



# Experiences of Latino Immigrant Families in North Carolina Help Explain Elevated Levels of Food Insecurity and Hunger<sup>1</sup>

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## Abstract

Household food insecurity is higher among minority households in the U.S., but few data exist on households of recent minority immigrants, in part because such households are difficult to sample. Four studies of a total of 317 Latino immigrant families were conducted in different regions and during different seasons in North Carolina. A Spanish translation of the 18-item U.S. Food Security Survey Module was used to assess the prevalence of food insecurity and hunger. In 3 of the studies, a total of 76 in-depth interviews were conducted to gather information on immigrants' experiences of food insecurity. Households in the 4 studies classified as food secure ranged from 28.7 to 50.9%, compared with 82.4% in the U.S. in 2004. Food insecurity without hunger ranged from 35.6% to 41.8%, compared with 13.3% in the U.S. The highest rates of hunger reported were 18.8% (moderate hunger) and 16.8% (severe hunger) in an urban sample. Qualitative data indicate that food insecurity has both quantitative and qualitative effects on diet. Immigrants experience adverse psychological effects of food insecurity. They report experiencing a period of adjustment to food insecurity leading to empowerment to resolve the situation. Reactions to food insecurity differ from those reported by others, possibly because immigrants encounter a new and not chronic situation. Overall, these findings suggest that immigrant Latinos experience significant levels of food insecurity that are not addressed by current governmental programs. *J. Nutr.* 136: 2638–2644, 2006.

## Introduction

Compared with much of the rest of the world, the U.S. enjoys relative freedom from food insecurity and hunger (FIH) (1,2). National data for 2004 show that 82.4% of U.S. households with children were food secure, 13.3% were food insecure without hunger, and 4.3% reported hunger (3). Although minority populations lag behind the general population, their figures for FIH are quite low in the national data (3).

Despite these favorable statistics, data available from national surveillance can conceal population segments that are potentially at high risk of FIH because their numbers are small or because they are hidden from national surveys. Geographically defined pockets of low-income populations [e.g., Appalachia (4), the lower Mississippi delta (5), and Los Angeles County, California (6)] have much higher rates of FIH than the overall U.S. population.

Immigrants constitute another such group at high risk for FIH that may also be under-represented in national data and face substantial barriers to food security. These include economic constraints posed by poverty, low-wage employment, job insecurity, language, education, and marginal social position. In recent years this risk has been compounded by restrictions on enrollment in government programs designed to prevent food insecurity, such as the Food Stamp Program (7).

Currently, 34.3 million U.S. residents are foreign-born; over half are from Latin America (8). Many of these immigrants face additional challenges because they lack valid immigration documents and do not seek assistance due to fear of being deported (9). The last decade has seen substantial movement of immigrants from Latin America into areas of the U.S., especially the Southeast, with little community infrastructure and no established Latino communities to receive the immigrants. For example, the Latino population increase between 1990 and 2000 was 394% in North Carolina (the state with the greatest increase in Hispanic population). Much of this increase was in "new settlement" counties with extremely low Hispanic numbers before 1990 (10). As a result, the Latino population differs substantially from one region of the country to another. Whereas the numbers of Latinos are greater in the Southwest than Southeast,

<sup>1</sup> Supported by grants from CDC (OH 07611) and NIH (ES 08739). Some data presented here for Study 1 were included in a prior publication (Quandt SA, Arcury TA, Early J, Tapia J, Davis JD. Household food security among Latino farmworkers in North Carolina. *Publ Health Rep.* 2004;119:568-76). Study 4 was conducted in partial fulfillment for the requirements for the Master of Medical Science degree in the Physician Assistant Program (Shoaf).

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Latinos in the Southwest are more likely to be born in the U.S. and to speak English (11), which are factors that confer greater access to income sources and government programs that help reduce the likelihood of household food insecurity.

