Stamps, Temporary Assistance for Needy Families and Food Hardships in Three American Cities," *Pacific Economic Review* 14(4):445-473.

Dixon, L.B., M.A. Winkleby, and K.L. Radimer. 2001. "Dietary Intakes and Serum Nutrients Differ between Adults from Food-Insufficient and Food-

Sufficient Families: Third National Health and Nutrition Examination Survey, 1988-1994," *Journal of Nutrition* 131(4):1232-1246.

Gundersen, C., and V. Oliveira. 2001. "The Food Stamp Program and Food Insufficiency," *American Journal of Agricultural Economics* 83:875-887.

Hamilton, W.L., J.T. Cook, W.W. Thompson, L.F. Buron, E.A. Frongillo, Jr. , C.M. Olson, and C.A. Wehler. 1997a. *Household Food Security in the United States in 1995: Summary Report of the Food Security Measurement Project.* Prepared for USDA, Food and Consumer Service. Available at: http://www.fns.usda.gov/ora/menu/published/foodsecurity/sumrpt.pdf

Hamilton, W.L., J.T. Cook, W.W. Thompson, L.F. Buron, E.A. Frongillo, Jr. , C.M. Olson, and C.A. Wehler. 1997b. *Household Food Security in the United States in 1995: Technical Report*. Prepared for USDA, Food and Consumer Service. Available at: http://www.fns.usda.gov/ora/menu/published/foodsecurity/tech_rpt.pdf

Heflin, C.M., J.M. Wilmoth, and A.S. London. 2011. *Veteran Status and Material Hardship: The Moderating Influence of Disability*. National Poverty Center Working Paper Series No. 11-11. University of Michigan: National Poverty Center. Available at:http://www.npc.umich.edu/publications/working_papers/?publication_id=207&

Huang, J., B. Guo, and Y. Kim. 2010. "Food Insecurity and Disability: Do Economic Resources Matter?," *Social Science Research* 39:111-124.

Leete, L., and N. Bania. 2009. "The Effect of Income Shocks on Food Insufficiency," *Review of Economics of the Household*, DOI 10.1007/s11150-009-9075-4. Published online November 20, 2009.

London, A.S., C.M. Heflin, and J.M. Wilmoth. 2011. "Work-Related Disability, Veteran Status, and Poverty: Implications for Family Well-Being," *Journal of Poverty* 15(3):330-349.

Loprest, P. and E. Maag. 2009. *Disabilities among TANF Recipients: Evidence from the NHIS,* Washington, DC: The Urban Institute.

Madrian, B.C., and L.J. Lefgren. 1999. *A Note on Longitudinally Matching Current Population Survey (CPS) Respondents*. Technical Working Paper 247. Cambridge, MA: National Bureau of Economic Research.

McKernan, S.M., and C. Ratcliffe. 2005. "Events That Trigger Poverty Entries and Exits," *Social Science Quarterly* 86(Supplement):1146-1169.

Meyer, B.D., W.K.C. Mok, and J.X. Sullivan. 2009. *The Under-Reporting of Transfers in Household Surveys: Its Nature and Consequences*, NBER Working Paper No. 15181, Cambridge, MA: National Bureau of Economic Research.

Meyer, B.D., and W.K.C. Mok. 2008. *Disability, Earnings, Income and Consumption*. Working Paper No. 06.10. The Harris School of Public Policy Studies, The University of Chicago.

Mitra, S., P.A. Findley, and U. Sambamoorthi. 2009. "Health Care Expenditures of Living with a Disability: Total Expenditures, Out-of-Pocket Expenses, and Burden, 1996 to 2004," *Archives of Physical Medicine and Rehabilitation* 90(9):1532-1540.

Nelson, K., M.E. Brown, and N. Lurie. 1998. "Hunger in an Adult Patient Population," *Journal of the American Medical Association* 279(15):1211-1214.

Nelson, K., W. Cunningham, R. Andersen, G. Harrison, and L. Gelberg. 2001. "Is Food Insufficiency Associated with Health Status and Health Care Utilization among Adults with Diabetes?" *Journal of General Internal Medicine* 16:404-411.

New York State Department of Health. 2003. *Nutrition and Weight Management Issues for Persons with Disabilities*. On Target: Disability and Health in New York State. Issue No. 10. New York State Department of Health, Disability and Health Program. Available at:http://www.health.state.ny.us/nysdoh/prevent/target10.pdf

Nielsen, R.B., S. Garasky, and S. Chatterjee. 2010. "Food Insecurity and Out-of-Pocket Medical Expenditures: Competing Basic Needs?" *Family and Consumer Sciences Research Journal* 39(2):137-151.

