

# Food Insecurity and Food Resource Utilization in an Urban Immigrant Community

Howard P. Greenwald<sup>1</sup> · Vanessa Zajfen<sup>2</sup>

© Springer Science+Business Media New York 2015

**Abstract** Risk and prevalence of food insecurity and use of food security resources are important but incompletely understood factors in immigrant health. Key informant interviews and a survey (N = 809) of housing units were conducted in a San Diego, California neighborhood with a high proportion of immigrant and low income families. The difference in food insecurity between immigrant and non-immigrant households was non-significant (20.1 vs. 15.7 %,  $p = n.s.$ ), though immigrant families were more likely to use food security resources such as SNAP (32.7 vs. 22.9 %,  $p < .01$ ) and food pantries (28.2 vs. 19.7 %,  $p < .001$ ). Among immigrants, neither national origin nor years in the United States predicted food insecurity or use of most food security resources. In immigrant families, food insecurity often remains a challenge long after immigration, suggesting a potentially increasing need for food security resources as immigration into the United States continues.

**Keywords** Nutrition · Food insecurity · Immigration · Policy

## Background

Food insecurity is a key concern in disease prevention, nutrition, and public health. The research reported here assesses the prevalence of and risk factors for food

insecurity, as well as utilization of food security resources, among immigrant families in the City Heights neighborhood of San Diego, California. This study aims to provide background for planning and allocation of resources to promote food security among the foreign born.

For the year 2013, the USDA reported that 14.3 % of families in the United States were food insecure for at least some time during the year [1]. Food insecurity has been linked to obesity [2], diabetes [3], cardiovascular disease [4], kidney disease [5], and depression [6]. Researchers have found elevated risk of food insecurity among low income individuals, families with children in the household, residents of “food deserts,” migrants, and other socially and economically disadvantaged people [7–12]. Health concerns go beyond food insecurity itself. Research has suggested that the diets of disadvantaged people lack sufficient fruits and vegetables, and that foods provided by SNAP and WIC, usually “shelf” products rather than fresh provisions, actually contribute to obesity [13–15].

Within the general population, a family’s personal resources relative to its size is key to determining its food security [16]. Other determinants include access to and use of food security resources, such as SNAP (formerly “food stamps”), the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and food pantries (free food outlets typically operated by churches and other community non-profits) [17]. Many food-insecure families do not participate in such programs, one study reporting that only 39.6 % of the food insecure received SNAP benefits [16]. Important differences in food security resource utilization across racial, demographic, and social dimensions have been reported [18–20].

Concerns regarding food insecurity are particularly relevant to immigrants, whose demographic importance is increasing rapidly in the United States [21]. In comparison

---

✉ Howard P. Greenwald  
greenwa@usc.edu

<sup>1</sup> Sol Price School of Public Policy, University of Southern California, 650 Childs Way, Los Angeles, CA 90089, USA

<sup>2</sup> San Diego, CA, USA

with native-born Americans, immigrants have larger families [22] and lower incomes [23]. The prevalence of food insecurity among immigrants to the United States has been reported as nearly three times greater than among the native-born (14.7 versus 5.4 %) [24]. Risk of food insecurity among immigrants must be understood in the context of their diversity. Like racial and demographic factors in the general United States population, ethnicity and country of origin appear capable of affecting both food security and use of food security resources. Time since immigration, already known to affect health status and health insurance [25, 26], also seems likely to be an important predictor of food insecurity. Food environment in the United States has been linked to unhealthy dietary practices among Latino, Asian, and Somali immigrants [27–29]. A study using a large, systematically selected sample, however, reports highly complex relationships between ethnicity and diet and a positive association between acculturation and healthy dietary practices among Latino children [30].

Studies published thus far leave several issues unresolved. Many studies of nutrition among immigrants are small scale and focused on one country of origin [31, 32], precluding direct comparison of people born in different countries. Although some studies have suggested that food insecurity among immigrants is temporary [33], this relationship has not been formally tested. Surprisingly, the question of whether low income rather than immigration itself explains food insecurity among immigrants has not been widely addressed.