Immigrants are distinguished from many nonimmigrants because they face an additional pressure that may strain already limited household food resources: the obligation to send money to family remaining in their country of origin. Although the amount of such remittances and its impact on the place of origin (12) and national economies has been documented (13), its impact on the immigrants who send it has not. Because the central purpose of immigration to the U.S. is often to support families left behind in the country of origin (14), such support may well be a factor in food security. The dispersed, bi-national nature of immigrant families and their unique economic obligations are inconsistent with the way food security is typically conceptualized in the measurement of FIH, that is, income from persons who live in the same dwelling being used to support coresident adults and children.

The purpose of our study was to describe FIH among Latino immigrants in North Carolina between 2002 and 2004. Data came from 4 samples, which included both urban and rural residents and those living in the eastern and western parts of the state. First, using quantitative data, we described levels of FIH in the samples. Second, using qualitative data, we explored immigrants' experience of FIH and compared this with the experience of FIH in other populations.

## Materials and Methods

Data for these analyses came from ethnographic research with immigrant Latinos in 1997 conducted in North Carolina through a community-university partnership composed of researchers at Wake Forest University School of Medicine and community-based organizations including North Carolina Farmworkers Project, Benson, NC, and Student Action with Farmworkers, Durham, NC. The research included 4 cross-sectional surveys on FIH conducted with different populations in

North Carolina between 2002 and 2004. In each case, one adult was interviewed per household. These quantitative data are supplemented by qualitative data from key informant interviews conducted in conjunction with 3 of the 4 surveys. Table 1 presents an overview of the data sources, including eligibility criteria and sampling strategy; sampling strategies for studies 1(15), 2, and 3 were designed to obtain as representative a sample as possible in a "hidden" population (16–18). In each case, data were collected after obtaining informed consent as approved by the Institutional Review Board of Wake Forest University School of Medicine. The 4 studies were designed to allow for rural vs. urban (Studies 1–3 vs. Study 4) and seasonal (Study 1 vs. Study 2) comparisons.

**Survey data collection and analysis.** All data were collected in face-to-face interviews conducted in Spanish by bilingual or Spanish-speaking interviewers trained by the study investigators. Interviewers conducted practice interviews before being approved for study data collection.

Food security was measured for each household using a Spanish-language adaptation of the 18-item U.S. Household Food Security Survey Module (FSSM) (19). This instrument classifies households as food secure, food insecure without hunger, food insecure with moderate hunger, and food insecure with severe hunger during the previous 12 mo. In Study 2, the time frame was changed to the previous 6 mo (November–April). Harrison et al. (20) developed the Spanish-language version, which is intended to be valid across different Hispanic populations.

Other data collected included age; gender; country of origin; education; time in the U.S., North Carolina, or Virginia; size and number of adults and children of the household; and (except in Study 3) participation of household members in food supplementation programs.

Data were analyzed using SPSS, version 13.0 (SPSS). Analysis for this article is primarily descriptive, using counts and percentages. Summary data were compared with U.S. reference data for 2004 (3) using 95% CI.

**Qualitative data collection and analysis.** In-depth, open-ended interviews were conducted with women in households meeting the same criteria as for the survey interviews. In Studies 1 and 3, the interviews focused on a wide range of environmental and occupational health concerns as well as the immigrant experience, including food insecurity. In Study 2, the interview focused on food insecurity and on the households' experience in attempting to meet a variety of family needs, including feeding the family and supporting family members remaining in Mexico. Interviews were conducted in Spanish, tape-recorded, and subsequently

