HARRIS SCHOOL WORKING PAPER
SERIES 04.2

Dietary Intake and Food Security Among Migrant Farm Workers in Pennsylvania

Katherine Cason, Sergio Nieto-Montenegro, America Chavez-Martinez, Nan Ly, and Anastasia Snyder

Dietary Intake and Food Security Among Migrant Farm Workers in Pennsylvania

November 2003

Katherine L. Cason, Ph.D., R.D.
Professor of Food Science and Human Nutrition
Clemson University, Clemson, South Carolina

Sergio Nieto-Montenegro, M.S.
America Chavez-Martinez, M.S.
Nan Lv, M.S.
Department of Food Science
The Pennsylvania State University

Anastasia Snyder, Ph.D.
Assistant Professor of Rural Sociology and Demography
The Pennsylvania State University

Paper prepared for presentation at the Joint ERS Food and Nutrition Research Small Grants Program 2003 in Washington, D.C. A grant from the University of Chicago Joint Center for Poverty Research provided support for this research (proposal no. AG020442).

Dietary Intake and Food Security Among Migrant Farm Workers in Pennsylvania

Introduction

Agriculture is Pennsylvania's single largest industry and migrant farm workers constitute a significant portion its labor force. Their contributions harvesting and processing farm crops have a positive economic impact on the farms and communities where they work and live. Each year approximately 45,000 to 50,000 migrant farm workers enter Pennsylvania to assist in harvesting the commonwealth's fruit, vegetable, and mushroom crops (Rural Opportunities, Inc., 2002). According to the Agricultural Statistics Service, 25% of the land in the state is farmland. Pennsylvania ranks fifth nationally in apple production, fourth in grape production, fifth in pear production, fourth in peach production, sixth in tart cherries, and ninth in sweet cherries production. In 2000, Pennsylvania produced 475 million pounds of apples; 310 million of those were produced in Adams County, and had an estimated value of approximately $35 million. (Pennsylvania Agricultural Statistics, 2001) Moreover, Pennsylvania growers supplied 53% of all mushrooms grown in the United States. Sales of Pennsylvania mushrooms accounted for 49 % of the nation's fresh market sales and 71 % of processing sales (Pennsylvania Agricultural Statistics, 2001).

It is tragically ironic that the efforts of migrant farm workers allow the U.S. population access to high quality and affordable foods while they often suffer from food insecurity, malnutrition, poor health status, poverty, low job security, and often live and work in unsafe and unsanitary conditions (Slesinger, 1992). These poor living and work conditions contribute to a myriad of health, mental health, and social and behavioral problems that include chronic health conditions (Slesinger, 1992; Slesinger, Christenson, & Cautley, 1986; Slesinger & Ofstead, 1993) substance abuse (Alaniz, 1994), domestic violence (Van Hightower & Gordon, 1999; Martin & Gordon, 1995; Tan, Ray, et al., 1991), and other co-morbid mental health problems (Alderete, Vega, et al., 2000; Kupersmidt & Martin, 1997). The families and children of migrant farm workers are not immune to these problems and often suffer from child abuse and neglect, poor physical and mental health, and limited educational opportunities (Belton, 2000; Elder et al, 2000; Kupersmidt & Martin, 1997; Larson et al., 1987; Larson et al., 1990; Lee et al., 1990; Martinez & Gingras, 1996; Slesinger & Cautley, 1986).

The purpose of this study was to expand upon this body of knowledge and examine critical components of health and well-being: the nutrition, food security, and food sufficiency maintenance practices of migrant farm workers in Pennsylvania, and the impact of food program participation on these outcomes. Useful information on the health and especially the nutritional status of migrant farm workers comes mainly from regional and state-specific studies (see Alarcon, 1995; Alderete & Vega, 2000; Runsten & Kearney, 1994; Slesinger, 1985). It is expected that state and regional variation in agricultural crops and products as well as individual and family characteristics will impact food security, food sufficiency maintenance practices, and potentially food assistance program participation of migrant farm workers and their families.

The methodology for this study involved the collection of quantitative and qualitative data (focus group interviews and surveys) to examine the food and nutritional context of migrant farm workers. The focus groups had three main objectives: 1) identify barriers to achieving good nutrition; 2) understand the programmatic, social, cultural, and lifestyle factors to which these barriers can be attributed; and 3) reveal practices employed to increase food security. The survey consisted of the USDA food security instrument, information on utilization of food assistance programs, and demographic characteristics. The Pennsylvania survey data was compared to an existing dataset from the Current Population Survey (CPS) to determine how factors such as ethnicity, migrant status (seasonal, settled), and other factors impact use of food assistance programs among migrant workers in five Pennsylvania counties (Adams, Berks, Chester, Erie, Franklin). These data also will function as pilot data for a larger future study of the

physical, mental and behavioral health and social context of migrant farm workers in Pennsylvania, and the development of their youth.

Limited Data Resources on Food Security and Nutrition of Migrant Farm Workers

Adequate nutrition and food security are fundamental elements of health and well being, especially for children. The USDA-sponsored food programs (food stamps, WIC, school breakfast and lunch programs) are designed, implemented, and targeted toward those without access to these basic components of health and nutrition (Oliveira & Gundersen, 2000; Winkcki, 2001). Despite these efforts and awareness of the problems that plague this group, no nationwide data exist that contain information on the health status of migrant farm workers, and even less on that of migrant children. Moreover, scant information on nutritional status is available in the state and regional studies that do exist.

It is difficult to identify migrant farm workers in most nationally representative data sources. For example, the National Center for Health Statistics and the Centers for Disease Control are unable to provide even rudimentary information about migrant farm workers (Mobed et al, 1992; Villarejo & Baron, 1999). The Census of Agriculture, collected by the USDA, provides detailed county-level information on agricultural products and farm capacity, but contains limited information on agricultural workers. The Continuing Survey of Food Intakes by Individuals (CSFII) 1994-96, 1998, sponsored by the Agricultural Research Service, USDA, provides information on the diets of a nationally representative sample of non-institutionalized individuals in 50 States, with over-sampling of the low-income U.S. population. However, the CSFII and other population-based surveys (e.g., the National Health and Nutrition Examination Survey) do not allow migrant workers to be identified.

The best sources of nationally-representative data on the food security of U.S. farm workers are the Current Population Survey (CPS) and the National Agricultural Workers Survey (NAWS). The CPS is conducted monthly by the Bureau of Labor Statistics (BLS) and is intended to provide detailed information on the labor force participation, employment and unemployment, and demographic characteristics of the U.S. population. Although not specifically designed to collect data from farm workers, farm work is included as an occupation category in the CPS. Since 1995, the BLS has collaborated with the USDA to collect annual information on food spending, food access and adequacy, and sources of food assistance for the U.S. population. This information is collected throughout the year as a supplement to the CPS using an 18 item food security survey developed by the USDA. Approximately 125,000 persons are given the CPS Food Security Supplement (FSS) each year. These data provide insight into the nature of food security and how low income households meet their food needs. These data have drawbacks, however, in that homeless or tenuously housed individuals (which often include migrant and seasonal farm workers and their families) are underrepresented in the CPS and the sample of identified farm workers is too small for reliable state estimates.

The U.S. Department of Labor also collects national information through the NAWS, which is a survey of U.S. crop farm workers. The NAWS provides detailed and descriptive information on migrant farm workers including detailed demographic, family, and household profiles; specifics regarding public assistance and social service utilization; and extensive information on work and earnings. The NAWS data has been collected annually since 1988 and now consists of over 25,000 farm workers. Data is collected in three cycles to better capture the seasonality of crop farm work. Migrant farm workers (defined as those who travel 75 or more miles to their work place) are also specifically sampled in the NAWS data. The data on food intake is extremely limited, however, and only concerns the provision of meals by employers. In addition, with the exception of California and Florida, NAWS data are not reported at the state level.

The information that is available on the health and nutrition status and the health conditions of migrant farm workers comes from a few regional or statewide surveys of migrant health status and needs. The Migrant Farm Workers in Wisconsin Study is an example of research conducted on a cross-sectional yet representative statewide sample of migrant workers in 1978 and 1989. The study emphasized physical health and economic well-being (see Slesinger, Christensin et al., 1986; Slesinger and Ofstead, 1993; Slesinger & Okada, 1984; Slesinger and Monson, 1994). Although the study provides excellent information on the health, economic, and social conditions of migrant farm workers and their children, a more recent and comprehensive data set—focusing also on nutrition and food security—is needed. No studies exist on these topics for migrant farm workers in Pennsylvania.

Food Assistance Program Participation

Chronically plagued by poverty, poor nutrition, and transient, unreliable work, migrant farm workers often do not access the very social services that could improve their lives. Most migrant farm workers are eligible for federal food assistance programs including Food Stamps and WIC, however the majority do not take advantage of these programs (Moretti & Perloff, 2000; USDL, 2000). Analysis of the 1997-1998 NAWS reveals that approximately 60% of farm worker families live in poverty yet only 10% utilize food assistance programs (USDL, 2000). No group of workers in America faces greater barriers in accessing basic services. Factors such as limited cultural capital, lack of political power, and frequent mobility operate as barriers to service utilization and food program participation (Slesinger, 1992). When these unique barriers are coupled with the typical obstacles that confront many poor populations it is clear why food program participation and overall service utilization is limited.

Nonprofit service organizations are frequently the main or only source of community support utilized by migrant farm workers and their families. Twenty-two percent of farm workers receive assistance from community-based charitable organizations (USDL, 2000), which often focus on food assistance, housing, transportation, reducing substance abuse, and improving basic health outcomes (Litrownik & Elder, 2000; Marier, 1996; Watkins & Harlan, 1994). These community outreach programs, which often rely on funding from charitable donations, provide a wide array of support services and information. These include: childcare and child health services, family health services, referrals to other community agencies, and acting as a liaison between the communities and other social institutions, such as schools (Watkins & Harlan, 1994). Unfortunately, these organizations are often inadequately funded, and their staff poorly trained and ill-equipped to deal with the multiple problems facing migrant farm workers and their families. The food security supplement to the CPS asks seven questions related to coping strategies used when confronted with food insecurity, including four on participating in food programs.