Nord, M. 2008. "Disability Is an Important Risk Factor for Food Insecurity," *Amber Waves* 6(1):5.

Nord, M. 2012. "How Much Does the Supplemental Nutrition Assistance Program Alleviate Food Insecurity? Evidence from Recent Programme Leavers," *Public Health Nutrition* 15(5):811-817.

Nord, M., and A.M. Golla. 2009. *Does SNAP Decrease Food Insecurity? Untangling the Self-Selection Effect,* ERR-85, USDA, Economic Research Service. Available at: http://www.ers.usda.gov/publications/err-economic-research-report/err85.aspx

Olin, G., and D.D. Dougherty. 2006. *Characteristics and Medical Expenses of Adults 18 to 64-Years Old with Functional Limitations, Combined Years 1997-2002*. Working Paper No. 06002. U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality. Available at: http://www.meps.ahrq.gov/mepsweb/data_files/publications/workingpapers/wp_06002.pdf

Palmer, M. 2011. "Disability and Poverty: A Conceptual Review," *Journal of Disability Policy Studies* 21(4):210-218.

Parish, S.L., M. Grinstein-Weiss, Y.H. Yeo, R.A. Rose, and A. Rimmerman. 2010. "Assets and Income: Disability-Based Disparities in the United States," *Social Work Research* 34(2):71-82.

Parish, S.L., R.A. Rose, and M.E. Andrews. 2009. "Income Poverty and Material Hardship among U.S. Women with Disabilities," *Social Service Review* 83(1):33-52.

Porterfield, S.L. 2002. "Work Choices of Mothers in Families with Children with Disabilities," *Journal of Marriage and Family* 64:972-981.

Ratcliffe, C., S.M. McKernan, and S. Zhang. 2011. "How Much Does the Supplemental Nutrition Assistance Program Reduce Food Insecurity?" *American Journal of Agricultural Economics* 93(4):1082-1098.

Ribar, D.C., and K.S. Hamrick. 2003. *Dynamics of Poverty and Food Sufficiency*. FANRR-36, USDA, Economic Research Service. Available at: http://www.ers.usda.gov/publications/fanrr36/fanrr36.pdf

Rose, D., and V. Oliveira. 1997. "Nutrient Intakes of Individuals from Food-Insufficient Households in the United States," *American Journal of Public Health* 87(12):1956-1961.

Rose, R.A., S.L. Parish, and J.P. Yoo. 2009. "Measuring Material Hardship among the U.S. Population of Women with Disabilities Using Latent Class Analysis," *Social Indicators Research* 94(391-415).

Schmidt, L., and S. Danziger. 2009. "The Supplemental Security Income Program and Material Hardship after the 1996 Welfare Reform," in *Thirty-First Annual Association for Public Policy Analysis and Management Research Conference* papers. Washington, DC.

Seligman, H.K., T.C. Davis, D. Schillinger, and M.S. Wolf. 2010. "Food Insecurity Is Associated with Hypoglyemia and Poor Diabetes Self-Management in a Low-Income Sample with Diabetes," *Journal of Health Care for the Poor and Underserved* 21 (4):1227-1233.

Seligman, H.K., E.A. Jacobs, A. Lopez, J. Tschann, and A. Fernandez. 2012. "Food Insecurity and Glycemic Control among Low-Income Patients with Type 2 Diabetes," *Diabetes Care* 35(2):233-238.

She, P., and G.A. Livermore. 2007. "Material Hardship, Poverty, and Disability among Working-Age Adults," *Social Science Quarterly* 88(4):970-989.

She, P., and G.A. Livermore. 2009. "Long-Term Poverty and Disability among Working-Age Adults," *Journal of Disability Policy Studies* 19(4):244-256.

Siefert, K., C.M. Heflin, M.E. Corcoran, and D.R. Williams. 2004. "Food Insufficiency and Physical and Mental Health in a Longitudinal Survey of Welfare Recipients," *Journal of Health and Social Behavior* 45(2):171-186.

Stuff, J.E., P.H. Casey, K.L. Szeto, J.M. Gossett, J.M. Robbins, P.M. Simpson, C. Connell, and M.L. Bogle. 2004. "Household Food Insecurity Is Associated with Adult Health Status," *Journal of Nutrition* 134:2330-2335.