**TABLE 1** Overview of 4 studies of food insecurity among Latino immigrants to North Carolina

Characteristic	Study			
	1 <sup>1</sup>	2	3	4
Survey interviews, <i>n</i>	55	49	112	101
In-depth interviews, <i>n</i>	25	10	41	0
Study dates	Summer 2002	Spring 2004	Spring 2002	Spring 2003
Food insecurity time frame, <i>mo</i>	12	6	12	12
Eligibility criteria	Latino	Latino	Latino	Latino
	Farmworker in household	Farmworker in household	Farmworker in household	Patient of free clinic
	Child <18 y in household	Child <6 y in household	Child <13 y in household	Child <18 y in household
Survey sampling frame	Site-based, farmworker community. 22 sites, including farm labor camps, trailer parks, individual dwellings, churches, Migrant Head Start, laundromats	Contacts of lay health promoters who were delivering pesticide safety information	Contacts of lay health promoters who would later deliver pesticide safety and nutrition education	Free clinic patients (<200% of poverty and no health insurance); all eligible patients; 94% participation rate
Study locale	Duplin, Harnett, Johnston, Sampson, and Wake Counties in Eastern NC	Harnett, Johnston, Sampson, and Wake Counties in Eastern NC	Alleghany, Ashe, Avery, and Watauga Counties in Western NC; Carroll, Smyth, and Grayson Counties in Southwestern VA	Forsyth County, Central, NC

<sup>1</sup> Reference 15.

transcribed and translated. Codes describing common experiences surrounding hunger and informants' attitudes toward feeding their families were defined (21). Each transcript was read and codes assigned by multiple coders; discrepancies were discussed and resolved. Computer-assisted text management (22) was used to extract and sort text to allow the coded text to be summarized. Exemplary quotations are provided to illustrate findings.

## Results

The survey respondents were predominantly females (Table 2). Median ages were 27–34 y of age with an overall range of 15–65 y. The majority of respondents were from Mexico. The urban sample (Study 4) included ~25% from 7 other countries in Central and South America. Respondents were most commonly from the 3 states of Oaxaca, Michoacan, and Guerrero, all located on the Pacific coast of southern Mexico. Most respondents had a primary or secondary education that was equivalent to elementary or junior high school in the U.S. Although each sample included persons who had been in the U.S. for many years, the median was 3–7 y, with most of that time spent in North Carolina.

The household size across studies ranged from 3 to 18 people, with a median of 4–6. Although there were some households with large numbers of adults, the median number of adults was 2–3. The median number of children was 1–3. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and the school lunch program were the most commonly reported government food programs. Food-stamp participation ranged from 13.9% in Study 4 to 32.7% in Study 2. Over 50% of the families in Study 1 participated in Migrant Head Start, a program that provides services to infants, toddlers, and preschool children in migrant workers' families. About 25% of those in Studies 1 and 2 reported receiving food from a food pantry, compared with only 12.9% of those in Study 4.

Over 50% of the respondents in each study reported worrying that food would run out and that the food bought would not last (Table 3). More than 25% of respondents in each study reported that children were not eating enough because of lack of money to buy food. In general, Study 3 respondents affirmed the fewest of the most serious indicators of food insecurity (e.g., cutting meal size, skipping meals, or not eating for a whole day), whereas Study 4 respondents affirmed the most.

All 4 studies had levels of food insecurity significantly higher than the 2004 rates for U.S. households with children (3), (Fig. 1). The percentage (and 95% CI) of households classified as food secure ranged from 50.9% ( $\pm$  9.3) in Study 3 to 28.7% ( $\pm$  8.8) in Study 4 compared with 82.4% ( $\pm$  0.48) in the U.S. survey. Food insecurity without hunger ranged from 35.6% ( $\pm$  9.3) in Study 4 to 41.8% ( $\pm$  13.0) in Study 1 compared with 13.3% ( $\pm$  0.42) in the U.S. sample. Study 4 had the highest percentages of households with hunger: 18.8% ( $\pm$  7.6) were classified as having moderate hunger and 16.8% ( $\pm$  7.3) severe hunger. Respondents described quantitative, qualitative, psychological, and social components of their food insecurity experience (Table 4).