Scope of Work

It is anticipated that this study will add to the limited body of knowledge regarding the nutrition and food security status of migrant farm workers and their families, inform the development of sound policy surrounding utilization of food assistance programs for migrant farm workers, and contribute to outreach education programs by providing needed information for intervention planning for the health and well being of the migrant farm worker population.

The project objectives were to:

- Collect pilot data on the basic nutrition, barriers to good nutrition, food program participation, food security, and food sufficiency maintenance practices of migrant farm workers;

- Identify areas where food assistance programs and policies can be modified to better serve this population;
- Provide reliable and current pilot data that can serve to objectively identify priorities for outreach education and interventions and inform the development of a larger project on this topic in Pennsylvania;
- Compare survey data to existing data (CPS) to determine how factors such as ethnicity, migrant status (seasonal, settled), and other factors impact use of food assistance programs.

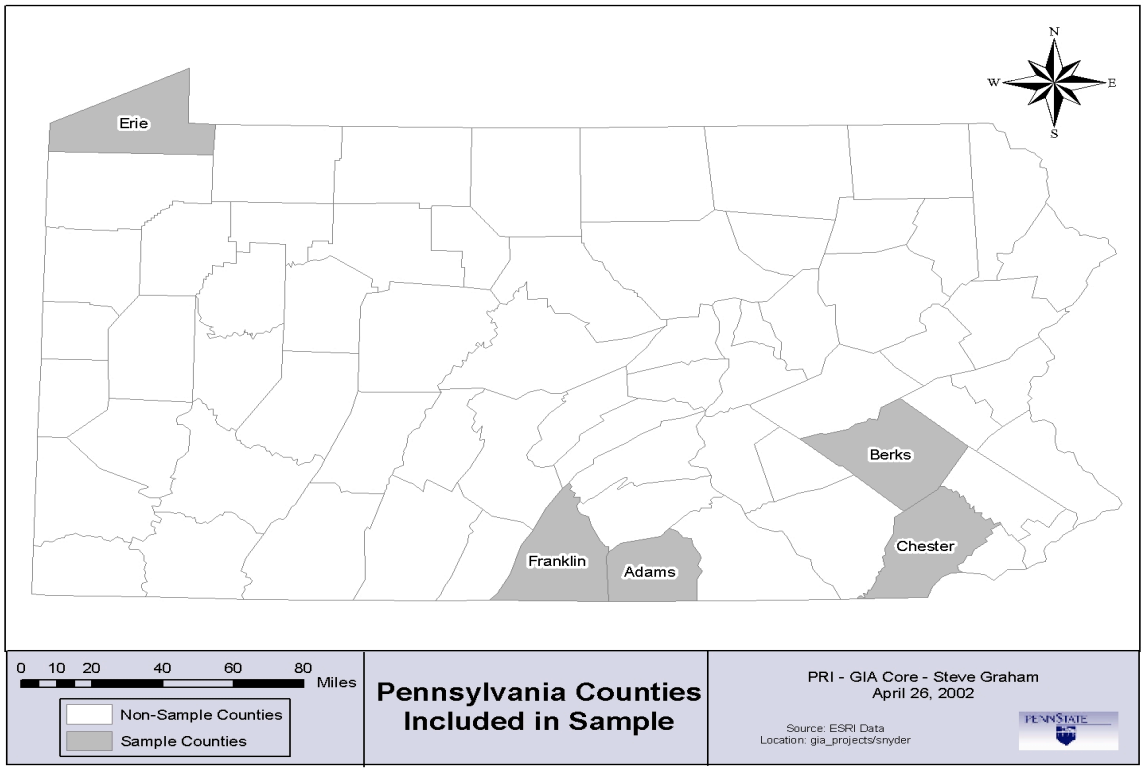

Figure 1. Pennsylvania Counties Included in Sample

Methodology

A combination of survey and focus group data was collected in five counties in Pennsylvania (Adams, Berks, Chester, Erie, and Franklin; see Figure 1) as these counties have the highest number of migrant worker households (Rural Opportunities, Inc., 2002).

Sample/Study Population – Descriptive Overview

It is estimated that 95% of Pennsylvania's migrant workers are minorities, most of who are Hispanic (including Mexican-Americans as well as Mexicans, Puerto Ricans, Cubans, and workers from Central and South America). The migrant population also includes Black Americans, Jamaicans, Haitians, Laotians, Thais, and other racial and ethnic minorities. Today, 95% of Pennsylvania's hired farm workers

are foreign-born (91% born in Mexico), twice the proportion of just a generation ago. It is estimated that 61% of the state's hired farm workers live in poverty, 42% are unauthorized immigrants, the average educational attainment is just six years of school, 24% are illiterate, and another 43% are functionally illiterate (Rural Opportunities Inc, 2002).

The composition of the diverse migrant population varies in each county. The major producers of apples, peaches, and cherries in Pennsylvania include Adams, Franklin, Berks, and Erie Counties. Most of the seasonal and migrant farm workers in these counties are Spanish-speaking workers from Mexico. While some migrants follow the tree fruit harvests from state to state, others are "settled." For example, numerous farm workers are hired for the nearly year-round mushroom industry in Chester County. The farm worker population in Chester County consists of predominantly "settled" workers-- since the mushroom season is longer than the fruit-growing season. (Rural Opportunities Inc, 2002) Nearly 98% of the mushroom workforce is Hispanic, with the majority of the population of Mexican descent. The population to be studied will therefore consist primarily of Hispanic farm workers of Mexican descent, and will include those who follow a migratory stream as well as those who are more "settled."

According to the 2000 census the total population in Pennsylvania is 12,281,054, which includes 394,088 who have identified themselves as Hispanic or Latino (of any race). The five counties participating in the study, Adams, Berks, Chester, Erie, and Franklin counties respectively had 3,287, 36,357, 16,126, 6,126 and 2,328 Hispanics or Latinos (of any race).

Recruitment of Participants

This target audience is difficult to reach, and difficult to get them to participate in any program, therefore a convenience sample was recruited to participate in the study. Faxes, letters and phone calls explaining our project and to invite them to collaborate with us were sent to the different service providers in the county areas that the project covered. Subsequently we establish formal contact with the following agencies, Farm-workers Program-Keystone Health Center (Berks County), Head Start- Rural Opportunities, Inc. (Adams and Franklin Counties), Hispanic Council (Franklin County), Mexican Consulate in Philadelphia, Migrant Education Office (Adams, Berks, and York Counties), Santa Maria Mission – Social Catholic Services (Chester County), and The Hispanic American Council (Erie County). We met with all interested agencies staff to provide a detailed explanation of the project, the instruments and the commitments involved in the project. Ultimately these agencies committed to recruit the participants with the specific characteristics that the project required. They all agreed to help us to recruit participants for the project and/or to use their facilities to conduct the focus groups interviews and the food security and 24-hour recall individual interviews. The participants were Hispanic people who lived or worked in the county where the agency was located. It was not was not a requirement for participation to be a user of any of the programs that the agency offered.

Survey

The total survey sample size was 401 respondents. For the purposes of this study we used a convenience sampling strategy. Convenience sampling is standard practice when studying hard to reach populations such as migrant farm workers and is the most efficient way to reach this population (Muhib, Lin, Stueve, Miller, Ford, Johnson and Smith, 2001). The subjects consist of migrant farm workers who are clients of local community centers, Migrant Head Start, health clinics, churches and missions in each county.

An 18-item set of indicators, also known as the Food Security Core Survey Module or, simply, Core Module was used in this study. The Core Module is a reliable tool for measuring the food security status

of households. In addition to being included in the Census Bureau's Current Population Survey, data from the Core Module is available in the 5-year longitudinal Survey of Program Dynamics (1998), the Early Childhood Longitudinal Study Kindergarten Cohort (1998-1999), the Panel Study of Income Dynamics Child Development Supplement (1997), and the 4th National Health and Nutrition Examination Survey.

The Core Module poses questions to respondents about: (1) anxiety related to food budget or supply and whether the budget is able to meet basic needs, (2) experiences related to running out of food without being able to obtain more due to financial constraints, (3) perceptions of intake adequacy by themselves or other household members, and (4) food use. (1) This scale measures only the "sufficiency" dimension of food security and does not encompass other aspects of food security, including the nutritional adequacy or safety of diets. (1) All of the questions specify financial limitations as the reason for the reported behaviors or conditions and ask about circumstances that occurred within the past 12 months. However, shorter time periods can be used. (1) Responses to the Core Module questions can be combined to create a scale that measures the degree of the severity of food insecurity/hunger experienced by a household. Based on the Core Module, households can be categorized into 4 categories of food security status, each representing a range of severity of the food security scale.

Food-secure households show no or minimal evidence of food insecurity. Households that are food insecure without hunger have members concerned about adequacy of the household food supply and household food management, including reduced quality of food and increased unusual coping patterns. However, in this category, little or no reduction in members' food intake is reported. When hunger is present, households categorized as food insecure (with hunger) can fall into 2 categories: "moderate" or "severe." These households have multiple indicators of hunger present, including, in the severe category, one or more entire days with no food due to lack of resources. In moderately hungry households, food intake for adults has been reduced to an extent that implies that adults have repeatedly experienced the physical sensation of hunger. In most, but not all, households with children, such reductions are not observed for children at this stage of food insecurity. At the severe level, all households with children have reduced their children's food intake to an extent indicating that the children have experienced hunger. For other households with children, the children's food intake may have been reduced at a less severe stage of food insecurity In addition, at the severe stage, adults in households with and without children have repeatedly experienced more extensive reductions in food intake than at less severe levels of food insecurity.