City Heights, with an unusually high concentration of diverse immigrants as well as widespread poverty, provides a favorable setting for learning about food insecurity among the foreign born. According to the 2010 United States Census, 45.7 % of persons residing in the six census tracts that comprise the City Heights core area were born outside the United States, compared with 23.2 % in surrounding San Diego County and 27.5 % in California as a whole. In these census tracts, 34.5 % of families were below the federal poverty line, compared with 10.0 % in San Diego County and 12.3 % across California. In addition to federal food security resources, the San Diego school system operates several programs (other than school lunches) to make food directly available to families. Philanthropies active in City Heights support food pantries, a farmers' market with subsidies for limited-income people to buy fresh produce, and a community gardens program open to anyone.

The research reported here focuses on five hypotheses:

**H<sub>1</sub>** Immigrant households will experience greater food insecurity than non-immigrant households.

**H<sub>2</sub>** Among immigrant households, food insecurity decreases in proportion to years in the United States.

**H<sub>3</sub>** Among immigrant households, factors such as income, country of origin, and time in the United States will help explain consumption of fresh fruits and vegetables.

**H<sub>4</sub>** Immigrant households are more likely to utilize food security resources than non-immigrant households.

**H<sub>5</sub>** Among immigrant households, factors such as country of origin and time in the United States will help explain use of food security resources.

H<sub>1</sub> is suggested by the lower income and larger size of immigrant families, both reported as risk factors for food insecurity [16]. H<sub>2</sub> appears likely, as immigrants over time become more familiar with food security resources [33] and, as historically has happened, their incomes increase. H<sub>3</sub> is based on a complex of factors associated with recentness of immigration. Food-related culture in the country of origin is likely to be important, but decline with post-immigration acculturation. Post-immigration decline in fruit and vegetable consumption has been widely reported [27, 28]. If, on the other hand, a family's income rises in post-immigration years, so should its consumption of fruits and vegetables [34, 35]. H<sub>4</sub> follows from the relatively low income expected among immigrants in comparison with non-immigrants and the fact that public and private agencies in City Heights actively inform new immigrants about food security resources. However, culturally-based reluctance to use such resources [33] may have the opposite influence. H<sub>5</sub> assumes that pre-immigration culture affects seeking food assistance in at least some groups but that such influences will decline in the years following immigration.

## Methods

### Key Informant Interviews

To ensure that the research questions were relevant to the community and food security resources available in City Heights, key informant interviews were conducted with executives and personnel in charge of program operations from 15 organizations conducting food security programs. One individual from each organization was interviewed. All were paid employees of their organizations and most (80 %) were female.

Based on their experience in San Diego, the authors compiled a list of organizations that operated food security programs. In the key informant interviews, each respondent was asked to review the list and identify organizations operating food security programs that were absent. Any programs thus identified were added to the list. This procedure yielded a complete enumeration of food security

programs in the area and the location of outlets such as food pantries. Using a semi-structured interview protocol, the researchers also asked these key informants about challenges and concerns regarding food insecurity in the area. Finally, these key informants were requested to suggest questions to be included in a later survey of community residents (see *City Heights Core Area Survey*, below) that would be of value in their work.

Another set of key informant interviews was conducted with four female elders who had come from Somalia as refugees. These individuals represented one of several ethnicities whose inclusion in the survey was limited due to the small percentage they represented of the population. Average age of these informants was 62 years and they had lived in the United States between 10 and 21 years. Interviewed with the aid of an interpreter, the women were encouraged to comment freely on their food consumption and their utilization of food sources in City Heights.

### City Heights Core Area Survey

The City Heights Core Survey was conducted between March and June, 2013, in six census tracts comprising the City Heights core area. Census blocks within these tracts were selected in a manner that ensured equal representation of individuals living in blocks of varying population sizes. To ensure adequate representation of individuals using public and private food security resources, census blocks in relatively low income census tracts were over-sampled. Interviewing took place door-to-door and was conducted by trained individuals residing in City Heights or nearby communities. Each household was approached a minimum of three and up to six times; if unsuccessful after these repeated attempts, interviewers selected additional households from the sampled blocks. Interviews were conducted in English, Spanish, and Vietnamese. A total of 809 responses with a response rate of 79.7 % was obtained.

To ensure that the respondent was adequately knowledgeable about the household's food issues, the interviews began with a series of screening questions. Respondents were first asked, "Do you ever shop for food or prepare it for yourself or other people here?" If a negative answer was given, the respondent was asked whether there was "someone at home now who shops for or prepares food." If a negative answer to this question was received, the interviewer asked the respondent if she could come back later and "talk with someone who shops for or prepares food."

