

Food Insecurity among Rural, Low-Income Families

Yoshie Sano
Washington State University Vancouver

Sheila Mammen
University of Massachusetts Amherst

Brittney Oliver
Mississippi State University

ABSTRACT. Compared to the general population, the rate of food insecurity is much higher among rural, low-income families. This paper summarizes 20 years of research findings on the food insecurity of marginalized rural families in three specific areas: (a) family food practice and management, (b) food insecurity and health outcomes, and (c) formal and informal supports and food insecurity. Overall, the findings demonstrate that the causes and consequences of food insecurity are complex and are embedded in various contextual factors that rural families face. This paper discusses the importance of building multi-disciplinary, multi-level programs (i.e., individual, family, and community) and policies to reduce food insecurity. These programs and policies would ultimately promote the health and well-being of rural low-income families.

Direct correspondence to Yoshie Sano at yoshie_sano@wsu.edu

Food Insecurity among Rural, Low-Income Families

Consumption of nutritious food is necessary for healthy, productive lives for adults and children. Although the majority of families in the United States (87.3%) were food secure, 12.7% (15.8 million) experienced food insecurity in 2015 (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2016). According to the United States Department of Agriculture (USDA) (ERS, 2016), food security includes two sub-categories: high food security and marginal food security. High food security is defined as “no reported indications of food-access problems or limitation” while marginal food security is described as “one or two reported indications—typically of anxiety over food sufficiency or shortage of food in the house” (ERS, 2016, para. 3). Food insecurity also has two sub-categories: low food security and very low food security. Low food security is described as “reduced quality, variety, or desirability of diet with little or no indication of reduced food intake.” The very low food security category includes “multiple indications of disrupted eating patterns and reduced food intake.” Among food insecure families, 5% of households (6.3 million) experienced very low food insecurity in 2015 (ERS, 2016).

Compared to the national average, rates of food insecurity were higher among families with children (16.6%), especially those with children under age six, racial/ethnic minorities (Black: 21.5%; Hispanic: 19.1%), single mother families (30.3%), low-income households (32.8%), and rural families (15.4%). Two studies, Rural Families Speak (RFS), 1998-2008, and Rural Families Speak about Health (RFSH), 2008-2019,¹ examined one population group that is among the most food insecure—rural, low-income families with children. These two studies, with two different sets of samples, have provided considerable insights into our understanding of the food insecurity issues faced by economically disadvantaged rural families, during periods before and after the recent Great Recession (2007-2009).

For participants in the RFS project, food security status was determined by quantitative responses to the USDA Core Food Security Module (CFSM) (Bickel, Nord, Price, Hamilton, & Cook, 2000) over the three interview years (Wave 1, Wave 2, Wave 3). Measured over a 12-month period, the CFSM is designed to capture magnitude and frequency of food insecurity by asking families 18 questions about their food acquisition, such as if the family worried about running out of food or relied on few kinds of low cost foods for children. Consistent with USDA methodology for calculating official food insecurity rates, we converted the response to each question into a binary (negative or positive) response and categorized families as food secure if they provided two or fewer positive responses and food insecure if they provided three or more positive responses (Bickel et al., 2000).

¹ The objective of the Rural Families Speak (RFS) project (1998-2008) was to study the well-being of rural, low-income families in the context of the 1996 federal welfare reform legislation. The overall goal of the Rural Families Speak about Health (RFSH) study (2008-2019) was to identify the factors that influence physical and mental health among vulnerable, rural families. While there were different samples in RFS and RFSH, the participants in both studies were rural female caregivers, 18 years of age or older, with at least one child under the age of 13. For a complete description of RFS/RFSH studies, please see “Rural, Low-Income Families and their Well-Being: Findings from 20 Years of Research” (Family Science Review, issue 1, 2018).

The RFSH study utilized the six-item short form of the US Household Food Security Module (Blumberg, Bialostoski, Hamilton, & Briefel, 1999) to assess food security status. This measure has been shown to identify food-insecure households and very low food-security households with reasonably high specificity, sensitivity, and minimal bias compared with the 18-item measure. It does not, however, directly ask about children's food security. Nor does it measure the most severe range of adult food insecurity, in which children's food intake is likely to be reduced.

Table 1 shows food security status of RFS and RFSH participants. Half (50.5%) of the RFS participants reported food insecurity at Wave 1 while 39.2% of the RFSH families were food insecure, of whom 23.5% and 16.2% experienced low food security and very low food security, respectively (data not shown in Table 1). Half (49.5%) of the RFS families were food secure; less than two-thirds (60.3%) of the RFSH families were food secure.