The questionnaire also includes several items concerning current, past, and planned food program participation, other receipt of public assistance, demographic characteristics, and specific barriers to participating in food programs, and dietary intake.

Dietary intake was collected through a 24-hour recall survey. All the interviews were conducted in Spanish by two experienced interviewers with a strong background in the Food Science and Nutrition fields. Visual aids were used to illustrate portion sizes to the participants. Probes were used by the interviewers to help the interviewees remind the consumed food on the previous day. Information on exercising habits, supplements intake, person’s weight changes over time, money spent on food, food security information and demographic information was also collected in the interview. Before the interview participants were required to sign a consent form. The Penn State University Office of Research Protections approved all procedures. All participants received an economic incentive in appreciation.

Focus Groups

Focus groups were conducted with migrant farm workers in Adams, Berks, Chester, Erie, and Franklin Counties. Focus group interviews are utilized to gain insights on the diverse attitudes, beliefs, and perceptions that shape nutrition and health behaviors. To better understand the barriers and facilitators to dietary change, Baronowski recommends qualitative studies to investigate dietary habits and health behaviors from the client's perspective (Baranowski, et al.1999). The focus group research technique was used to elicit views and in-depth information from the target audience in an atmosphere that encourages discussion of feelings, attitudes and perceptions about a specific topic. The qualitative focus group data can be used to confirm and/or enrich the relationships derived from quantitative data, and also inform subsequent quantitative survey development.

The focus groups interviews were conducted at different locations in five different counties in Pennsylvania between October 2002 and August 2003 totaling 117 participants. The number of focus groups conducted per county was as following, Adams County (3), Berks County (2), Chester County (2), Erie County (3), and Franklin County (2). The focus groups were conducted in Spanish using a script of open-ended questions with probes and were tape recorded for their analysis. The same two moderators whose first language is Spanish conducted all sessions; the moderators had experience on conducting focus groups and a strong background in the Food Science and Nutrition fields. Before the discussion the project was explained to the participants and they were required to sign a consent form. The Penn State University Office of Research Protections approved all procedures. Since this target audience had never been invited to participate in any focus groups discussion or interview, culturally compatible analogies and examples were used to explain the mechanics of the focus groups and during the ice-break, this latter to break down the barriers between the moderators and the participants that might be present at beginning of the focus groups and to make the participants feel comfortable when expressing their opinions. All focus group interviews were audio taped. The assistant moderator took field notes during the interviews, capturing body language of the participants and recording points that generated group agreement. A focus group interview guide was developed to elicit answers to the research questions. Content validity of the interview guide was established through a literature review of the nutritional behaviors of the population and consensus of researchers with expertise in qualitative research and nutrition. The guide was piloted with one segment of the study population before the final interview guide was developed. All focus groups participants received $25 in cash in appreciation.

The focus group interviews encompassed: 1) current health and nutritional status; 2) level of food security; 3) health care utilization by the participant and his/her family; 4) work and housing conditions; 5) food security maintenance practices; and 6) demographic profile including race, ethnicity, age, family composition, immigration status, country of origin, migration pattern. The primary goals of these focus groups were to identify the barriers to achieving good nutrition and understanding the programmatic, social, cultural and lifestyle factors to which these barriers can be attributed, if any. The focus group research addressed the following objectives: 1) gain a better understanding of migrant farm worker perceptions of what constitutes good health and proper nutrition; 2) identify barriers to achieving good health, diet and proper nutrition (language, literacy, mobility cultural or social issues, attitudes, program guidelines and policies); 3) identify public or community-based resources that migrant farm workers employ, if any, when they need assistance; 4) identify specific practices employed to improve health; and 5) identify health care and social service programs, and why or why not these are utilized.

Quantitative Data Analysis

Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS 10.0) and the

Statistical Analysis System (SAS) Version 8.1 (SAS Institute Inc.). Descriptive statistics were used to compute the frequency of responses for socioeconomic and demographic characteristics and food security. Analysis of variance was used to test for significant differences across relevant variables (i.e., measures of food security and relevant demographic variables). Duncan's multiple range test was used to assesses which groups differ significantly from each other. Linear regression analyses was used to examine associations of dietary measures with the psychosocial factors, controlling for relevant demographic characteristics.

Qualitative Data Analysis

The collection and analysis of data proceeded in a sequential manner from collection and transcription of raw data, to the development of descriptive statements from the raw data, which was then interpreted. Audiotapes of the focus groups were transcribed verbatim. The researchers independently conducted a transcript-based analysis which involved reading through transcripts and field notes, looking for emerging themes, developing coding categories, coding the data, sorting the data into coded categories and constructing topologies or diagrams to represent patterns and relationships in the data (Krueger, 1994). After reaching consensus on code words to best represent the data, the transcripts and code words were entered in to the software program, Ethnograph, which sorts the data by the code words. The researchers then work again independently to identify themes and sub-themes, which are organized into a conceptual framework by the researchers working as a team. This method is characteristic of inductive approaches such as grounded theory (Marshall & Rossman, 1999).

The survey data was compared to data from other studies, specifically the NAWS and CPS. The focus group interviews provide in-depth information regarding the issues identified as well as other related topics that emerged during the focus group discussions. The flow of focus group discussions inevitably follows participants to areas that are subjectively important and has the potential to provide new insight into specific processes of interest. We anticipate that the focus group discussions will also inform subsequent survey development.

Results

Pennsylvania Survey

Demographic characteristics

The mean age was 32 years old. Approximately half (47.4%) of the participants were male. About three fourth of the participants (76.8%) were born in Mexico. On average, people who have not lived in the US all their life have lived in the US for 8.1 years. The majority of the participants (81.0%) spoke Spanish at home. Almost all the participants (99.8%) considered themselves to be Hispanic, Mexican, or Latino. On average, the participants have completed 8.0 years of school. About three fourth of the participants (75.8%) received all or most of their education in Mexico. Participants reported participating mainly in four assistance programs: WIC (27.9%), School lunch (24.4%), School breakfast (16.7%), and Head Start (10.2%). About half of the participants (44.6%) reported having $751-$1,500 monthly household income. Another 30.3% reported having monthly household income between $1,501 and $2,500 and 10.8% reported having more than $2,500 monthly household income. On average, the participants paid $323.9 for housing in the month before the interview.

Insert Table 1 here

Food Security

Table 2 displays the frequency of responses to the food security questionnaire. When being asked the food available in their household when they were a child, about one fourth of the participants (27.2%) reported having enough of the kinds of food they wanted to eat. About one third of the participants (34.7%) had enough but not always what they wanted to eat. About one fourth of the participants (24.4%) reported not having enough food sometimes and 13.7% reported not having enough food often. When being asked the food eaten in your household in the last 12 months, 87.4% of the participants reported having enough to eat and the kinds of food they want. About one tenth of the participants (7.8%) had enough to eat but not always the kinds of foods they want and 4.5% did not have enough to eat sometimes. Only 0.3% often did not have enough to eat.

About nine tenths of the participants reported that the following statements never happened to them: "we worried whether our food would run out before we got money to buy more" (90.0%), "the food that we bought just didn't last, and we didn't have enough money to get more" (90.5%), "we couldn't afford to eat balanced meals" (90.0%), "we relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food" (93.0%), "we couldn't feed our children a balanced meal, because we couldn't afford that" (93.8%). The other participants reported that the above statements happened to them sometimes or often.

One hundred twenty one participants who gave affirmative response ("Yes") to any one of questions 2-7 were asked question 8-13. Among 121 participants, about four fifth of the participants (78.9%) reported that their children were never not eating enough because they just couldn't afford enough food. The majority of the participants answered "No" to the following statements which described their situation in the last 3 months: "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" (83.5%), "did you ever eat less than you felt you should because there wasn't enough money to buy food?" (83.5%), "were you ever hungry but didn't eat because you couldn't afford enough food"(85.0%), "did you lose weight because you didn't have enough money for food" (95.9%), and "did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food" (98.3%).

Twenty-six participants who gave affirmative response ("Yes") to any one of questions 8-13 were asked about their children's situation in the last 3 months. About three fourths of these people (73.1%) reported that they never cut the size of their child's meals because there wasn't enough money for food. About two-third of these people (58.3%) reported that their child never skip meals because there wasn't enough money for food. The majority of these people (76.9%) reported that when their child was hungry but they could afford more food. All these people (100.0%) reported that their child never not eat for a whole day because there wasn't enough money for food.

Insert Table 2 here

Different levels of food security (See Table 3) were calculated. The food security status of each household lies somewhere along a continuum extending from complete food security at one end to severe hunger at the other end. This continuum is divided into ranges: (1) Food secure, and (2) Food insecure without hunger.

Each household's location on this continuum is assessed by their responses to a series of questions about behaviors and experiences known to characterize households having difficulty meeting their food needs.

The 18 questions in the national food security survey ask about behaviors and experiences across a wide range of severity of food

In the food secure category, there are 368 (91.8%). 3.5% of the participants are in the food insecure without hunger category. Under the food insecure with moderate hunger category, there are 14 (3.5%) participants. Under the food insecure with sever hunger category, there are 5 (1.2%) participants.

Insert Table 3 here

Current Population Survey Food Security Supplement Data

The results presented here are from a combined sample of the 1999 and 2000 FSS to the CPS. All frequencies are weighted using the person weight.

Demographic Characteristics

Table 4 provides a demographic description of the 1999 and 2000 CPS respondents who listed farm worker as their main occupation. There are a total of 2112 farm workers in this sample. Over four fifths (81.9%) of the sample is male. Approximately three fourths (72.9%) were born in the U.S., 20.9% were born in Mexico and 6.2% were born in other countries. Most have lived in the U.S. their entire lives, 10.6% have lived here for 10 or more years, 6.3% have lived here for 5-10 years, and 10.3% have lived here for less than 5 years. Slightly more than one fourth of participants (28.5%) consider themselves to be Latino. Nearly three fourths (76.2%) have a high school education or less. Participation in food programs is limited and the most often used program is the school lunch program. Compared to the Pennsylvania sample, a larger proportion of the CPS farm worker sample are male, are U.S. natives, are not Latino, and have a high school or better education. Food program participation is mixed. More of the Pennsylvania sample participates in the school breakfast and lunch programs while more of the CPS sample receives assistance from the WIC and food stamp programs, and food pantries.