**Quantitative component.** The quantitative component of FIH refers to the amount of food available for household consumption. For these immigrants, 2 overlapping cyclical components to FIH affect quantity. One has to do with the migration cycle: when families are newly arrived from Mexico, they typically have received no wages, even if they have jobs, and have spent most of their money for transportation and sometimes for passage across the border. The second has to do with the annual cycle of employment. Most are employed in seasonal jobs such

**TABLE 2** Description of survey respondents and their households in 4 studies of food insecurity among Latino immigrants

Characteristics	Study			
	1	2	3	4
Respondent female, %	80.0	100.0	100.0	75.2
Age, y				
Median	28	28	27	34
Range	18–56	18–45	15–43	20–65
Country of origin, %				
Mexico	94.5	98.0	92.9	75.2
United States	5.5	2.0	3.6	0.0
Other	0	0	0.9	24.7
Most commonly reported state of birth in Mexico, %	Oaxaca, 27.5	Oaxaca, 32.7	Michoacán, 26.0	Guerrero, 56.8
Highest level of education completed, %				
Never attended	3.8	0	0	7.9
Primary	58.5	68.8	47.3	37.6
Secondary	32.1	20.8	37.3	29.7
Preparatory	5.7	10.4	13.6	13.9
GED	0	0	0	2.0
College	0	0	1.8	8.9
Time in U.S., y				
Median	6	7	3	6
Range	<1–56	1–30	<1–27	<1–21
Time in North Carolina, y				
Median	4	4	3	4
Range	<1–22	<1–21	<1–27	<1–17
Household total number of persons				
Median	6	5	4	6
Range	3–11	3–18	3–9	3–14
Total adults				
Median	3	3	2	3
Range	2–6	1–8	1–6	2–11
Total children				
Median	3	3	1	2
Range	1–5	1–10	1–6	1–7
Food program participation, %				
WIC	60.0	63.3	ND <sup>1</sup>	40.6
Food stamps	20.0	32.7	ND	13.9
School lunch	61.8	59.2	ND	63.4
Migrant Head Start	52.7	NA <sup>2</sup>	NA	NA
Food pantry/church food distribution	23.6	25.0	ND	12.9

<sup>1</sup> Data not collected.

<sup>2</sup> Program not available in study area during time covered by data collection.

as farmwork, landscaping, or construction. In winter, work is scarce and heating bills are high due to the weather and poor repair of available low-cost housing. This is an expense to which most families are unaccustomed and for which, at least in the first year, they do not have money saved.

The quantitative component has degrees of severity. With mild food insecurity, families try to keep the size of the meals the same, regardless of their content. With more severe food

**TABLE 3** Percent of respondents affirming each food insecurity item, by study

Food insecurity questionnaire item	Study			
	1	2	3	4
I worried whether our food would run out before we got money to buy more.	63.6	59.2	55.9	73.3
The food that we bought just didn't last, and we did not have money to get more.	54.5	53.1	50.9	64.4
We couldn't afford to eat balanced meals.	50.9	45.8	47.7	69.3
We relied on only a few kinds of low-cost food to feed the children because we were running out of money to buy food.	55.6	59.2	43.8	60.4
We couldn't feed the children a balanced meal because we couldn't afford that.	44.4	45.8	39.3	60.4
The children were not eating enough because we just couldn't afford enough food.	41.5	32.7	25.9	46.5
Did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?	11.1	10.2	4.5	27.7
Did you ever eat less than you felt you should because there wasn't enough money to buy food?	18.9	24.5	7.1	33.7
Were you ever hungry but didn't eat because you couldn't afford enough food?	15.1	12.2	5.4	31.7
Did you lose weight because there wasn't enough food?	13.2	12.6	2.7	23.8
Did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?	4.2	0	0.9	16.8
Did you ever cut the size of any of the children's meals because there wasn't enough money for food?	19.1	12.2	8.0	31.7
Did any of the children ever skip meals because there wasn't enough money for food?	6.4	4.1	3.6	17.8
Were the children ever hungry but you just couldn't afford more food?	6.4	12.2	2.7	21.8
Did any of the children ever not eat for a whole day because there wasn't enough money for food?	4.3	2.0	0	15.8

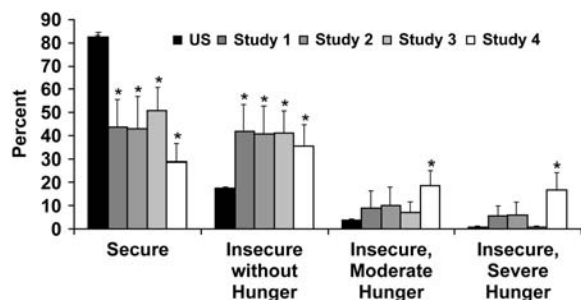
insecurity, adults tend to eat less to allow more for children. Parents find that children cannot understand the lack of food, so they feed them first. Only when food insecurity was severe did respondents report having to go without food for a day. This appears to be quite rare. Respondents reported that they almost always had something to eat, even if it was just beans or eggs.