In the following sections we highlight our research findings about the food insecurity of rural, low-income families in three areas: (a) family food practice and management, (b) association between food insecurity and health outcomes, and (c) formal and informal support and food security. We then discuss implications for policies and practices based on the findings.

FINDINGS

Family Food Practice and Management

Food practice. The RFS/RFSH studies have documented that family food contexts and practices among rural, low-income families are complex. While many mothers reported their efforts to provide healthy food to their children, there appeared to be a gap between their intentions and actual behaviors (Sano, Gibbs, & Vaughn, 2013). Sano et al. reported that the majority (93%) of families always or often eat at least one meal together and always or often eat fruits and vegetables with the main meal (91%). But half of them (49%) watched television while eating dinner, approximately a quarter (24%) of the mothers did not restrict their child's sugar intake, 27% used food as a reward for the child's behavior, and 27% of children always or often drank soda or Kool-Aid at meals. Paradoxically, for mothers who had low expectations of family involvement at mealtime, food insecurity did not affect their mental health status. On the other hand, food insecurity significantly increased mothers' stress levels for those who had high expectations for family meal times, perhaps because financial struggles and lack of access to quality food prevented them from creating perceived optimal meal environments for their families (Bao & Greder, 2015).

Rural immigrant mothers faced additional challenges as they attempted to ensure their children had adequate nourishment to grow up healthy in their new US communities. Greder, Slowing, and Doudna (2012) investigated Latina immigrant mothers' satisfaction with food and their young children's eating patterns qualitatively. They found that the mothers (a) acted as gatekeepers of healthy child eating; (b) identified barriers to healthy eating, including a lack of "fresh" food in their communities (e.g., in the US, food was old and tasted different from food in their home countries) and healthy food being more expensive in rural communities; and (c) reported that easily available foods are less healthy (e.g., processed, junk, fast food, and more

meat) and raised concerns about the quality of food children ate at school (i.e., school breakfast and lunch). Additionally, mothers varied in their abilities to negotiate their new food environments to maintain cultural food practices and promote healthy child eating patterns.

Mothers' expectations, attitudes, and behaviors toward food were found to be strongly influenced by their childhood food-related experiences (Olson, Bove, & Miller, 2007; Sano, Gibbs, & Vaughn, 2013). For example, Olson et al. (2007) reported that women who had experienced food deprivation during their childhood were more likely to use food to meet their emotional needs, developed tendencies to overeat when they experienced negative emotions, were super-motivated to actively avoid food insecurity, and showed tremendous excitement toward food after periods of deprivation. Several studies have also documented that food insecurity and/or deprivation in childhood and adulthood resulted in mothers' disordered eating patterns such as food binges (Bove & Olson, 2006; Olson & Bove, 2005; Olson et al., 2007; Mammen, Bauer, & Richards, 2009). These patterns may be one factor contributing to the prevalence of overweightness and obesity among the low-income population.

Food management in the context of poverty. Since food is a basic need that affects our ability to survive and thrive, rural low-income mothers responded to that need (and to concerns about its adequacy in quantity and quality) used various strategies to alleviate food insecurity and manage food supplies effectively (Grutzmacher, 2004; Mammen et al., 2009). Grutzmacher (2004) reported that mothers with higher education called on their general life skills, food-related skills, and their abilities to make budgets to significantly increase their likelihood of achieving food security. Specifically, Mammen et al. (2009) documented various food-related strategies used by vulnerable mothers, which included shopping techniques (use of coupons, bulk buying, selecting off-brands), social support strategies (having meals with extended family and friends), money-related techniques (using credit cards, juggling bills, knowingly writing bad checks), food production and storing techniques (gardening, freezing, canning, preparing big soups or stews) and relying on community and governmental support. Unfortunately, some families engaged in several risky food consumption reduction strategies to deal with food insecurity, such as dieting to manage or reduce hunger ("needing to lose weight"), curbing their appetites (smoking, drinking coffee, ignoring mealtimes), and triage (making deliberate choices about which family members would eat first: often, children first, then adult males) (Mammen et al., 2009). These findings highlight that food insecurity is not simply a result of having low income. Rather, it is a product of various factors including (a) economic, social, and community resources; (b) knowledge and skills; (c) childhood experiences; and (d) emotional responses to food.