The survey instrument contained only closed-ended questions. Food insecurity was assessed through the US Household Food Security Survey Module [36]. According to this module, a household that *sometimes* had not had enough to eat in the last 12 months was designated moderately food insecure; a household that *often* had not had

enough to eat was designated severely food insecure. Based on a series of items focused on fresh fruit and vegetable consumption, dichotomous variables were created indicating whether the respondent consumed at least one fresh fruit or vegetable per day. The instrument covered food security programs utilized, opinions about services received from selected programs, and social background variables such as age, race, ethnicity, income, household size, country of origin, and, in the case of immigrants, number of years in the United States. Respondents were asked to indicate which "best described their race" according to these categories: Black/African-American, White, Asian/Pacific Islander, Native American/Alaska Native, or more than one race. A separate item asked respondents whether they were "Latina/Latino" or "Hispanic." Income and household size were used to compute dichotomous variables indicating 100 and 133 % of the federal poverty line according to 2013 USDHHS criteria.

Instruments and procedures were approved by the University of Southern California Institutional Review Board.

### Data Analysis

Focused on tests of the hypotheses stated above, data analysis included contingency tables with Chi square tests of statistical significance. Both OLS and logistic regression were used to test hypotheses. Independent variables in the equations include those identified in the literature reviewed above as predictors of food insecurity and diet: (poverty, family size, years since immigration, and place of origin). All these independent variables were entered in the equations reported below, since any could be considered a potential confounder for all others. Age, a factor potentially capable of confounding years since immigration, was also entered in the equations. Race was not included in the equations due to the strong correlations of racial categories with regions of origin among immigrants in City Heights. Only logistic regression results are presented here. To simplify analysis, the most frequent countries of origin were collapsed into categories. Mexico (65.4 % of immigrants in the sample) and Central America (6.7 %) were designated as "Mexico/Central America;" Vietnam (19 %), Cambodia (2 %) and other Asian countries (2.0 %) were designated as "Asia;" all African countries (4.3 %) were designated as "Africa."

## Results

### Program Operator Interviews

Key informant interviews with food security program personnel indicated concern for program sustainability in

connection with potential shifts in priorities of public funding and private philanthropy. Program operators expressed concern that adoption of American diets by immigrants might reduce healthful practices such as consumption of fresh produce. The informants expressed concern that cultural factors might deter immigrants from participation in food security programs. Feelings of shame at accepting free food or food subsidies, as well as lack of knowledge and ineligibility for public programs, were seen as potential barriers. Finally, cultural factors associated with country of origin were cited as inhibitions to program utilization, related, for example, to unavailability of traditional foods through food security programs or reluctance of non-Christians to accept food distributed by churches. The informants commented that City Heights, though a low income area, was not a food desert.

### The City Heights Core Survey

Table 1 presents characteristics of survey respondents born in and outside the United States, as well as the total sample. Immigrants are more likely to be at or below 100 % and 133 % of the federal poverty line. Regions of origin were: Mexico/Central America (72.1 %); Asia (23.0 %); Africa (4.3 %); multiple or elsewhere (.8 %). No statistically significant differences between immigrants and non-

immigrants were found in household size, food insecurity, and fresh fruit and vegetable consumption. The survey instrument included an item on education, but this was not included in the analysis, since degree designations were considered likely to have non-uniform meanings across countries of origin.

According to Table 1, immigrants were more likely than non-immigrants to participate in all food security programs with the exception of community gardens. In logistic regressions controlling for number of individuals in the household, being at or below 100 % poverty, and age, being born in the United States significantly predicted lower use of WIC (OR .400,  $p < .001$ ) and school programs (OR .548,  $p < .05$ ), but not other food security resources.

Focused specifically on immigrants, Table 2 presents coefficients from logistic regression equations predicting food insecurity and daily consumption of at least one fresh fruit or vegetable. Being at or below 100 % of the poverty line and household size both predicted food insecurity. Neither time since immigration (represented by dichotomous variables indicating 0–10, 11–15, and 16–20 years in the United States) nor region of origin predicted food insecurity. In a similar equation (not tabled) predicting food insecurity among respondents born in the United States, 100 % of the poverty line or below, but not household size, predicted food insecurity.