**Qualitative component.** This component is related to the quality of the diet. Cyclic shortages affect the type of food available, primarily through fluctuations in money available for food purchase. Many families report cutting back on foods they consider expensive (meat and fruit) and unnecessary (soda, snacks, eating out):

Since meats are the most expensive, that's where you limit yourself. You try not to eat so much meat.

Some make substitutions of lower-cost products such as Kool Aid for fruit juice. As with food quantity, parents overwhelmingly report attempting to maintain food quality for children at the expense of adults.

**Psychological component.** The words used by respondents to describe their initial reactions to being food insecure suggest the adverse psychological impact of FIH. They experience worry and stress about their competing expenses and low earnings.



**Figure 1** Food insecurity levels from 4 studies of Latino immigrants to North Carolina compared with national data for 2004 for households with children (3). Values are proportions  $\pm$  95% CI. Asterisks indicate differences between Latino studies and national data.

They fear applying for public or private assistance because they lack immigration documents:

There are a lot of programs that can help you, but the applications are very complicated or people don't want to do them.... A lot of people are afraid because they are

**TABLE 4** Components of the food insecurity experience of Latino immigrants that emerged from in-depth interviews

Component	Description
Quantitative	Cycles of income result in cycles of food shortages
	Mild: try to keep the size of meals the same, regardless of their content
	Moderate: adults eat less to spare children
Qualitative	Severe: having to go without food for a meal or day
	Cyclic shortages affect types of food available
	Cut back on meat, fruit, and other expensive types of food when money is tight
	Substitute less expensive foods
Psychological	Try to feed children normal meals at the expense of adults
	Initial reaction: worry and stress about competing expenses and low earnings
	Initial reaction: fear of applying for help because of lack of documents
	Initial reaction: embarrassment at having persons from home know of food insecurity
	Initial reaction: loneliness, home-sickness
	Initial reaction: guilt because of not being able to support family in country of origin
	Accommodation: get used to having less
	Accommodation: come to terms with situation and ask for help
	Empowerment: plan for shortages to take care of yourself
	Socio-economic
	Treated with disrespect when applying for assistance
	Need to send money home
	Borrow money, but not food
	Boss gives garden land for home food production

illegal. They feel that [governmental employees] are going to send them back to Mexico.

Many express embarrassment at having others from their same hometown know of their predicament. The food insecurity situation makes them lonely and homesick for their families in Mexico. Some express guilt at not being able to send home the money they thought they would make. Those who have been in the U.S. for several seasons report that, after these initial reactions, there is a process of adjustment that has 3 stages. Accommodation is the first stage, which entails getting used to having less:

At first I felt bad and I felt like crying. I would say to myself, "Why do I have to buy this instead of that?" But I have learned that I don't always have money to buy "X" thing. And now I don't feel bad when I have to buy those things. I mean, I'm prepared for that.

The next stage is action, or coming to terms with the situation and asking for help, whether from family members, private food pantries, or social services:

I don't know if I woke up or I just had my eyes closed when I got here, but it seems that there are more people helping us now. There are more organizations. I don't know if it's from embarrassment or because they don't know that there are places that can help. I always tell people, "Go there because they can help you."

Finally, some reach a stage of empowerment in which they plan for shortages so they can take care of themselves. This includes raising gardens, buying canned and dried staples to save for winter, or putting extra cash in the bank:

The hot season was very good and we made a little bit more money. We started planning our strategy which was to begin buying some extra foods that wouldn't spoil to have during the cold season. We had already been through the experience of not having a whole lot of things during the winter. So then, if we paid the power bill, we didn't have enough money to buy food. We started seeing that if we had a little extra money ... and that's what we have been doing.