Insert Table 4 here

Food Security

Table 5 displays the food security measures in the CPS. In general, food security is more of a problem among the CPS sample compared to the PA sample, with the exception of food insecure moderate and severe hunger categories. The PA sample is less likely to report ever engaging in all behaviors that indicate food insecurity.

Insert Table 5 here

Figure 2 compares degrees of food security, using the five categories outlined earlier, between the Pennsylvania and CPS samples. The majority of both samples is food secure. A slightly larger percentage of the CPS sample experiences food insecurity.

Insert Figure 2 here

Dietary Intake (24 hour recall)

Table 6 provides a demographic description of the participants who completed the 24 hour recall. The

mean age was 32.07 years old. Approximately half (52.2%) of the participants were females. Seven percent of participant women were pregnant and almost seven percent (6.66%) were breastfeeding at the time of the interview. The majority of the participants (79.6%) were born in Mexico, although there were participants from several other countries such as Puerto Rico, USA, Costa Rica, Dominican Republic, Guatemala, Argentina, Colombia, and Ecuador. On average, they have lived in the US for 8.37 years. The majority of the participants (80.6%) spoke Spanish at home. All the participants (100.0%) considered themselves to be Hispanic, Mexican or their nationality, or Latino. On average, the participants have completed 8.08 years of school. The majority of the participants (88.4%) received all or most of their education in Mexico or their countries of origin. Participants reported participating mainly in four assistance programs: WIC (31.3%), School lunch (27.9%), School breakfast (21.1%), and Head Start (10.9%). About half of the participants (43.3%) reported having $751-$1,500 monthly household income. Another 31.4% reported having monthly household income between $1,501 and $2,500 and 12.9% reported having more than $2,500 monthly household income. On average, the participants paid $333.89 for housing in the month before the interview. The mean number of people living in the same household was 5.31. The weekly average of money spent per person on food was 39.38 ± 21.20 with a range from 11.67 to 150 dollars.

One third of participants (34.1%) perform a physical activity regularly, although this number included men who reported their job as physical activity. One fifth (21.4%) of the studied population were taking supplements. More than half (57.5%) of participants reported that they gained weight when they got to the country and 34 % said they have gained weight on the last year. Finally 64% of participants reported that they changed their eating habit and food choices when they arrived here.

Dietary Intake – 24 Hour Recall

The EFNEP Evaluation/Reporting System 4.0 (ERS) software was used to calculate nutrient intake. On average, participants consumed 2179.6 ±1061.8 kcal per day with 50.5% of calories coming from carbohydrates, 32.1% of calories from fat, and 15.9% from protein. The average of dietary fiber intake was 20.4 grams per day. Forty-three percent of participants had 2200 or more calories per day, forty one percent of participants had between 1200-2199 calories per day, and only sixteen percent of participants reported to have less than 1199 calories per day. The sample included all kinds of people, from people who were extremely active because of work and people who were trying to loose weight or did not eat anything the day before because they could not because of the job. Table 7 contains the mean caloric intake and percentage of calories of macronutrients.

Insert Table 7 here

Although the majority of participants had a diet with approximately 50% of energy from carbohydrates, which is generally adequate for the general population, when we compared some micronutrients with the EAR's, we found out that there were a considerable number of participants who did not meet the recommended intakes. Table 8 shows the mean nutrient intake, the usual intakes distribution and comments for selected nutrients of males and females aged 19 to 50 years. The table shows intakes from diet only (not supplements). Only one day of dietary intake information was collected, therefore caution must be taken when drawing nutrient adequacy conclusions about this specific population.

Insert Table 8 here

When the data was analyzed by using a food grouping scheme we found that 38.8% and 21.4% of the studied population consumed 6-11 serving and 12 or more servings of breads and cereals respectively,

this could be due to the fact that Mexican diet it is based on the tortilla consumption along with almost any dish. Approximately one third (37.6%) of participants had 0 servings of fruits and almost one fifth (18.9%) of them had 0 servings of vegetables. Exactly one third (33.1%) of the studied population had 0 servings of dairy products and about half of participants (53.7%) had 2 or more servings of the meat & alternatives group. Table 9 shows the mean and percent of participants eating a specific number of servings organized by food group.

Insert Table 9 here

Focus Groups

The focus groups interviews were conducted at different locations in five different counties in Pennsylvania between October 2002 and August 2003 totaling 117 participants. The number of focus groups conducted per county was as following, Adams County (3), Berks County (2), Chester County (2), Erie County (3), and Franklin County (2).

The researchers conducted a transcript-based analysis, which involves reading through transcripts and field notes, looking for emerging themes, developing coding categories, coding the data, sorting the data into coded categories and constructing topologies or diagrams to represent patterns and relationships in the data. The focus groups addressed questions in six main topic areas: (1) favorite foods; (2) food choices; (3) what affects food choices; (4) dietary acculturation; (5) food sufficiency practices; and (6) nutrition education. The specific questions covered in each focus group varied somewhat based on responses to earlier questions within the focus group and on time constraints.

Demographics

All focus groups participants were Hispanic totaling 117 participants in all twelve discussions. Nineteen percent of participants lived in Adams County, twenty four percent in Berks County, twenty percent of participants were from Chester County, twenty three percent of people lived in Erie County, and fourteen percent in Franklin County. Slightly more than half of participants were females (58.1%) and sixty seven percent of all participants were married. Almost three-fourths of the interviewed people (70.1%) came from Mexico, although there were people from several countries such as Puerto Rico, USA, Costa Rica, Dominican Republic, Guatemala, Argentina, Colombia, and Ecuador. The mean age of participants was 31.86 years (range 18-64 years) and most people (72%) had 9 years or less of education. The average number of people living in the same household was 4.96. Nearly half of respondents (46.5%) had an income in the range from $15,001 to $25,000.

Favorite Foods

The first main topic area was participants' favorite foods. Participants were asked what their favorite foods were, and why these foods have become their favorites. Themes emerging from responses to these questions are shown below. The questions were included partly in order to get the focus groups "warmed up," but they yielded themes that also emerged as important in response to questions on later topics.

Participants in all 12 focus groups reported that their favorite foods were the traditional foods of their home country. Traditional favorites included *arepas* (cornmeal patties), *arroz con gandules* (rice and pigeon peas), *barbacoa* (barbecue), beans, *bistec asado* (grilled steak), *bistec tacos* (beef tacos), burritos, *carnitas* (braised pork), *chiles rellenos* (stuffed peppers), *chicharrón* (fried pork skins), *chuletas adobadas* (fried pork chops with adobo sauce), enchiladas, fried bananas, *mangú con pollo* (pureed

plantains with chicken), mole, *pan dulce* (sweet buns), *pozole* (heart hominy stew made with pork), salads, *sancocho* (Puerto Rican beef stew), tamales, and tortillas. Referring to a traditional favorite, one participant stated, "It's our culture and we can't leave it behind."

One participant noted that preparation of traditional favorites differs somewhat here in the U.S. because of the unavailability of some ingredients: "There are a lot of herbs and vegetables that are unknown here, so we have to make substitutions on meats, to prepare them in a different way."

Participants in six of the 12 focus groups indicated that their favorite foods also included American foods. According to one participant, "There are a lot of foods we used to eat in Mexico that we keep eating here. We keep the Mexican tradition, our parents' tradition, the way they cooked and what they gave us to eat. We can also find all the stuff here and cook it at home, but when you go into town on the weekends you try to eat something else."

Participants in three of the 12 focus groups stated that their children like or even prefer American foods. One participant from the Dominican Republic stated, "I do make the mole from scratch. My kids like it but they also eat salads and some other stuff. We eat different foods not just one thing all the time. We eat mole once per month, then Dominican food once per month, different things on different days." Another participant indicated, "There are a lot of American foods that my sons like to eat and I'm not referring to hot dogs and hamburgers. … Our sons are starting to eat this food [pasta and pizza] because at school they get these kinds of foods." A third participant stated, "In my case my son prefers to eat out – you know, pizza and hamburgers, food that isn't healthy – and he's rejecting homemade food."

Food Choices

The second main topic area was participants' favorite foods. Participants were asked how they decide which foods to eat, and were asked probes relating to health, weight control, taste preferences, and price. They were also asked a probe regarding the use of grocery lists. The main themes emerging from responses to these questions are shown below.

How Do You Decide Which Foods to Eat?

Theme	*Number of Focus Groups Mentioning Theme*
Based on what others in my household want to eat	12
I prefer to eat traditional foods of my home country	10
My household plans meals and uses grocery lists	8
I eat whatever I'm craving (no planning)	8
Based on health considerations	8
Based on prices of different food items	7
We try to vary what we eat throughout the week	7
Based on convenience	6
Not based on health considerations	5
Not based on price	2
Based on the season of the year	2
Whatever food is served where I work	2

Participants in all 12 focus groups indicated that their food choices are based at least in part on what others in their household want to eat. According to one participant, "I cook whatever my husband is craving. If he says that tomorrow he feels like eating tamales, then tomorrow I'll cook tamales for him. If he wants chiles rellenos, I cook chiles rellenos. If he wants enchiladas, then I cook enchiladas." Another participant stated, "Sometimes I ask my husband or son what they would like to eat the next day. Then they tell me what they want to eat." A third participant indicated, "Sometimes when I get home early I get to decide what to eat. If my wife is happy I can choose what I want to eat, and if she's not in a good mood she just decides to eat beans."