**Table 1** Comparison of immigrant and non-immigrant survey respondents

	Born in the United States		<i>p</i>	All
	Yes	No		
Income				
At or below 100 % poverty	31.9	57.3	<.001	48.7 (358)
At or below 133 % poverty	48.6	75.5	<.01	66.2 (482)
Country of origin				
Mexico/Central America	–	72.1	NA	(368)
Southeast Asia	–	23.0	NA	(117)
Africa	–	4.3	NA	(22)
Multiple and Other	–	.8	NA	(4)
People in household (mean)	3.1	4.2	NS	3.8
Food insecurity				
Moderate	13.8	15.9	NS	15.2 (116)
High	1.9	4.2	NS	3.4 (26)
No daily fresh fruit or vegetable	35.5	29.4	NS	31.4 (244)
Food resources used				
SNAP	22.9	32.7	<.01	29.3 (224)
WIC	19.5	34.4	<.01	29.3 ((223)
Farmers' market	33.3	40.3	<.05	37.8 (290)
Food pantries	19.7	28.2	<.05	23.7 (184)
School programs	15.3	28.2	<.001	23.8 (178)
Community gardens	4.5	7.0	NS	6.2 (47)

NA not applicable, NS not statistically significant

**Table 2** Predictors of food insecurity and fresh fruit and vegetable consumption among immigrants

	Food insecure		No daily fresh fruit or vegetable	
	B	SE	B	SE
At or below 100 % poverty	.799	.279**	.180	.221
Household size	.201	.068**	.025	.060
Age	.008	.012	-.004	.010
Years in United States				
0–10	-.393	.394	-.472	.336
11–15	-.310	.372	-.188	.317
16–20	-.175	.340	.139	.282
21 and over (omitted)	0		0	
Country of origin				
Mexico/Central America	.669	.381	.635	.305*
Africa	-.559	1.099	1.094	.569
Asia (omitted)	0		0	

SE standard error

\* &lt; .05; \*\* &lt; .01

Neither 100 % poverty, nor household size, nor time in the United States predicted daily intake of at least one fresh fruit or vegetable. However, people who immigrated from Mexico/Central America and Africa (the latter at marginal significance) were less likely to eat a fresh fruit or vegetable than immigrants of Asian origin. In an equation (not tabled) predicting daily consumption of a fresh fruit or vegetable among non-immigrants, being at or below 100 % poverty, though not ethnicity, was statistically significant.

Table 3 presents coefficients from logistic regression equations predicting participation by immigrants in public food security programs (SNAP, WIC, and school-operated). Household size predicts participation in all the programs. Being at or below 100 % of poverty predicts participation only in SNAP after all other variables have been controlled. Older individuals are less likely to participate in WIC or school programs than younger ones. With the exception of the equation predicting WIC participation, time in the United States predicts participation in none of the programs by a statistically significant margin.

Table 4 presents coefficients from logistic regression equations predicting participation by immigrants in food security programs at least partially supported by private funds (the City Heights Farmers' Market, food pantries, and community gardens). Being at or below 100 % poverty significantly predicts participation only in food pantries. Household size significantly predicts participation in all three programs. With the exception of the observation of use by people from Mexico/Central America of community gardens, neither national origin nor time in the United States predict participation in any of the privately-supported programs.

A focus on food pantries provides clues to issues in planning and operating food security programs. Food pantries, utilized by 28.2 % of immigrant households in City Heights, are an important resource. Notably, many people who use public programs also use food pantries. Of 164 immigrant families that received SNAP benefits, for example, 60 (36.6 %) also used food pantries. Among all food security programs, however, food pantries were rated as least convenient and least likely to provide healthy and high quality food by survey respondents. Key informant interviews with food security operators suggest that stigma of waiting in public to be served reduces utilization and satisfaction with these outlets.

### Somali Refugee Interviews

Interviews conducted through an interpreter with four Somali refugees yielded insights potentially applicable to other groups not captured in sufficient quantity by the survey for statistical analysis. Unfamiliarity with food and food-related practices in the United States initially inhibited their use of food security resources. The women recalled that they had to learn such basics as how to use a can opener. Meat had to be obtained through different processes than those used in Somalia, where a live goat might be selected from among animals in the seller's pen. Frozen foods had not been sold in Somalia. Food in cans was suspect, as it was feared that these provisions might contain pork. All the women used SNAP and food pantries, yet preferred to shop at a local Somali grocery, where they could be confident that the foods were *halal*.