Trenkamp, B. and M. Wiseman. 2007. "The Food Stamp Program and Supplemental Security Income," *Social Security Bulletin* 67(4):71-87.

U.S. Department of Agriculture, Food and Nutrition Service. 2012. *Building a Healthy America: A Profile of the Supplemental Nutrition Assistance Program*. USDA/FNS, Office of Research and Analysis. Available at: http://www.fns.usda.gov/ora/MENU/Published/snap/FILES/Other/BuildingHealthyAmerica.pdf

U.S. Census Bureau. 2009. *Current Population Survey, 2009 ASEC Technical Documentation*. Available at: http://www.census.gov/apsd/techdoc/cps/cpsmar09.pdf

U.S. Social Security Administration. 2011. *State Assistance Programs for SSI Recipients, January 2011*. SSA Publication No. 13-11975, Social Security Administration. Available at:http://www.ssa.gov/policy/docs/progdesc/ssi_st_asst/2011/ssi_st_asst2011.pdf

U.S. Social Security Administration. 2012. *Social Security Disability Benefits*. SSA Publication No. 05-10029, Social Security Administration. Available at: http://www.ssa.gov/pubs/10029.pdf

Vozoris, N.T. and V.S. Tarasuk. 2003. "Household Food Insufficiency Is Associated with Poorer Health," *Journal of Nutrition* 133(1):120-126.

Waldrop, J. and S.M. Stern. 2003. *Disability Status: 2000*. Census 2000 Brief 17. U.S. Census Bureau. Available at: http://www.census.gov/prod/2003pubs/c2kbr-17.pdf

Wallace, S.P., L.C. Molina, and M. Jhawar. 2007. *Falls, Disability and Food Insecurity Present Challenges to Healthy Aging*. Health Policy Research Brief. Los Angeles, CA: UCLA Center for Health Policy Research. Available at: http://www.healthpolicy.ucla.edu/pubs/files/healthy_aging_pb_051507.pdf

Wang, Q. 2005. *Disability and American Families: 2000*. Census 2000 Special Reports 23. U.S. Census Bureau. Available at: http://www.census.gov/prod/2005pubs/censr-23.pdf

Wilde, P. and M. Nord. 2005. "The Effect of Food Stamps on Food Security: A Panel Data Approach," *Review of Agricultural Economics* 27(3):425-432.

Yen, S.T., M. Andrews, Z. Chen, and D.B. Eastwood. 2008. "Food Stamp Program Participation and Food Insecurity: An Instrumental Variables Approach," *American Journal of Agricultural Economics* 90(1):117-132.

Zaidi, A. and T. Burchardt. 2005. "Comparing Incomes When Needs Differ: Equivalization for the Extra Costs of Disability in the U.K," *Review of Income and Wealth* 51(1):89-114.

Appendix—Matching Households Interviewed in the Current Population Survey Food Security Supplement and the Current Population Survey Annual Social and Economic Supplement

Households are interviewed for the monthly Current Population Survey (CPS) for 4 consecutive months, rotate out of the sample for 8 months, and rotate back into the sample for a final 4 months. New households enter the survey each month, so the CPS sample changes from month to month as households rotate through the monthly sample. Because households are interviewed for 4 consecutive months, data provided in the Food Security Supplement (FSS) administered in December can be matched to data provided in the Annual Social and Economic Supplement (ASEC) administered in March for some households. One-quarter of households interviewed for the December Current Population Survey-Food Security Supplement (CPS-FSS) were also interviewed for the March ASEC. Some additional households are interviewed for the ASEC in February and April to increase the number of Hispanic households and the number of households with children (U.S. Census Bureau, 2009, p. 2-2). Therefore, some additional FSS interview households complete the ASEC interview in February and are potentially matchable households.