**Socio-economic component.** This component focuses on interpersonal or economic resources related to food security status. Respondents noted that a lack of transportation limited their access to food pantries and applying for assistance. In rural communities there is little public transportation, and even when rides are given by informal contacts, there is an expectation of payment.

People say there are [places to get free food] and you should know where they are located, but since I don't know how to drive, it's hard for me to go to the places where they give away food. I mean, you have to go and get it because they are not going to come to the house and they don't know what necessities you have.

Respondents are treated disrespectfully when applying for food stamps or other assistance, which they attribute to racism. The need to send money home presents a dilemma, which is usually resolved by feeding family here and postponing remittances. Although no one indicated that they would let family here go hungry because of sending money home, several suggested that they felt they were justified in sending money home even though they would worry about food here, because those at home were in more dire circumstances:

My husband is the one who sends money more frequently to Mexico, but when things get complicated by someone getting sick, he sends double the amount—2 or 3 times a month. If someone gets sick, they need to do something to get better; and they also have to eat and buy medicine. In that way, their expenses are multiplied.

If it is necessary to feed the family, most respondents said they borrow money, but only from close family who would keep their situation confidential. They avoid borrowing money for food from unrelated persons from their home town lest these individuals might gossip to people back home. The possibility of being embarrassed in this way was reported by many respondents in Studies 1 and 2. Both studies were conducted in areas with numerous farmworkers who tend to cluster in communities with families from their home regions:

No. I think [acquaintances that don't have enough food] must be embarrassed because since we are from the same place, we don't tell each other stuff because they, as well as I, feel awkward about talking about that stuff.... I know you [the interviewer] and you also know me, but we are not from the same town.... Because if they tell us [they are hungry], they think we might repeat it to everyone else. That's why we don't talk about it.

On the positive side, several respondents reported that employers provide garden space on which they can produce vegetables for home consumption. This supports the strategy of taking control of one's food supply and planning for shortages:

The boss gives my husband a piece of land where he can plant. He goes and buys the seeds and we plant them. And then, later, between him, the children, and me, we weed. And then, when it's ready, we eat some and we give some to other people because they get ripe very quickly.

## Discussion

These data reveal rates of food insecurity that were considerably higher than those reported for the U.S. population and for Hispanics in the U.S. (3), as well as for some low-income populations (5,6). Rates among these immigrants are comparable to those of Appalachia, where ~50% of inhabitants reported FIH (4). Comparing the immigrant samples, urban residents (Study 4) reported more FIH than rural, perhaps reflecting larger households and the fact that the urban sample was not necessarily employed. Surprisingly, Study 2, which analyzed food security status only for the winter months, reported no worse FIH than did the analysis for the entire year in the same area (Study 1). This may represent a selection bias: those without some prospect of a winter job may migrate elsewhere so that only those with employment stay. Study 4, which examined populations western North Carolina, had the lowest rates of FIH. This likely reflects the year-around nature of work in the Christmas tree industry, as well as service jobs available both summer and winter in tourism.

The experience of food insecurity and hunger described in the qualitative interviews are consistent with the quantitative data and shares some features with findings in studies in different populations. The strategies to manage food shortage through quantitative and qualitative dietary measures were reported by children and older adults in the U.S. and low-income families in Canada (23–26). Likewise, psychological dimensions of food insecurity, including embarrassment, shame, and anxiety,

appear to be common across studies as are some sociological dimensions, including obtaining food in ways that create social discomfort (e.g., food pantries and applying for public assistance).