**Table 3** Participation in public food security programs among immigrants

	SNAP B	SE	WIC B	SE	School B	SE
At or below 100 % poverty	1.170	.240**	.393	.244	.323	.249
Household size	.246	.061**	.312	.070**	.383	.070**
Age	.000	.010	-.066	.012	-.037	.012**
Years in United States						
0–10	.270	.324	.889	.345*	-.084	.363
11–15	.367	.323	.616	.330	.196	.331
16–20	.167	.299	.090	.072	.071	.331
21 and over (omitted)	0		0		0	
Country of origin						
Mexico/Central America	-.311	.292	.511	.349	.779	.372*
Africa	.315	.592	-.307	.698	.869	.691
Asia (omitted)	0		0		0	

SE standard error

\* &lt; .05; \*\* &lt; .01

**Table 4** Participation in private food security programs among immigrants

	Farmer's Market B	SE	Pantries B	SE	Gardens B	SE
At or below 100 % poverty	.104	.205	.886	.250**	-.397	.395
Household size	.163	.057**	.247	.063**	.200	.095*
Age	.005	.009	.029	.011**	.049	.018**
Years in United States						
0–10	.122	.302	-.174	.357	.393	.663
11–15	.195	.296	.499	.330	1.171	.550*
16–20	.262	.268	-.063	.313	.663	.542
21 and over (omitted)	0		0		0	
Country of Origin						
Mexico/Central America	-.269	.259	.150	.312	1.798	.788*
Africa	-.550	.590	.029	.712	1.772	1.299
Asia (omitted)	0		0		0	

SE standard error

\* &lt; .05; \*\* &lt; .01

## Discussion

Among immigrants in City Heights, the strongest and most consistent predictors of food insecurity are low income and household size, the latter most consistently predicting use of food security programs. Prevalence of food insecurity does not differ by a statistically significant margin between immigrant and non-immigrant households, but immigrant households are more likely to use public and private food security resources.

Findings from this study contradict H<sub>1</sub>. Immigrant households do not experience greater food insecurity than non-immigrant households. Combining moderate and severe food insecurity measures used here, 20.1 % of immigrant

households and 15.7 % of non-immigrant households evidenced food insecurity, a non-significant difference.

The hypothesis (H<sub>2</sub>) that food insecurity in immigrant households decreases as time in the United States increases does not receive support. Among the families of respondents who had been in the United States 0–10, 11–15, 16–20, and 21 years and over, percentages of moderately or severely food insecure were 19.8, 18.4, 18.1, and 22.4. In a logistic regression equation predicting food insecurity among immigrant households, none of the dichotomous variables representing years since immigration is statistically significant.

A third hypothesis (H<sub>3</sub>), that country of origin and time in the United States help explain consumption of fresh fruits

and vegetables, receives some support. Survey respondents who immigrated from Mexico/Central America or Africa are less likely to consume a fresh fruit or vegetable every day than those from Asia, the index category. Previous research has reported that non-consumption of fresh fruits and vegetables is a consequence of poverty [36]. No relationship between poverty and consumption of fruits and vegetables was found among the immigrants studied here. But the study suggests the cultures in some countries of origin can affect fruit and vegetable consumption.

The hypothesis (H<sub>4</sub>), that immigrant households are more likely to utilize food security resources than non-immigrant households, is supported. The difference between immigrant and non-immigrant utilization of several programs (SNAP, school-based, and food pantry) appears to be explained by the larger household size and more frequent poverty status among immigrant families.

The final hypothesis (H<sub>5</sub>), that country of origin, time in the United States, and other social background factors help explain use of food security resources among immigrants receives partial support. Relatively recent immigrants are more likely to use WIC and immigrants from Mexico/Central America more likely to use community gardens than others. Older individuals and long-term residents of the United States are less likely to use WIC or school programs than others, observations almost certainly explained by the presence of children in the household and other life cycle-related factors. Older survey respondents more frequently report use of community gardens and food pantries, behavior perhaps explained by lack of access to programs such as WIC and school food distributions.

The findings reported here should be viewed in the light of several limitations.

Small but potentially important segments of City Heights' population (such as Eritreans, Ethiopians, Somali, and Hmong) were not well captured in the City Heights Core Area survey. These individuals are likely to experience challenges different from the English, Spanish, and Vietnamese-speaking respondents contacted in the survey. Barriers to utilization of food security resources are not fully explored. The degree to which findings reported here might, moreover, be reproduced elsewhere, or in the United States as a whole, is uncertain.