Household data from the FSS and ASEC were merged in SAS 9.2 statistical software according to the following procedure. The FSS and ASEC files were first matched at the person level by State, household identification numbers, and person's line number. Following the initial merge and after omitting households identified in the data as having moved out or moved in between December and the ASEC interview, the characteristics of interviewed persons were compared across the two files to ensure that the persons matched were indeed the same in both datasets. The individual characteristics compared between the FSS and ASEC were: age (considered the same across files if the difference was plus or minus 2 years to allow for some reporting error), race and Hispanic origin, sex, and relationship to household reference person. (Possible or likely changes in the relationships of household members to the household reference person were: acquiring a relative; losing a relative; or marrying a nonrelative, partner, roommate, or boarder. Other changes in the relationship to the reference person were considered unlikely changes and indicated that a different household had moved in.) If a person was the same across the two files on all of these variables or if they only changed on one of these variables, they were classified as the same or probably the same person. If the person had two or more changes on these variables, they were classified as probably different across the two files. If there were no household members who were classified as the same or probably the same person across the two files, then the household was considered different across the two files. This merge procedure was consistent with recommendations for matching persons across multiple years of ASEC interviews (Madrian and Lefgren, 1999).

If a household contained no individuals that were matched across the FSS and ASEC files, then the household was deleted from the matched file. Therefore, the matched file only contained data from households that were interviewed in the FSS and ASEC and whose characteristics appeared to be the same or very similar across the two interviews. One-third of households in the FSS were matched to data in the ASEC.

Appendix table 1

Logistic regression model examining the association between disability and household-level adult food insecurity among households with valid income

Variable	Model 4 (overall model) households with working-age adults and valid income			
	Parameter estimate	Standard error	p	Odds ratio
Intercept	-1.21	0.07	<.0001	
Household employment				
Not in labor force-disabled, none employed	0.29	0.06	<.0001	1.33
Full-time employed and *not in labor force-disabled*	0.23	0.08	<.01	1.25
Part-time employed and *not in labor force-disabled*	0.30	0.12	0.02	1.35
Full-time employed (reference)				
Part-time employed	0.26	0.05	<.0001	1.30
Retired	-0.41	0.08	<.0001	0.66
Unemployed	0.61	0.06	<.0001	1.84
Other not in labor force	-0.11	0.07	0.13	0.90
Type of specified disability				
Hearing disability	0.14	0.08	0.08	1.14
Vision disability	0.32	0.08	<.0001	1.37
Mental disability	0.50	0.06	<.0001	1.64
Physical disability	0.40	0.05	<.0001	1.50
Self-care disability	-0.01	0.09	0.95	0.99
Going-outside-home disability	0.08	0.07	0.24	1.09
Veteran with disabilities	-0.06	0.09	0.49	0.94
Two or more adults with disabilities	0.25	0.08	<.01	1.29
Income-to-poverty ratio	-0.56	0.02	<.0001	0.57
Income-to-poverty ratio squared	0.01	0.00	<.0001	1.02
Household composition				
Married with children (reference)				
Single mother	0.44	0.05	<.0001	1.56
Other household with children	0.19	0.07	0.01	1.21
Multiple adults	0.03	0.04	0.44	1.03
Male alone	0.25	0.05	<.0001	1.29
Female alone	0.34	0.05	<.0001	1.41
Educational attainment of highest educated adult				
Less than high school	0.57	0.06	<.0001	1.77
High school/GED	0.50	0.04	<.0001	1.64
Some college/associate's	0.53	0.04	<.0001	1.69
Bachelor's or more (reference)				
Race/ethnicity of reference person				
White non-Hispanic (reference)				
Black non-Hispanic	0.22	0.04	<.0001	1.25
Hispanic	0.22	0.04	<.0001	1.25
Other non-Hispanic	0.00	0.06	0.98	1.00

continued—

Appendix table 1

Logistic regression model examining the association between disability and household-level adult food insecurity among households with valid income—continued

Variable	Model 4 (overall model) households with working-age adults and valid income			
	Parameter estimate	Standard error	p	Odds ratio
Residence				
Unidentified metropolitan	-0.02	0.05	0.74	0.99
Suburban metropolitan	0.07	0.04	0.04	1.08
Principal city metropolitan (reference)				
Nonmetropolitan	-0.22	0.04	<.0001	0.80
Census region				
Northeast (reference)				
Midwest	0.00	0.05	0.97	1.00
South	0.07	0.04	0.09	1.08
West	0.11	0.05	0.01	1.12
-2LL	33144.40			
Likelihood ratio	8282.04			
Df	34			
Pseudo R^2	0.2759			
Number of households[1]	46,913			

Estimates are weighted to represent the U.S. population.

[1]Excludes households with missing data on household income.

Source: Calculated by USDA, Economic Research Service using data from the December 2009 (MIS 5-8) and December 2010 Current Population Survey Food Security Supplement.