The findings here differ from those of other studies (23–26) in several respects. First, these immigrant families view themselves as members of bi-national communities, so they are concerned that the shame of being unable to feed their families in the U.S. will spread to their communities in Mexico. Because many conceal from their family at home just how tenuous their circumstances are, the threat of being exposed constrains them from seeking help in the U.S. Second, the bi-national nature of families means that immigrants have a financial obligation not present in other nonimmigrant populations. Although none of the families provided money to family members in their country of origin at the expense of their family members in the U.S., there is continuing pressure to help. Third, these families are relatively recent immigrants in new situations, constantly adapting to life in a foreign country. Perhaps for this reason they can recognize stages in their adjustment to income and expense cycles that might eventually make them more food secure. Finally, these immigrants focus less on public assistance for their children than reported by others (23). This is likely because the primary form of public food assistance (food stamps) is largely unavailable to these families as noncitizens (except for children born in the U.S.). However, it is notable that even those whose children are receiving meals at Head Start and at school do not talk about these as part of their food strategy.

Our studies suggest that there may be difficulties in comparing results from immigrant and U.S. residents on the FSSM, which has an implied model of food insecurity based on the economic resources and obligations of a household as a coresident group. This may be complicated further by spousal differences in how they conceptualize their household and its obligations. For example, women in the qualitative interviews reported that men were obligated to take care of their own parents. However, women also felt obligated to take care of their own parents, an obligation generally not acknowledged by the husbands. Thus, the frame of reference for judging economic obligations may differ between individuals, even in the same household.

These findings should be interpreted in light of the studies' limitations. Income data were not collected in any of the studies because of the difficulty for immigrants to estimate incomes that vary monthly. Dietary intake data or data to assess nutritional status were not collected in this study. The nonrandom nature of the samples is also a limitation. Whereas random samples are preferred, sampling frames did not exist for this population. Standard survey techniques (e.g., census and mapping to create a sampling frame) would have been incomplete, because many immigrants (regardless of immigration status) were reluctant to respond to a census because of fears of deportation. Thus the site-based sampling used in 3 of 4 studies provides an alternative that can be used when investigators have an ethnographic understanding of the distribution of the population across a study area. Few comparative data are available for the Spanish translation of the USDA instrument. Its developer and others (20,27) have noted that the concept of a "balanced" meal and "not eating for a whole day" are difficult to translate, so measurement differences may exist between these studies and others using the English FSSM.

Recent evidence linking FIH to negative health and social outcomes, like obesity, through economic limits on food choice (28) raises the prospect of long-term consequences of FIH. This suggests that changes in state and national policies are needed to improve the situation for new immigrants. Programs such as

WIC and the school lunch are being accessed by many immigrants, but the number of people not accessing these services is unknown (9). Participation in the food stamp program, the mainstay of the food security safety net, is not available to many immigrants. Policy makers need to reconsider access to food programs in light of the level of FIH and its short- and long-term consequences. Further studies are needed to monitor levels of immigrant FIH and the strategies that they adopt for coping.