### New Contributions to the Literature

This study points out several ways in which the operations and objectives of food security resources might be modified. Food insecure people will view food pantries more positively and possibly utilize them more fully if convenience can be increased and visibility of their utilization decreased. In order to effectively address disparities in

fresh fruits and vegetable consumption, food security programs need to do more than offer fresh provisions, promoting familiarity with fruits and vegetables available in the United States and educating newcomers about their importance for a healthy diet.

Policymakers in government and philanthropy must maintain a commitment of long-term support for food security resources accessible to immigrants. As indicated by the proportion of City Heights immigrant families who use both SNAP and food pantries, both public and private food security resources need to be maintained. A key finding of the study reported here is that many food insecure immigrants remain food insecure and continue to use food security resources long after they have settled in the United States. The projected growth of immigrants as a proportion of Americans suggests a continuing, and perhaps increasing, need for food security programs.

### References

1. Coleman-Jensen A, Nord M, Singh A. Household food security in the United States in 2013, ERR-155, U.S. Department of Agriculture, Economic Research Service. 2014. <http://www.ers.usda.gov/publications/err-economic-research-report/err155.aspx>. Accessed January 15, 2015.
2. Adam TC, Epel ES. Stress, eating, and the reward system. *Physiol Behav.* 2007;91(4):449–58.
3. Seligman HK, Bindman AB, Vittinghoff E, Kanaya AM, Kushel MB. Food insecurity is associated with diabetes mellitus: results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999–2002. *J Gen Intern Med.* 2007;22(7):1018–23.
4. Ford ES. Food security and cardiovascular disease risk among adults in the United States: findings from the national health and nutrition examination survey, 2003–2008. *Prev Chronic Dis.* 2013;10:130244.
5. Crews DC, Kuzmarski MF, Grubbs V. Effect of food insecurity on chronic kidney disease in lower-income Americans. *Am J Nephrol.* 2014;39(1):27–35.
6. Heflin CM, Siefert K, Williams DR. Food insufficiency and women's mental health: findings from a 3-year panel of welfare recipients. *Soc Sci Med.* 2005;61(9):1971–82.
7. Hill BG, Moloney AG, Mize T, et al. Prevalence and predictors of food insecurity in migrant farmworkers in Georgia. *Am J Public Health.* 2011;101:831–3.
8. Bauer KW, Widome R, Himes JH, et al. High food insecurity and its correlates among families living on a rural American Indian reservation. *Am J Public Health.* 2012;102:1346–52.
9. Patton-Lopez MM, Lopez-Cevallos DF, Cancel-Tirado DI, Vasquez L. Prevalence and correlates of food insecurity among students attending a midsize rural university in Oregon. *J Nutr Educ Behav.* 2014;46(3):209–14.
10. Mayer VL, Bachhuber MA, Long J. Food insecurity, neighborhood food access, and food assistance in Philadelphia. *J Urban Health.* 2014;91(6):1087–97.
11. Furness B, Simon PA, Wold CM, et al. Prevalence and predictors of food insecurity among low-income households in Los Angeles County. *Public Health Nutr.* 2004;7(6):791–4.