Participants in 10 focus groups reiterated the main theme emerging from the previous question on favorite foods, namely that they prefer the traditional foods of their home country. Participants in eight focus groups indicated that they plan meals and use grocery lists. One participant stated, "I have a sheet of paper in the fridge, so if I'm out of broccoli I make a note. Whatever I'm out of, I just make a note. So whenever the weekend comes I already have a shopping list. …When I go there [the store] without a list I always shop double." Another participant indicated using a mental list: "No, I don't use a grocery shopping list. I look for the things that are missing in the freezer and I memorize the things that I need to buy."

On the other hand, participants in eight focus groups also indicated that they often do not plan, but instead eat whatever they happen to be craving. One participant indicated, "We don't plan anything if we are craving something. We prepare it and that's it." Another participant stated, "One thing that we don't know is how to plan our meals, because Americans have their rules to avoid repeating meals or to repeat meals that they like a lot. They are very organized people in general and we don't have that, so we need some education related to food."

Participants in eight focus groups stated that their food choices are based partly on health considerations. One participant indicated, "My husband has to follow a diet that the doctor gave to him, because he has a back problem. So whenever he gets overweight he has to follow it." Another participant stated, "If there is a tendency for diabetes they [a family] have to pay attention to the food they eat." Participants felt that diabetes was common among Hispanics in their communities. On the other hand, participants in five focus groups stated that health considerations were not important in deciding what to eat. According to one participant, "I'd rather work out than stop eating."

Participants in seven focus groups indicated that food choices are based to a greater or lesser degree on price. One participant stated, "The price of the product is the most important thing. We always look for the best price, and we look for the things that are on sale. If there is something on sale and I don't need it I sometimes buy it." On the other hand, participants in two focus groups stated that price was not the major factor. According to one participant, "Here at the grocery store, they have different prices [for meat], like $0.99 or $1.99 and some other is $4.00. I would never buy cheap meat because when you cook it, it gives off a really bad smell and a lot of fat. It's not worth it."

Participants in seven focus groups stated that they try to vary what they eat throughout the week. One participant stated, "Eating meat everyday is annoying, and you need to vary the menu so that it doesn't bore you." Another participant indicated, "We look for variety, so you don't repeat the same dish a lot. For example, if we had beef soup during the week, we'd try to cook it again after a couple of weeks, so the kids don't get bored eating the same things."

Participants in six focus groups indicated that food choices are based partly on convenience. According

to one participant, what impacts food choice the most is "Variety and time. If I get home early I can cook rice and chicken, but if I get home from work late I wouldn't cook something difficult because you're so tired that you just want anything." Another participant stated, "I work from 7 a.m. to 5 p.m. and I go to school two times a week, and I don't have time to cook something with vegetables. Just something quick, something fried." A third participant indicated, "Since I have a job and I come home late, I have to stop at a convenience store and buy a hot dog or soup, just to ease the hunger a little bit."

Participants in two focus groups indicated food choices were based partly on the season of the year – for example, soups in the wintertime. Participants in two focus groups stated that they eat whatever food is served where they work.

What Affects Food Choices

The third main topic area was what affects participants' food choices. Within this topic area, participants were asked five questions: (1) problems they have in buying food, with probes related to income, transportation, and food selection/availability; (2) what they would buy if they had an extra $100 to spend on food; (3) what foods they prepare to help stretch their budgets; (4) who in their household is responsible for buying and preparing food; and (5) how many meals they prepare per day. The main themes emerging from responses to the first question are shown below.

What Problems Do You Have in Buying Food?

Theme	*Number of Focus Groups Mentioning Theme*
Lack of transportation to grocery stores and markets	8
Lack of income	8
Difficulties in finding traditional foods of my home country	6
Language barriers	6
Foods don't taste the same here as in my home country	6
Income is not a problem	5
Transportation is not a problem	4
Availability of traditional foods of my home country is not a problem	3
I don't have any problems	3

Participants in eight focus groups indicated that a lack of transportation to grocery stores and markets is a problem, or had been a problem in the past. According to one participant, "Transportation was a problem at the beginning unless you had family here that you could ride with. I was pregnant when I got here and I had trouble getting to WIC or to the store, but after four months I got a car and could move around freely." Another participant stated, "We don't have any means of transportation, so even though we want to go or have the money to go shopping, there is no one who can take us there, to Wal-Mart, since it's on the city outskirts." A third participant stated, "We do not have a car. There are times we walk home along the railway line carrying bags [of groceries]." On the other hand, participants in four focus groups felt that transportation was not a problem. One participant indicated, "When a new person arrives he usually has family here, and his family or friends help him out."

Participants in eight focus groups felt that a lack of income was a problem. One participant stated, "We had very hard times when we first got here from Mexico. We wanted to eat meat the entire week. We

couldn't eat it because the money wasn't enough to buy meat for the whole week. So we reduced our meals to vegetables, pastas, rice and some other things so we could make it." Another stated, "You have to limit yourself and have good planning. For example since I don't work, my husband is the one that works, … I'm in charge of looking for sales, to spend as little as I can."

Participants in five focus groups, on the other hand, felt that income was not a problem, at least not as far as food consumption is concerned. One participant stated, "All people spend their money on food first." Participants in six focus groups stated that they currently have or in the past had difficulties in finding the traditional foods of their home country. One participant indicated, "The most common problem we had when we arrived here was that we didn't find hot peppers. And we weren't used to eating without hot peppers. In the past grocery stores didn't have hot peppers. There were no Mexico products, tortillas. We used to eat bread or we used to make flour tortillas." Another stated, "When you go to the grocery store you don't find fresh fruits and vegetables … chicken either. We always find them packaged. … People who have been here for several years have gradually been getting used to it." A third stated, "Not all the grocery stores carry Latin American food, maybe just Giant."

Participants in three focus groups stated that the availability of traditional foods from their own country was not a problem. One participant stated that this had been a problem in the past but not now: "Ten years ago it was difficult to find tortillas, and now it's easier to find almost any type of Mexican food at any big grocery store. Now we try to eat the food that we used to eat in our country. Years ago we used to eat only the things that were here – hamburgers, pizzas, roasted chicken, and all kinds of American food. … Now 90% of the food that we eat is Mexican." Another expressed a similar thought: "I think that now there is now there is no problem [in getting foods from Mexico], it is easier now. Now there are a lot of products imported from Mexico. There are a lot of stores that don't carry them but some do."

Participants in six focus groups stated that language barriers were a problem. According to one participant, "When I first got here I looked at things [in the grocery store] and did not know what they were." Another participant stated, "There are times when you see beef with less fat or less tendons at the grocery store but you can't ask for it, even though you really want it, … because of the language." One participant stated that language barriers in regular grocery stores had led her to shop at more expensive Mexican stores, where language was not an issue: "What we do is get it more expensively at the Mexican stores. Most of the time you can get it cheaper at regular grocery stores than at the Mexican stores."

Participants in six focus groups also stated that foods do not have the same taste here in the U.S. as in their home country. According to one participant, "I don't like how they [fruits] taste in this country. When we find them at the supermarket they could be too ripe or they were picked before the time is right." Another stated, "Let's say … I was making a chicken soup with green peppers and zucchini. Here the zucchini comes all ugly and old, and it doesn't taste like zucchini. It's the same with the chicken – it's all frozen, ugly and doesn't taste good. Then you have to … prepare it in a different way so you can eat it and it tastes OK."

Participants in three focus groups indicated that they did not have any problems in buying food. Participants in eight of the 12 focus groups were asked what they would buy if they had an extra $100 to spend on food. Participants in six of the eight focus groups that addressed this question indicated that they would buy meat, while participants in six focus groups also indicated that they would buy vegetables. Participants in five focus groups indicated that they would buy seafood, while participants in four groups stated that they would buy fruit. One participant indicated that she would buy more cheese.

Participants indicated that a common characteristic was that these foods were generally more expensive in

the U.S. than in their home country, particularly fruit and vegetables. According to one participant, "I love fruit but it is very expensive here." Another stated, "I've been craving mangos. They're so expensive here, almost 2 bucks apiece." A third participant indicated, "When I went grocery shopping and looked at the price [of oranges] I said noooo! With that price I can get as much as double in Mexico." A fourth indicated, "Here avocados are a luxury. In Mexico you can get like 8-10 avocados with the same amount of money that you can one here, and the quality here is very bad." One exception noted by participants was chicken, which they felt was less expensive in the U.S. than in Mexico.

One participant, who indicated that she would use an extra $100 to buy shrimp, stated, "It isn't that people don't have money to buy groceries but you don't want to spend it on things like shrimp. Can you imagine buying 5 pounds of these at $8-10 per pound, how much you would spend. You can get a lot of other stuff with that [much money] to eat for a whole week."

Participants in three focus groups indicated that they would not buy anything special, but just more of the foods that they buy now. Participants indicated that they might use the $100 to stock up on nonperishable items. One participant stated that she would use an extra $100 to buy more food for her children.

Participants in seven of the 12 focus groups were asked what foods they prepare to help them stretch their budget. The main themes emerging from their responses to this question are shown below.

What Foods Do You Prepare to Help Stretch Your Budget?

Theme	*Number of Focus Groups Mentioning Theme*
Soups	5
Beans	3
Eggs	3
Potatoes	3
Rice	3
We rely on leftovers	3
We economize on other things, not food	2
We eat smaller portions of meat	2
Carrots	1
Green beans	1
Hot dogs	1
Bologna	1
Tortillas	1

Note: this question was covered in seven of the 12 focus groups.

Participants in five of the seven focus groups that covered this question indicated that they prepare soups in order to help stretch their budget. Participants in three focus groups each mentioned beans, eggs, potatoes, and rice. Participants in three focus groups stated that they rely on leftovers. Other foods mentioned by participants were carrots, green beans, hot dogs, bologna, and tortillas.