Food Insecurity and Health Outcomes

Food insecurity has implications for physical and mental health outcomes across the lifespan. Physical health outcomes associated with food insecurity among adults are increased rates of obesity and chronic health conditions that include heart disease, diabetes, and hypertension (Seligman, Laraia, & Kushel, 2010). Similarly, poor mental health outcomes such as depression are linked to decreased food security.

Maternal health outcomes. Food insecurity has been identified as a predictor of poor health among rural women, with positive associations to a number of chronic conditions, work absenteeism, and visits to doctors (Simmons-Wescott, 2004). Women residing in rural communities, especially those areas characterized by isolation and poverty, reported engaging in disordered eating and low levels of physical activity, which contributed to obesity risks (Bove & Olson, 2006).

Extending beyond physical health, food insecurity had psychological implications, namely depression, among rural low-income women (Simmons-Wescott, 2004). Among Latina women, food insecurity, unemployment, and being single were variables that predicted clinically significant depressive symptomology (Downey & Greder, 2014). In investigating the relationship between food insecurity and maternal depressive symptomology, Bao, Pang, Arellanes, Greder, and Smith (2016) identified family rituals and child behaviors as mediating factors. Although the impact was marginal, family rituals indirectly affected the relationship between food insecurity and mothers' depressive symptoms. Among younger (1½ - 5 years) and older (6 - 13 years) children, behavior problems influenced this relationship significantly.

The relationship between household food insecurity and depression, however, was not unidirectional. Huddlestone-Casas, Charnigo, and Simmons (2009) identified depression as a factor contributing to food insecurity and vice versa. Furthermore, this relationship persisted over time (Lent, Petrovic, Swanson, & Olson, 2009; Doudna, 2012). Lent et al. (2009) found that mothers who initially reported depressive symptoms and poor mental health status were unlikely to report food security after three years.

Child health outcomes. The relationship between food insecurity and deleterious health behaviors and poor health outcomes was not exclusive to adults. Food insecurity status predicted problem behaviors among rural children (Bao et al., 2016; Sano, McGuire, Greder, & Greer, 2015). Bao et al. (2016) found that younger and older children experiencing food insecurity also exhibited externalizing and internalizing behavior problems. Externalizing behaviors included interpersonal conflicts and aggressive interactions with others. Internalizing behaviors represented intrapersonal factors that children experience, such as anxiety and depression. Family practices were associated with externalizing and internalizing behavior problems among younger children. Among older children, however, family practices were only predictive of internalizing behavior problems (Sano et al., 2015).

Childhood experiences of food insecurity also had implications for dietary behaviors in adulthood (Olson, Carson, & Bove, 2007). Women who had experienced childhood poverty-associated food deprivation actively avoided food insecurity in adulthood. Childhood food deprivation also influenced women's adult attitudes toward food and eating behaviors.

Formal and Informal Support and Food Security

Rural, low-income families turned to various forms of support to cope with food insecurity including public assistance programs, community agencies, and family and friends.

Public assistance programs. The Supplemental Nutrition Assistance Programs (SNAP), formerly known as the Food Stamps program, is the largest federal nutrition program providing food assistance to almost 44 million eligible low-income Americans, with an average of USD 125.50 in food assistance per person each month (USDA, 2017). The program was designed to alleviate hunger and malnutrition and to help provide families with more nutritious diets. Other federal nutrition programs include Women, Infants, and Children (WIC) for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five at nutritional risk, as well as the National School Lunch Program (NSLP), a free or reduced price school meal program. As shown in Table 1, rural low-income families' participation in public assistance programs included SNAP, 54.4% (RFS) and 70% (RFSH); WIC, 84.3% (RFS) and 52.7% (RFSH); NSLP, 86.4% (RFS) and 66.2% (RFSH) (Anderson & Swanson, 2002; Mammen & Sano, 2013).

According to Grutzmacher and Braun (2004), rates of participation in food assistance programs and of difficulties in purchasing food decreased among food-secure and food-insecure families from Wave 1 to Wave 2. A slightly larger percentage of food-secure households, compared to food-insecure households, participated in WIC. The reverse was true of NSLP participation. Participation in SNAP, WIC, and NSLP, however, was not a significant predictor of food security in either of the two years in the two groups (Grutzmacher, 2004; Grutzmacher & Braun 2004). Using quantitative and qualitative analyses, Swanson, Olson, Miller, and Lawrence (2008) concluded that although SNAP, WIC, and NSLP were not significantly associated with protection from food security. Nevertheless, these programs helped food-secure and food-insecure families meet their food needs.