12. Larson NI, Story MT, Nelson MC. Neighborhood environments: disparities in access to healthy foods in the U.S. *Am J Prev Med.* 2009;36:74–81.
13. Robaina KA, Martin KS. Food insecurity, poor diet quality, and obesity among food pantry participants in Hartford, CT. *J Nutr Educ Behav.* 2013;45(2):159–64.
14. Zagorsky JL, Smith PK. Does the U.S. Food Stamp Program contribute to adult weight gain? *Econ Hum Biol.* 2009;7:246–58.
15. DeBobo NL, Ross NA, Berrang-Ford. Does the Food Stamp Program cause obesity? Area list review and a call for place-based research. *Health Place.* 2012;18:747–56.
16. Anderson P, Butcher K, Hoynes H et al. Beyond income: what else predicts very low food security among children? University of Kentucky Center for Poverty Research Discussion Paper Series DP2014-06. 2014. <http://www.ukcpr.org/Publications/DP2014-06.pdf>. Accessed 31 August 2015.
17. Ratcliffe C, McKernan S, Zhang S. How much does the supplemental nutrition assistance program reduce food insecurity? *Am J Agric Econ.* 2011;93(4):1082–98.
18. Dalponte BO. Private versus public relief: use of food pantries versus food stamps among poor households. *J Nutr Edu.* 2000;32(2):72–88.
19. Martin KS, Cook JT, Rogers BL, Joseph HM. Public versus private food assistance: barriers to participation differ by age and ethnicity. *J Nutr Educ Behav.* 2003;35:249–54.
20. Bhattarai GR, Duffy PA, Raymond J. Use of Food Pantries and Food Stamps in Low-Income Households in the United States. *J Consum Aff.* 2005;39:276–98.
21. Camerota SA. Immigrants in the United States: A profile of America's foreign-born population. Washington DC: Center for Immigration Studies. 2012. <http://cis.org/2012-profile-of-americas-foreign-born-population>. <http://www.cis.org/sites/cis.org/files/articles/2012/immigrants-in-the-united-states-2012.pdf>. Accessed November 12, 2014.
22. Blau FD, Kahn LM, Liu AY, et al. The transmission of women's fertility, human capital, and work orientation across immigrant generations. *J Popul Econ.* 2013;26:405–35.
23. Short K. The research supplemental poverty measure: 2010. P60-241. Washington, DC: U.S. Census Bureau. 2011. <http://www.census.gov/prod/2011pubs/p60-241.pdf>. Accessed 31 August 2015.
24. Hofferth SL. Persistence and change in the food security of families with children, 1997–99 USDA Publication E-FAN-04-00. 2004. <http://www.ers.usda.gov/Publications/EFAN04001>. Accessed 1 September 2015.
25. Afable-Munsuz A, Mayeda ER, Perez-Stable EJ, et al. Immigrant generation and diabetic risk among Mexican Americans: the Sacramento area Latino study on aging. *Am J Public Health.* 2013;103(5):e45–52.
26. Greenwald HP, O'Keefe S, DiCamillo M. Why employed Latinos lack health insurance: a study in California. *Hisp J Behav Sci.* 2005;27:517–32.
27. Guendelman S, Abrams B. Dietary intake among Mexican-American women: generational differences and a comparison with white non-Hispanic women. *Am J Public Health.* 1995;85(1):20–5.
28. Yang W, Read M. Dietary pattern changes of Asian immigrants. *Nutr Res.* 1996;16:1227–93.
29. Dharod JM, Croom C, Sady CG. Dietary intake, food security, and acculturation among Somali refugees in the United States: results of a Pilot Study. *J Immigr Refug Stud.* 2011;9:82–97.
30. Guerrero AD, Ponce NA, Chung PJ. Obesogenic dietary practices of Latino and Asian subgroups of children in California: an analysis of the California Health Interview Survey, 2007–2012. *Am J Public Health.* 2015;105:e105–12.
31. Martinez AD. Reconsidering acculturation in dietary change research among Latino immigrants: challenging the preconditions of US migration. *Ethn Health.* 2013;18:115–35.
32. Torres-Aguilar P, Teran-Garcia M, Wiley A et al. Factors correlated to protective and risk dietary patterns in immigrant Latino mothers in non-metropolitan rural communities. *J Immig Minor Health.* 2015. <http://www.ncbi.nlm.nih.gov/pubmed/25990256>. Accessed 11 Dec 2015.
33. Quandt SA, Shoaf JI, Tapia J, et al. Experiences of Latino immigrant families in North Carolina help explain elevated levels of food insecurity and hunger. *J Nutr.* 2006;136:2638–44.
34. Lorson B, Melgar-Quinonez HR, Taylor CA. Correlates of fruit and vegetable intakes in US children. *J Am Diet Assoc.* 2009;109:474–8.
35. Leung CW, Epel ES, Ritchie LD, et al. Food insecurity is inversely associated with diet quality of lower-income adults. *J Acad Nutr Diet.* 2014;114(12):1943–53.
36. US Department of Agriculture. Household food security survey food module: three-stage design, with screeners. 2012. [http://www.ers.usda.gov/datafiles/Food\\_Security\\_in\\_the\\_United\\_States/Food\\_Security\\_Survey\\_Modules/ad2012.pdf](http://www.ers.usda.gov/datafiles/Food_Security_in_the_United_States/Food_Security_Survey_Modules/ad2012.pdf). Accessed September 20, 2014.