Participants in two focus groups mentioned that they eat smaller portions of meat. One of these participants stated, "If I have two pounds of meat, and a chicken, I make chicken for two days and I make portions of beef for three days. I cook it in different ways so it lasts the whole week. I also add some rice,

beans, so they eat less beef and vegetables." One participant stated that the foods used to stretch a budget vary according to where someone is from: "Here there are people from all over, and we all have different things to stretch a budget. If you ask a Mexican 'what are you going to eat,' they will tell you beans and eggs, but if you ask a Puerto Rican they will tell you that the cheapest food is rice with fried eggs."

Participants in two groups indicated that they did not economize on food but rather on other things such as clothing when they needed to stretch their budget.

Participants in 11 of the 12 focus groups were asked who in their household is responsible for buying and preparing food. The main themes emerging from responses to this question are shown below.

Who in Your Household Is Responsible for Buying and Preparing Food?

Theme	*Number of Focus Groups Mentioning Theme*
Female(s) in household	9
Husband and wife share responsibility	8
I live alone, so I'm responsible	1

Note: this question was covered in 11 of the 12 focus groups.

Participants in nine of the 11 focus groups that addressed this question indicated that the females in the household had responsibility. One participant indicated that it was "basically women" while another stated, "the wife and daughters."

Participants in eight focus groups indicated that the husband and wife shared responsibility in their households. According to one participant, "In my house … we both cook and … the one that arrives [home] first cooks for the entire family." Another participant stated, "Here you don't find machismo. … In Mexico the woman does the household chores and the husband just [does nothing] even if he doesn't work. … Here if he wants to eat he has to help." A third participant noted, "In my family everybody cooks. We go together to the grocery store." A participant in one focus group indicated that he lived alone so he was responsible.

Participants in 10 of the 12 focus groups were asked how many meals they prepare per day. The main themes emerging from responses to this question are shown below.

How Many Meals Do You Prepare per Day?

Theme	*Number of Focus Groups Mentioning Theme*
Two	9
One	7
Three	5

Note: this question was covered in 10 of the 12 focus groups.

Participants in nine of the ten focus groups that covered this question indicated that they prepare two meals per day. One participant stated, "I prepare breakfast in the morning, this is for my son and me. I

cook in the evenings, not during the day because I'm working. Everyone in my home eats a sandwich or … leftovers [for lunch]. My son eats [lunch] at school." Another indicated, "In the morning, before sending the kids to school, I prepare them a sandwich or a potato *taquito*, and when my husband comes home in the evening I prepare him some tacos."

Participants in seven focus groups stated that they cook once per day. One participant stated, "When I'm working I cook just once per day but I cook a lot of stuff because I have to take lunch to work." Another participant expressed a similar thought: "I only cook once per day. When I come home from work I cook dinner and the next day's lunch."

Participants in five focus groups stated that they cook three meals per day. One of these participants stated that, in this regard, their situation had not changed since they moved to the United States: "People usually make the same number of meals here that they used to make in Puerto Rico."

Dietary Acculturation

The fourth main topic area was dietary acculturation. Participants were asked how their eating habits have changed since they have been in the United States. Follow-up probes asked what foods they eat less of now and what foods they eat more of now. The main themes emerging from responses to this question are shown below.

How Have Your Eating Habits Changed Since You Have Been in the United States?

Theme	*Number of Focus Groups Mentioning Theme*
More fast food and junk food	8
Fewer fruits	6
I've gained weight	6
I've gone from 3 to 1 or 2 prepared meals per day	5
Fewer traditional foods of my home country	4
Fewer vegetables	4
More vegetables and fruits	3
More meat	3
My eating habits haven't changed	3
More canned foods	2
I'm eating healthier foods	1
I've lost weight	1

Participants in eight focus groups indicated that they were eating more fast food and junk food, primarily for the sake of convenience. According to one participant, "Most people work and they don't have enough time to choose [what to eat]. They just eat whatever they find first. If … I get home and my daughters are already at home, I just buy them a pizza so they can eat." Another participant said, "We didn't have fast food back home. Now we go to Burger King, McDonald's, KFC. Sometimes if you're tired and you don't want to took you just go there. … It's easier." A third participant said, "I substituted more microwave foods for my [home country's] food. More microwave food because it cooks fast, and pizza."

Participants in six focus groups indicated that they eat fewer fruits here than in their home country, while participants in four focus groups indicated that they eat fewer vegetables. Participants stated that this was due to higher prices for fruits and vegetables in the U.S. compared to their home country, and also due to differences in how they taste here. One participant stated, "It seems like fruits have lost their taste here. Everything is tasteless." Another stated, "Their [vegetables'] flavor is different here. I don't like to buy them because of this." A third participant said, "The fruits [here] are grown in our countries but they're brought to this country, and by the time the shipments get here there's a loss in quality. … So if you're looking for a mango you have to look for the good one, if they don't all come dry and bad."

On the other hand, participants in three focus groups indicated that they eat more fruits and vegetables here than they did in their home country, primarily because they are earning more money here. One participant stated, "There was everything, all kinds of fruits in Mexico but we just couldn't afford them."

Participants in six focus groups stated that they have gained weight since they have been in the United States. One participant said she had gained 100 pounds. Participants felt that this was primarily due to changes in lifestyle and eating habits. According to one participant, "Here we have a more stressful life. That's why it's hard to keep in shape here." On the other hand, one participant stated that she had lost weight because she did not like the taste of the food here.

Participants in five focus groups indicated that they have gone from preparing three meals per day to just one or two. One participant stated, "In Puerto Rico most women stay home and the men go to work, so they cook up to three meals per day. But here in Erie, we all have to work outside [the home] so we can only cook once per day." Another stated, "In Mexico you used to have three meals and here you just have two meals. Here you have the same dish for dinner and lunch. Now that you have everything [here] there is no time to eat."

Participants in four focus groups stated that they eat fewer traditional foods of their home country. According to one participant, "In Mexico if I want pozole I could go to the vendor on the corner and get it. If I want quesadillas or tacos I know where and how people sell it there. Here if I want some sort of taco I need to go to the grocery store and buy it, then cook it and make the taco myself, or sopas or quesadillas. Here we need more time to make food." Another participant stated, "Chicken here is tasteless. In Mexico we eat fresh chicken and meat every day, but here everything is refrigerated."

Participants in three focus groups indicated that they eat more meat here than they did in their home country. According to one participant, "When I was in Mexico I didn't have much money. We lived in a little town in the countryside. Then I moved to the city and my mom used to give me 50 pesos [5 dollars] for the entire week. I used to eat a lot of fruits and vegetables. Not too much meat because the meat was too expensive. Then my brother invited me to come here, and now I eat beef every day. Here with my brother we always have a lot of food. … Not too many vegetables because here they're more expensive. I buy more beef and bread." Another stated, "Here you buy everything because … you can afford it. With one day of work you can afford anything. … In Mexico it's very difficult for you to eat meat. You'd like to eat it everyday, but you don't have any way to buy it. … Here you can buy meat for every day if you want to, just by working."

Participants in two focus groups indicated that they buy more canned foods here than in their home country. They mentioned the convenience of canned goods, stating that they buy them "because people work more" and "because of time."

One participant stated that she was eating healthier foods here: "Puerto Rican people eat a lot of fried

food. Like la capurria, relleno, el pionono. El pionono [an egg dish] is something that I haven't found here in 15 years. To eat it I have to go to my country. I had to change. Here I started to eat salads. I my country I didn't eat salads like I do here. I could eat salads every day." Participants in three focus groups stated their eating habits have not changed since they have been in the United States.

Food Sufficiency Maintenance Practices

The fifth main topic area was food sufficiency practices. Within this topic area, participants were asked four questions: (1) whether they have a garden; (2) whether they can or freeze foods; (3) the things they do to get through the month; and (4) the types of food assistance used by people like them.

Participants in nine focus groups stated that they have a garden. Several participants mentioned that they grow tomatoes, green tomatoes, and peppers. Other plants mentioned by participants included basil, beans, cantaloupes, cilantro, corn, cucumbers, eggplant, garlic, horseradish, lettuce, onions, peas, potatoes, strawberries, watermelons, and zucchini. One participant characterized the plants she grows (cucumbers, peppers, cilantro, and horseradish) as "things you can't find at the grocery store." Another participant stated that she grows tomatoes because they cost too much at the grocery store: "Mexican cuisine is based on tomatoes and here they're very expensive."

Participants in five focus groups stated that they do not have a garden, either because their landlord does not allow it or because they do not have room. Related to this, participants in four focus groups indicated that renters are typically not allowed to have a garden. One participant stated, "People grow things whenever they have room or the landlord's permission to do it, but there are some people who don't."

Participants were also asked whether they can or freeze foods. Participants in seven focus groups stated that they freeze foods. Foods mentioned by participants included beef, cherries, chicken, green tomatoes, peaches, peppers, pork, salsa, tomatoes, and zucchini. One participant stated, "We can homemade salsa and give it away or eat it. We also can peaches in syrup." Another participant indicated, "I buy zucchini if it's on sale. I chop them and then freeze them. Then I just get out whatever I need. I also do this with green peppers." A third participant said, "You freeze them [tomatoes and peppers] in plastic bags and you just take out whatever you're going to need."

One participant felt that freezing food in the Hispanic community was mostly limited to meat: "My opinion is that the only thing Hispanic people freeze is meat. I don't think there are a lot of Hispanic people who preserve tomatoes or vegetables." Participants in three focus groups stated they can foods. One participant mentioned that she had learned how to can from a program provided by Penn State. Participants in seven focus groups stated that they do not can or freeze foods. One participant mentioned freezer burns, while another simply stated, "I don't like it."

Participants in 11 of the 12 focus groups were asked about the types of food assistance used by people like them. The main themes emerging from responses to this question are shown below.

What Types of Food Assistance Are Used by People Like You?