Doudna (2012) found that mothers' knowledge of various community resources, including how to apply for SNAP and WIC, served as a protective mechanism against maternal depression and food insecurity, which predict each other over time. Similarly, Downey and Greder (2014) reported that the use of WIC, along with high levels of healthful eating and physical activity routines, acted as protective factors in the case of non-Latina mothers who experienced clinically significant depressive symptomology at twice the rate as Latina mothers. Among Latina immigrant families, greater participation in NSLP resulted in lower maternal depression scores, perhaps because NSLP contributed to increased household food security (Browder, Greder, & Jasper Crase, 2013).

Latina families across three food security groups (i.e., consistently food-secure, fragile, and consistently food-insecure) used WIC and NSLP. Few of these families, however, received SNAP. Besides their obvious needs for public assistance, families' use of this support was also influenced by their awareness, past experiences, and cultural norms regarding such assistance (Sano, Garasky, Greder, Cook, & Browder, 2011). According to Greder, Cook, Garasky, Sano, and Randall (2009), food-secure Latina families had greater knowledge of community resources. Perhaps this was why these families were more likely to access WIC than food-insecure families, and why they did so more often.

Informal supports. Swanson et al. (2008) reported that while families participated in federal assistance programs, they simultaneously relied on various informal supports, including community-based (food pantries and churches) and individual (family and friends) sources, to

provide either food or money for groceries. Regardless of their food security status, all Latina immigrant families relied on social support in part because of the many obstacles they faced when trying to access public assistance (Greder, Cook, Garasky, & Ortiz, 2008). Food-insecure families were more likely to receive multiple forms of such support (child care, food, housing, money, transportation) from a myriad of sources (family, friends, church, community agencies). To meet basic needs, they accessed financial support from family members while food-secure families did not require such assistance, even though this source was also available to them (Greder et al., 2008; Greder et al., 2009).

Difficulties in accessing federal food assistance programs. Accessing federal food assistance programs was difficult for many rural low-income families. They identified these barriers: (a) not being aware of their eligibility; (b) the values of the vehicles they used for going to work and grocery stores counting against their eligibility; (c) marginal employability and/or sporadic pay periods making them ineligible for benefits in some months; (d) cumbersome processes for application and re-certification; (e) difficulty in accessing SNAP authorizing offices due to inconvenient hours or access; (f) travel distances or lack of transportation; (g) lack of anonymity within small rural communities; (h) desire to not use government assistance; and (i) perceived discrimination in treatment by program workers and grocery clerks, along with social stigma associated with receiving benefits and using programs (Anderson & Swanson, 2002; Braun, 2008; Swanson et al., 2008). In the case of Latina immigrant families, their ineligibility to participate in public programs (such as SNAP) and cultural differences were additional factors in their abilities to achieve food security (Greder, Cook, Garasky, & Ortiz, 2008).

RECOMMENDATIONS FOR POLICIES AND PROGRAMS

Although RFS and RFSH both targeted the same population, i.e. rural low-income families, direct comparisons between the findings are not possible because the samples were different. Nonetheless, findings from both projects have clearly highlighted the importance of focusing on the food insecurity of this marginalized group. More than one in ten Americans, including children, experienced food insecurity in 2015 (Coleman-Jensens et al., 2016). Poor families with children living in rural communities are particularly at risk for food insecurity. Our findings from two decades of studies documented how low-income families living in rural communities managed or failed to manage their food supplies and how their food insecurity impacted the health of their families. Collectively, our studies point to the importance of building multi-disciplinary, multi-level programs (individual, family, and community) and policies to support rural low-income families.

Strategies for Individuals and Families

Various strategies to improve food insecurity of poor families have been suggested. First, rural low-income families must be able to obtain the necessary skills, resources, and food management techniques to protect them from food insecurity. Participation in nutrition and consumer education (e.g., through Cooperative Extension) would provide families guidance about healthy food and beverage choices, meal planning, and strategies for maintaining stable household food supplies. In the case of immigrant families and their communities, family and

consumer science professionals could play important roles to help strengthen their social capital and to support healthy child eating patterns. These goals could be achieved by (a) linking immigrant families to Extension Master Gardeners to learn techniques to successfully grow food in a new climate; (b) bringing immigrant families, school food service staff, growers, and grocers together to develop strategies to increase children's access to locally grown food at schools; (c) assisting immigrant families to identify strategies to maintain healthy cultural food traditions while consuming less fat, salt, and sugar; and (d) increasing representation of immigrant families on school and community program advisory committees to ensure that families inform policies and programs.