## Literature Cited

1. Core indicators of nutritional state for difficult-to-sample populations. *J Nutr.* 1990;120 Suppl II:1559–600.
2. Holben DH, American Dietetic Association. Position of the American dietetic association: food security and hunger in the United States. *J Am Diet Assoc.* 2006; 106:446–58.
3. Nord M, Andrews M, Carlson S. Household food security in the United States, 2004. Food Assistance and Nutrition Research Program, Economic Research Services, USDA, Economic Research Report 11, Washington, DC; 2005 Oct.
4. Holben DH, McClincy MC, Holcomb JP, Jr, Dean KL, Walker CE. Food security status of households in Appalachian Ohio with children in head start. *J Am Diet Assoc.* 2004;104:238–41.
5. Stuff JE, Horton JA, Bogle ML, Connell C, Ryan D, Zaghoul S, Thonron A, Simpson P, Gosset J, Szeto K. High prevalence of food insecurity and hunger in households in the rural lower Mississippi delta. *J Rural Health.* 2004;20:173–80.
6. Furness BW, Simon PA, Wold CM, Asarian-Anderson J. Prevalence and predictors of food insecurity among low-income households in Los Angeles County. *Public Health Nutr.* 2004;7:791–4.
7. Kasper J, Gupta SK, Tran P, Cook JT, Meyers AF. Hunger in legal immigrants in California, Texas, and Illinois. *Am J Public Health.* 2000;90:1629–33.
8. U.S. Census Bureau. Table 3: Annual estimates of the population by sex, race and hispanic or latino origin for the United States: April 1, 2000 to July 1, 2004 (NC-EST2004-03). [cited 2005 Jul 29]. Population Division, U.S. Census Bureau. Available from: <http://www.census.gov/popest/national/asrh/NC-EST2004/NC-EST2004-03.xls>
9. Geltman PL, Meyers AF. Immigration legal status and use of public programs and prenatal care. *J Immigr Health.* 1999;1:91–7.
10. Kochhar R, Suro R, Tafoya S. The new Latino south: the context and consequences of rapid population growth. Washington, DC: Pew Hispanic Center, 2005.
11. Grzywacz JG, Quandt SA, Early J, Tapia J, Graham CN, Arcury TA. Leaving family for work: ambivalence and mental health among migrant Latinos. *J Immigr Minor Health.* 2006;8:85–97.
12. Grey MA, Woodruff AC. Unofficial sister cities: meatpacking labor migration between Villachuato, Mexico, and Marshalltown, Iowa. *Hum Organ.* 2002;61:364–76.
13. Coronado R. Workers' remittances to Mexico. *El Paso Business Frontier* 2004 (1) 1–4.
14. Schmalzbauer L. Searching for wages and mothering from afar: the case of Honduran transnational families. *J Marriage Fam.* 2004;66: 1317–31.
15. Quandt SA, Arcury TA, Early J, Tapia J, Davis JD. Household food security among Latino farmworkers in North Carolina. *Publ Health Rep.* 2004;119:568–76.
16. Arcury TA, Quandt SA. Participant recruitment for qualitative research: a site-based approach to community research in complex societies. *Hum Organ.* 1999;58:128–33.
17. Parrado EA, Flippen CA, McQuiston C. Use of commercial sex workers among Hispanic migrants in North Carolina: implications for the spread of HIV. *Perspect Sex Reprod Health.* 2004;36: 150–6.
18. Muhib FB, Lin LS, Stueve A, Miller RL, Ford WL, Johnson WD, Smith PJ. Community intervention trial for youth study team. A venue-based method for sampling hard-to-reach populations. *Public Health Rep.* 2001;116:216–22.

19. Bickel G, Nord M, Price C, Hamilton WL, Cook JT. Guide to measuring household food security: revised 2000. Alexandria (VA): USDA Food and Nutrition Service; 2000.
20. Harrison GG, Stormer A, Herman DR, Winham DM. Development of a Spanish-language version of the U.S. household food security survey module. *J Nutr.* 2003;133:1192–7.
21. Arcury TA, Quandt SA. Qualitative methods in arthritis research. Sampling and data analysis. *Arthritis Care Res.* 1998;11:66–73.
22. Muhr T, Friese S. User's manual for ATLAS.ti 5.0. 2nd ed. Berlin: Scientific Software Development; 2004.
23. Connell CL, Lofton KL, Yadrick K, Rehner T. Children's experiences of food insecurity can assist in understanding its effect on their well-being. *J Nutr.* 2005;135:1683–90.
24. Wolfe WS, Frongillo EA, Valois P. Understanding the experience of food insecurity by elders suggests ways to improve its measurement. *J Nutr.* 2003;133:2762–9.
25. Quandt SA, Arcury TA, McDonald J, Bell RA, Vitolins MZ. Meaning and management of food security among rural elders. *J Appl Gerontol.* 2001;20:356–76.
26. Hamelin A, Beaudry M, Habicht JP. Characterization of household food insecurity in Quebec; food and feelings. *Soc Sci Med.* 2002;54:119–32.
27. Derrickson JP, Sakai M, Anderson J. Interpretations of the "balanced meal" household food security indicator. *J Nutr Educ.* 2001;33:155–60.
28. Drewnowski A, Darmon N. Food choices and diet costs: an economic analysis. *J Nutr.* 2005;135:900–4.