Theme	*Number of Focus Groups Mentioning Theme*
WIC	10
Welfare	4

School lunch program	3
Food stamps	2
Food banks	2

Note: this question was covered in 11 of the 12 focus groups.

Participants in 10 of the 11 focus groups that covered this question indicated that they or people like them use WIC. Some of these participants stated that WIC was the only type of food assistance they use. Other participants mentioned that they do not have children and are therefore ineligible for WIC.

Participants in three focus groups indicated that they use the school lunch program. Participants in two focus groups each mentioned food stamps and food banks. Participants in four focus groups indicated that they use "welfare," without indicating the specific welfare program or programs that they use.

In commenting on why some people do not use food assistance programs, one participant stated, "There are people who don't know about some programs. But you have to qualify to get help. I get help [WIC] because I live alone with my children. I wanted to ask for help [food stamps] but when I applied they denied my application because I make too much money for that. I make $270 per week."

Nutrition Education

The final main topic area was nutrition education. Within this topic area, participants were asked four questions: (1) where they get information about food and healthy eating; (2) what information about food and eating they would like to have; (3) what would make them change their eating habits; and (4) if nutrition classes were set up, what their advice would be. The main themes emerging from responses to the first question are shown below.

Where Do You Get Information About Food and Healthy Eating?

Theme	*Number of Focus Groups Mentioning Theme*
Doctor's office	9
WIC office	8
TV	8
Family and friends	6
I learned about it in school in my home country	4
My children's school	4
Universities	3
Magazines	2
Food product labels	2
Hispanic Council	1
Migrant Head Start	1
Radio	1
My health insurance company	1

Participants in nine focus groups indicated that they get information about food and healthy eating at the doctor's office. Participants in eight focus groups mentioned the WIC office. According to one participant, "The WIC office offers educational talks and videos in Spanish to tell you what foods are

good." Another participant stated, "People generally get a lot of information from the WIC program. People get a lot of leaflets there. They try to have a lot of the materials in Spanish, but they don't necessarily have all of them."

Participants in eight focus groups mentioned that they get information from TV, while participants in six focus groups mentioned family and friends. Participants in four focus groups indicated that they learned about food and health while in school in their home country. Participants in four focus groups also mentioned their children's school as a source of information. One participant stated, "When you send your kids to a program they might come back with a flyer telling you why you are giving them [a certain] kind of food, so the parents can realize what is good or necessary for their children's growth."

Participants in three focus groups mentioned universities. One participant stated, "The universities, at least in the health area, they provide health leaflets." Participants in two focus groups each mentioned magazines and food product labels. Themes emerging in one focus group each were the local Hispanic Council, Migrant Head Start, radio, and a participant's health insurance company.

Participants were asked what information about food and eating they would like to have. The main themes emerging from responses to this question are shown below.

What Information About Food and Eating Would You Like to Have?

Theme	*Number of Focus Groups Mentioning Theme*
How to eat healthier	11
How to lose weight	9
Healthy food for my children	9
How to cook certain foods (e.g. vegetables)	4
New recipes	3
Food safety	3
How to read food labels	2

Participants in 11 focus groups indicated that they would like to have information about how to eat healthier. One participant stated that she would like to know "what fruits or vegetables are good for [what] things. For example, if you eat a lot of carrots what are you going to get out of that or what nutrients are you getting if you eat a lot of broccoli." Another participant said, "We eat a lot of meat around here. How does meat nourish us, or if eating a lot of meat helps us or hurts us." A third participant stated, "I sometimes don't understand what's going on because when I was little everyone used to say that meat, eggs and milk were good for you and now they tell you to avoid eggs, beef."

Participants in nine focus groups indicated that they would like to have information on how to lose weight. Participants in nine focus groups also mentioned information about healthy food for their children. One participant stated, "I would like to know how to feed my children, to put them on a diet, because they're overweight." According to another participant, "How to feed your children better. We get some information I would like to go deeper, because kids love to snack and I have that problem with my child. I'd like to know what's going on with that, what I should give him." A third participant stated, "There is also the belief that the fatter the kid is the healthier he is, because my daughters are skinny and my father keeps saying to me, 'look at them, they're starving.'"

Participants in four focus groups mentioned learning about how to cook certain foods such as vegetables. One participant stated, "It would be good to have a program that teaches kids about eating vegetables, or to tell parents how to cook vegetables. They sometimes don't eat them because they haven't even tried them."

Participants in three focus groups mentioned new recipes. Participants in three focus groups also mentioned food safety. One participant stated, "How long can certain foods be in the refrigerator after we cook them. Or beef, we usually thaw it in the microwave, but there are some people who take it out in the morning and freeze it again at night. I would like to know about the spoiling process." Another stated, "Last year I got salmonella because I didn't cook a chicken properly. I didn't know about bacteria or disease, but the doctor told me I got it because I ate something improperly cooked. Then I learned not to leave meat thawing outside, to leave it in the refrigerator the day before."

Participants in two focus groups mentioned they would like to learn how to read and interpret food labels. According to one participant, "This information [food product labels] is there because the government requires companies to put it there but we don't know what it means." Another participant stated, "My son says 'look mom this has 100 calories,' but I don't know if that is a lot or not."

Participants in five of the 12 focus groups were asked what would make them change their eating habits. The themes emerging from responses to this question are shown below.

What Would Make You Change Your Eating Habits?

Theme	*Number of Focus Groups Mentioning Theme*
Getting sick	5
Diabetes	4
A need to lose weight	4
High blood pressure	1
A change of season	1

Note: this question was covered in five of the 12 focus groups.

Participants in all five of the focus groups that addressed this question indicated that "getting sick" would make them change their eating habits, without indicating a specific illness or disease. Participants in four focus groups specifically mentioned diabetes. Participants felt that diabetes was common in the Hispanic communities where they lived. According to one participant, "For Mexicans diabetes is new. I would say … diabetes wasn't that common among people in the past. … My mother used to say that this is because there wasn't enough money to buy a lot of the junk that we can buy now."

Participants in four focus groups indicated that a need to lose weight would make them change their eating habits. Participants in one focus group each mentioned high blood pressure and a change of season (i.e., eating different foods in the winter than in the summer).

Finally, participants were asked what their advice would be if nutrition classes were set up. The themes emerging from responses to this question are shown below. Participants offered advice in three main areas: scheduling classes, class content, and advertising classes.

If We Were to Set Up Nutrition Classes, What would be Your Advice?

Theme	*Number of Focus Groups Mentioning Theme*
Schedule them at convenient times and locations	8
Provide information in Spanish	6
Provide written materials (flyers, leaflets, etc.)	6
Have oral presentations	5
Have cooking demonstrations	5
Advertise through the mass media (TV, radio, etc.)	4
People don't read written materials	3
Advertise through churches	2
Advertise at work locations	2
Advertise using flyers sent home from my children's school	2
Have programs for children	1
Don't have lessons	1
Advertise through the Hispanic Council	1
Advertise through health clinics	1
Advertise through targeted mailings	1
Send out reminders before the classes	1

With respect to scheduling, participants in eight focus groups recommended that classes be scheduled at convenient times and locations. Participants generally recommended that they be held on weekends, although they felt that even then some people would have scheduling conflicts. One participant stated, "Maybe a weekend, on a Sunday, because there are people who work on Saturdays." Another stated, "Not on Saturdays because there are parties or you talk your children to the park." A third participant noted, "There are some companies where you have to work even on Sundays." Two participants indicated that Friday was a good day for them. One participant recommended holding classes at varying times: "The schedule has to vary because there are people who work different shifts." Participants also recommended that they be held in the afternoon or in the evening, not in the morning.

In terms of location, participants recommended holding classes at local schools as well as the places where these focus groups were held. One participant recommended holding them on-site at work locations, subject to the employer's approval: "You would have to go to the mushroom farms where people live and at the time they set for you, because they don't have a set schedule. Their bosses [would have to] agree to let them come at a specific hour."

With respect to class content, participants in six focus groups recommended that written and oral information be provided in Spanish. One participant stated, "I read whatever I get in the mail if it's in Spanish but if it's in English I don't read it, I just throw it away." Another stated, "There should be more information available for reading. There is now but it's in English, and we don't know English." One participant recommended against using interpreters: "It's not the same when you have an interpreter. You get upset with the interpreter, you feel bad, you think you're a burden on the interpreter."

Participants in six focus groups recommended that written materials be provided, either alone or in

conjunction with nutrition classes. According to one participant, "I'm busy all the time. I'd rather have some written information because I can't attend another activity." Another participant stated, "The best thing would be to combine the two things, give an explanation or show us how to do something, then we get a leaflet to reinforce it."

On the other hand, participants in three focus groups recommended against written materials because they felt that people cannot or do not read them. One participant stated, "There are lots of people who don't have time to read or who don't like to read. I would say that talks or videos are better because people would be paying attention to something." Another participant indicated, "There are a lot of people who don't know how to read. This means no reading, [but instead] talking and showing them some pictures, the [food guide] pyramid in colors."

Participants in five focus groups recommended using oral presentations. According to one participant, "Reading materials … would be a waste of time because sometimes people get information and they just throw it away. You should have a group like this [focus group]. You bring in a person who explains things and you go over some material. When you read you might have a question and who is going to answer it."

Participants in five focus groups also recommended having cooking demonstrations, particularly ones in which people participate and share food. According to one participant, "It would be nice to have an incentive to come … [such as] if you bring the ingredients and prepare the food here and share the dishes. … You might make a dish from each country and share it." Another participant felt that the nutrition classes should be "like a festival, so you can also get to know other food because there might be good, nutritious, and tasty food from other cultures."

A participant in one focus group recommended against having lessons: "Lessons wouldn't work. … Like English classes, we don't know English but people don't come, or computer lessons and there are just a few people who come." A participant in one focus group also recommended having programs for children.