Additionally, findings from RFS/RFSH studies have elucidated recursive relationships between food security status and individuals' physical and mental health outcomes. In acknowledging this multidirectional relationship, interventions targeting food insecurity should aim to identify and address the physical and mental health of rural low-income families (Doudna, 2012; Huddleston-Casas et al., 2009). Similarly, mental health practitioners should consider the potential impacts of food environments and of mothers' expectations for family meal times on the mental health of mothers.

Although it seems paradoxical, the experience of poverty and associated food insecurity in childhood may be one of the important contributors to the obesity epidemic in adults. This finding points to the importance of addressing the fundamental underlying cause of the obesity problem (i.e., poverty-associated food insecurity in early life) and eating patterns that stem from childhood food deprivation. Furthermore, understanding the roles of such intrapersonal, interpersonal, and community factors in experiences of food insecurity highlights the importance of multi-disciplinary and socio-ecological interventions (McLeroy, Bibeau, Steckler, & Glanz, 1988).

Strategies for Community and Policy Programs

Although individual and familial characteristics contribute to food insecurity, community- and policy-level factors cannot be ignored. Our findings point to persistent food insecurity among these rural low-income families as a consequence of personal circumstances and place (Mammen et al., 2009). To reduce their food insecurity, families should be encouraged to participate more fully in SNAP. Policy makers should consider more flexible policies and program practices, such as (a) longer hours of operation for authorizing offices, (b) more diversified locations for program re-certifications, (c) greater access to SNAP, (d) better coordination between TANF and SNAP, and (e) increased training for SNAP staff to improve quality of service (Anderson & Swanson, 2002; Grutzmacher & Braun, 2004). It is also important to find ways of reducing the stigma associated with receiving and using SNAP and other food assistance programs (Doudna, 2012).

Other recommendations to reduce food insecurity among rural families include designing formal and informal community-based food assistance programs and other family supports, as well as educating communities about meeting food needs specific to rural areas (Swanson, Olson, Miller, & Lawrence, 2008). For example, while assisting low-income families to produce food through gardening programs, community stakeholders may establish a mechanism to sell

home grown plants and vegetables at a local farmer's market or roadside stands. Furthermore, there should be incentives to encourage discount grocery retailers, especially affordable organic grocery stores, to locate in rural communities. This may help households, particularly those with transportation difficulties, to maintain stable food supplies.

Finally, more research is required to understand the unique food challenges of Latina immigrant families because undocumented families are ineligible for public programs including SNAP (Greder et al., 2009). There should be efforts to strengthen the native language skills of immigrants, since it is low literacy in their native languages (not their lack of English fluency) that may hinder their participation in programs. In addition, forming coalitions that include immigrant families, social service professionals, and local business and community leaders may be useful for raising awareness of community resources, promoting cultural sensitivity, and creating welcoming community atmospheres (Greder et al., 2009; Sano et al., 2011).

In conclusion, the RFS/RFSH studies have demonstrated that causes and consequences of food insecurity are complex and embedded in various contextual factors. There is a need for multi-disciplinary, multi-level programs to reduce food insecurity. Ultimately, such programs may promote the health and well-being of rural low-income families.

Acknowledgments

This research was supported in part by USDA/CSREES/NRICGP Grant Number 2001-35401-10215 & 2002-35401-11591, 2004-35401-14938. Data were collected in conjunction with the cooperative multi-state research projects: (1) NC223/1011, Rural Low-Income Families: Monitoring Their Well-being and Functioning in the Context of Welfare Reform (commonly known as "Rural Families Speak") and (2) NC1171, Interactions of Individual, Family, Community, and Policy Contexts on the Mental and Physical Health of Diverse Rural Low Income Families (commonly known as "Rural Families Speak about Health"). Cooperating states are California, Hawaii, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, New Hampshire, New York, North Carolina, Ohio, Oregon, South Dakota, Tennessee, Texas, Washington, and Wyoming along with Arizona, Florida, Kansas, Mississippi, and Oregon.

The authors gratefully acknowledge the assistance of Andrew Shepherd, graduate research assistant at the University of Massachusetts Amherst.

Yoshie Sano is an Associate Professor in the Department of Human Development at Washington State University Vancouver, Vancouver, WA 98686.

Sheila Mammen is a Professor in the Department of Resource Economics at the University of Massachusetts Amherst, Amherst, MA 01003.

Brittney Oliver is an Assistant Professor of Health Promotion in the Department of Food Science, Nutrition and Health Promotion at Mississippi State University, Mississippi State, MS 37959.

REFERENCES

- Anderson, K., & Swanson, J. (2002). *Rural families: Welfare reform and food stamps*. Policy Brief. Retrieved from <http://www.cehd.umn.edu/FSoS/projects/ruralspeak/pdf/rural-families-brief2.pdf>
- Bao, J., Pang, Y., Arellanes, J., Greder, K., & Smith, S. (2016). *Mediating effects of family rituals and child behavior on food insecurity and rural mothers' mental health*. Poster presentation at Iowa State University. Retrieved from <https://iastate.app.box.com/s/lar6xrrciz2ploj168496j099fg4v11w>
- Bao, J., & Greder, K. (2015). *Effects of food insecurity and expectation of family involvement on rural Latina immigrant mothers' mental health*. Poster presentation at Iowa State University. Retrieved from <https://iastate.box.com/s/ouwq9y7hcz9j2vj17o53jp3nz35oai4b>
- Bauer, J. W. (2004). RFS Project Basebook. Unpublished.
- Bove, C. F., & Olson, C. M. (2006). Obesity in low-income rural women: qualitative insights about physical activity and eating patterns. *Women & Health, 44*(1), 57-78. doi:10.1300/J013v44n01_04
- Braun, B. (2008). Rural, low-income mothers: Persistent problems, possible interventions. *The Online Journal of Rural Research and Policy, 1*(6). <https://doi.org/10.4148/ojrrp.v3i6.44>
- Bickel, G., Nord, M., Price, C., Hamilton, W., & Cook, J. (2000). *Guide to measuring household food security revised*. U.S. Department of Agriculture, Food and Nutrition Service. Alexandria, VA. Retrieved from <http://hungerfreecommunities.org/wp-content/uploads/2011/04/USDA-guide-to-measuring-food-security.pdf>
- Blumberg, S. J., Bialostosky, K., Hamilton, W., L., & Briefel, R. R. (1999). The effectiveness of a short form of the household food security scale. *American Journal of Public Health, 89*(8), 1231-1234.
- Browder, D., Greder, K., & Jasper Crase, S. (2013). *Individual and family factors related to depression among rural Latina immigrant mothers*. Julian Samora Research Institute, Michigan State University.
- Coleman-Jensen, A., Rabbitt, M. P., Gregory, C. A., & Singh, A. (2016). *Household Food Security in the United States in 2015*. RR-215, U.S. Department of Agriculture. Economic Research Service.
- Doudna, K. (2012). *The longitudinal relations between depression and parenting self-efficacy in rural mothers with low income*. (Unpublished thesis). Iowa State University, Ames, IA.
- Downey, J., & Greder, K. (2014). Depressive symptomology among rural low-income Latina and non-Latina white mothers. In S.L. Blair and J.H. McCormick (Eds.), *Family and*

- health: Evolving needs, responsibilities, and experiences* (pp. 247-269). Emerald Group Publishing Limited, Bingley, United Kingdom.
- Economic Research Service. (2016). *Definitions of food security*. United States Department of Agriculture. Retrieved from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security/#ranges>
- Greder, K., Slowing, F. R., & Doudna, K. (2012). Latina immigrant mothers: negotiating new food environments to preserve cultural food practices and healthy child eating. *Family and Consumer Sciences Research Journal*, 41(2), 145-160. doi: 10.1111/fcsr.12004
- Greder, K., Cook, C., Garasky, S., Sano, Y., & Randall, B. (2009). Rural Latino immigrant families: Hunger, housing, and economic well-being. In R. L. Dalla, J. DeFrain, J. Johnson, & D. A. Abbott (Eds.) *Strengths and challenges of new immigrant families: Implications for research, policy, education and service*. (pp. 345-368). Lanham, MD: Lexington Books.
- Greder, K., Cook, C., Garasky, S., & Ortiz, L. (2008). *Latino immigrants in Iowa and the United States: Food and housing insecurity*. Policy brief. Iowa State University, Ames, IA.
- Grutzmacher, S. & Braun, B. (2004). *Food resource management: Key to food security outcomes among rural, low-income families*. Research brief. Family Policy Impact Seminar. University of Maryland, College Park, MD. <http://www.cehd.umn.edu/FSoS/projects/ruralspeak/pdf/food-security.pdf>
- Grutzmacher, S. (2004). *Influence of food-related life skills on food security of rural, low-income families*. (Unpublished master's thesis). University of Maryland, College Park, MD.
- Huddlestone-Casas, C., Charnigo, R., & Simmons, L. A. (2009). Food insecurity and maternal depression in rural, low-income families: a longitudinal investigation. *Public Health Nutrition*, 12(8), 1133-1140. doi: 10.1017/S1368980008003650
- Lent, M. D., Petrovic, L. E., Swanson, J. A., & Olson, C. M. (2009). Maternal mental health and the persistence of food insecurity in poor rural families. *Journal of Health Care for the Poor and Underserved*, 20(3), 645-661. doi: 10.1353/hpu.0.0182.
- Mammen, S., & Sano, Y. (2013). Basebook Report. Rural Families Speak about Health (RFSH) (2008-2014). Technical report prepared for the Rural Families Speak about Health project team.
- Mammen, S., Bauer, J. W., & Richards, L. (2009). Understanding persistent food insecurity: A paradox of place and circumstance. *Social Indicators Research*, 92(1), 151-168. <https://doi.org/10.1007/s11205-008-9294-8>
- McLeroy, K.R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351-377.

- Olson, C. M., Bove, C. F., & Miller, E. O. (2007). Growing up poor: long-term implications for eating patterns and body weight. *Appetite*, 49(1), 198-207. doi:10.1016/j.appet.2007.01.012
- Olson, C. M., & Bove, C. F. (2005). Obesity in rural women: Emerging risk factors and hypotheses. In Coward, R.T., Davis, L.A., Gold, C.H., Smickilas-Wright, H., Thorndyke, L.E., & Vondracek, F.W. (Eds.). *Rural Women's Health: Linking Mental, Behavioral, and Physical Health*. (pp. 63-81). New York: Springer Publishing.
- Sano, Y. Gibbs, L., & Vaughn, L. (April, 2013). *Family environment during meal time in rural low-income families*. Poster presentation at the annual meeting on the American Council for Consumer Interests, Portland, OR.
- Sano, Y., Garasky, S., Greder, K. A., Cook, C. C., & Browder, D. E. (2011). Understanding food insecurity among Latino immigrant families in rural America. *Journal of Family and Economic Issues*, 32(1), 111-123. <https://doi.org/10.1007/s10834-010-9219-y>
- Sano, Y., McGuire, J., Greder, K., & Greer, B. (November 2015). *Food insecurity, family environment and child health outcomes of rural families*. Poster symposium at the annual meeting of the National Council on Family Relations, Vancouver, B.C.
- Seligman, H.K., Laraia, B.A., & Kushel, M.B. (2010). Food insecurity is associated with chronic disease among low-income NHANES participants. *Journal of Nutrition*, 140(2), 304-310. doi: 10.3945/jn.109.112573
- Simmons-Wescott L.A. (2004). *Well-being in a rural context: A model of selected factors influencing health and economic well-being in rural, low-income mothers*. (Unpublished doctoral dissertation). University of Georgia, Athens, GA.
- Swanson, J. A., Olson, C. M., Miller, E. O., & Lawrence, F. C. (2008). Rural mothers' use of formal programs and informal social supports to meet family food needs: A mixed methods study. *Journal of Family and Economic Issues*, 29(4), 674-690. <https://doi.org/10.1007/s10834-008-9127-6>

Table 1. RFS & RFSH: Receipt of Food Assistance, Food Security Status, and Food-Related Health Outcome²

Research Study	Families Receiving:			Food Security:		Health Outcome:
	SNAP*	WIC*	NSLP*	Food insecure	Food secure	Mother BMI overweight/obese
1. RFS N=414	192 (54.4)	274 (84.3)	235 (86.4)	197 (50.5)	193 (49.5)	69 (17.1)
2. RFSH N=444	311 (70.0)	234 (52.7)	294 (66.2)	174 (39.2)	264 (60.3)	306 (68.9)

²Frequencies are based on valid numbers. Number in parentheses is percentage.

*SNAP: Supplemental Nutrition Assistance Program; NSLP: National School Lunch Program; WIC: Women, Infants, and Children Program