With respect to advertising classes, participants had a diverse range of suggestions. Participants in four focus groups recommended advertising through the mass media (TV, radio, newspapers, and posters). Participants at two focus groups each mentioned advertising at local churches and at work locations. Participants in two focus groups also recommended advertising via flyers sent home from their children's school. Other recommendations included advertising through the local Hispanic Council, through health clinics, and through targeted mailings. One participant stated advertising should be done "the same way you announced this focus group." One participant recommended sending out reminders prior to any classes: "People who are organizing any kind of program sometimes have to call a person 10 times to see if they want to come and take a nutrition class."

Conclusions

More than 50,000 Latino farm/industry workers migrate to Pennsylvania each year for the harvests—a subset of the 5 million that come to the United States. These workers are a critical part of the state and national agricultural industry, yet little is known about their health and nutrition.

This study used quantitative and qualitative research methodologies (focus group interviews and survey) to gain insight on the health and nutrition context of migrant farm workers in five Pennsylvania counties. The findings from this study indicate that the migrant population is a diverse one, and its composition

varies from county to county. The population consists mainly of Spanish speaking workers from Mexico. Some are "settled," while others follow a migrant stream originating in Florida and moving on to New York or Indiana after their work in Pennsylvania.

Migrant farm workers often face physically demanding labor, crowded and unsanitary housing conditions, poverty, and suffer from food insecurity and hunger. This study examined the level of food security of migrant farm workers. While the majority of the participants surveyed were in the food secure category, 3.5% of the participants were in the food insecure without hunger category. Under the food insecure with moderate hunger category, there were 14 (3.5%) participants. Under the food insecure with sever hunger category, there were 5 (1.2%) participants. Food security is more of a problem among the CPS sample compared to the PA sample, with the exception of food insecure moderate and severe hunger categories. The PA sample is less likely to report ever engaging in all behaviors that indicate food insecurity. More of the Pennsylvania sample participates in the school breakfast and lunch programs while more of the CPS sample participates in WIC, Food Stamps, and food pantries. This information can help inform the development of sound policy surrounding utilization of food assistance programs (especially the school food programs), and contribute to outreach education programs. Including more culturally appropriate nutrition education with a parent component through the school breakfast and lunch programs, could be an effective method of intervention for this audience.

When the 24 hour recall intake data was analyzed, we found that a considerable number of participants did not meet the recommended levels for intake of food groups and/or certain nutrients. A large number of participants reported consuming no fruit, vegetables, or dairy products. The 24-hour dietary recall was helpful in studying this audience. This set of data could be used as pilot or preliminary data for further research on this population and for targeting and developing nutrition education interventions for covering the specific needs of this population. Specific educational interventions could focus on efforts to increase consumption of fruit, vegetables, and dairy products.

The focus group interview data revealed additional information that could help explain the results from the survey. The participants appeared to be concerned with a variety of nutrition and diet-related health issues, including diabetes, heart disease, obesity, and anemia. Focus group participants cited issues affecting their food choices as flavor, habit, tradition, and pleasure. Price, perception that American foods have a low quality and are expensive, a lack of transportation, language barrier, being unfamiliar with where they live and what foods are available, and a difficulty in identifying food by their name were mentioned as barriers to adequate access and consumption.

Participants in all focus groups mentioned that their eating habits have changed dramatically since being in the United States, such as not eating as many fresh fruits and vegetables because of the perceived poor quality and high price. They all stated that they have increased their consumption of foods from restaurants like McDonald's and restaurants that have buffets.

The food sufficiency practices mentioned were sharing with friends and family, not eating or drinking certain foods and beverages because of the cost, eating a lot of beans, rice and tortillas, buying food on sale, eating less and making good use of leftover foods. None of the participants mentioned participation in food assistance programs such as Food Stamps, WIC, soup kitchens, churches, or food banks.

The participants made suggestions regarding the content and format for educational programs. They stated that they need information about how to feed babies and children, how to make more nutritious and cheaper food, how to use American foods, weight loss information for both children and adults, and information about diabetes. All mentioned that the programs should be fun, interactive, should be in

Spanish, and should involve cooking.

The educational model used by Cooperative Extension's Expanded Food and Nutrition Education Program (EFNEP) could be an effective approach for reaching this target audience. EFNEP funding has been available to all 50 states and US territories through the U.S. Department of Agriculture for more than 30 years. EFNEP utilizes a group of paraprofessionals (lay educators) who work with individuals and/or small groups of limited resource audiences. EFNEP helps children, youth and young families with limited resources develop the knowledge, skills, attitudes, and behavior needed to improve their diet. Families learn to make informed choices about low-cost, nutritious foods; to better manage family finances; and to become more self-sufficient.

Through an experiential learning process, adult EFNEP program participants learn how to make good choices to improve the nutritional quality of the meals they serve their families. They participate in a series of at least twelve lessons based on the *Food Guide Pyramid* and the *Dietary Guidelines for Americans.* The hands-on, learn-by-doing approach allows the participants to gain the practical skills necessary to make positive behavior changes. They increase their ability to select and buy food that meets the nutritional needs of their families and they gain new skills in food preparation, storage, safety, and sanitation. They also learn to better manage food budgets, including the use of Food Stamps and WIC coupons. EFNEP provides individualized education in the participants' home or in sites convenient to participants.

The EFNEP also provides a series of nutrition lessons to help children and youth develop healthy eating patterns and skills in preparing nutritious meals and snacks. The youth EFNEP program emphasizes a variety of delivery modes for reaching youth, from traditional classroom settings and after-school programs during the school year to day camps and youth group activities during the summer. The youth curriculum emphasizes learning by experience and reflection, and is adaptable to a wide variety of educational settings.

The EFNEP could be expanded or a similar model be developed to provide culturally appropriate education in Spanish to the migrant farm workers and their families. Specific attention could be made to help participants deal with the issues mentioned in the focus group interviews.

Recommendations

The challenging health, working and living conditions of such a vital segment of our population - and state economy - has been ignored for too long a period of time. The need for developing a nutrition and health policy and research agenda for migrant farm workers is evident. The health issues affecting farm workers and their families must become a permanent part of the public policy efforts in Pennsylvania. It is important to create a central focus for issues on farm worker health, food security, and nutrition. Interest and attention to the conditions of agricultural workers has not received sustained, visible commitment from the public. Presently, these conditions often go unnoticed by the general public and thus receive limited public policy attention.

Information Systems

There is not sufficient information, which is readily available to develop specific recommendations on migrant farm workers. While the data obtained from this study provide a better understanding of the

nutrition and health context of the migrant farm worker population in Pennsylvania, it is clear that more coordinated information is needed for future studies and recommendations.

1. Create an ongoing assessment of health and nutrition-related issues of migrant farm workers and family members in Pennsylvania.
2. Conduct additional research, which includes data on the physical, mental and behavioral health and social context of migrant farm workers in Pennsylvania. Future plans should include the development and administration of a statewide survey of this population surrounding these issues. The qualitative data obtained from the focus group and key informant interviews can be used to inform survey development. The survey should encompass: 1) levels of health care utilization by the participants' household; 2) current health and nutrition status; 3) level of food security; 4) work history; 5) immigration status; 6) workplace conditions and training; 7) wage rates and household income; and 8) occupational conditions, safety training and injuries.

Collaborative Services

There are a substantial number of collaborative services already in place for migrant farm workers. It is important to expand and enhance these services, as well as increase awareness of and access to these services within the migrant community.

1. Establish and support local migrant farm worker service provider committees with the goal of fostering and facilitating inter-disciplinary collaborative connections and partnerships.
2. Increase the quantity and capacity of farm worker-oriented, culturally competent health care professionals. Specific actions include: short-and long-term strategies targeting recruitment, preparation and retention of medical providers; creating a program that reimburses loans for graduates who practice in agricultural communities; and fellowship programs.
3. Fund efforts to increase points of access to comprehensive health, dental and mental care where farm workers and their families live and work. Consider alternative models and methods such as mobile units that bring health care directly to farm workers in their communities.
4. Fund and develop policies that will increase outreach and access to services by those who are eligible for public programs; and develop a health care solution for those who are not eligible for public health care services.

Health, nutrition education programs

The study findings indicate a need for culturally appropriate health and nutrition education, focusing on how to prepare healthy, nutritious, and inexpensive meals as diet-related disease risk reduction.

1. Provide funding to enhance existing health and nutrition education programs such those operating through Cooperative Extension and the Health Department
2. Develop and implement educational programs that are culturally appropriate
3. Employ bilingual educators who are indigenous to the farm worker community
4. Utilize alternative program delivery methods such as mobile units and home visits

It is our hope that the information provided from our project will catalyze needed progress in improving the health of migrant farm workers. The knowledge base developed through this research project can further the development of sound health policy, contribute to appropriate education programs, and provide needed information for disease prevention and intervention planning for the migrant farm worker population.

References

(2000). Report on the Youth Labor Force, U.S. Department of Labor**:** 52-76.

(2000). Findings from the National Agricultural Workers Survey (NAWS) 1997-1998: A Demographic and Employment Profile of United States Farmworkers. Washington, D.C., U.S. Department of Labor**:** 61.

Alaniz, M. L. (1994). "Mexican farmworker women's perspectives on drinking in a migrant community." International Journal of the Addictions **29**(9): 1173-1188.

Alarcon, R. (1995). Immigrants or Transnational Workers? The Settlement Process Among Mexicans in Rural California. Davis, The California Institute for Rural Studies**:** 37.

Alderete, E. and e. a. W.A. Vega (2000). "Lifetime prevalence of the risk factors for psychiatric disorders among Mexican migrant farmworkers in California." American Journal of Public Health **90**(4): 608-614.

Baranowski, T., Cullen, K.W., Baranowski, J. (1999). Psychosocial correlates of dietary intake: Advancing dietary intervention. Annual Rev Nutr. 19:17-40.

Belton, P. (2000). "The Children who Pick Our Grapes." Peace Review **12**(3): 463-466.

Elder, J. P. and e. a. N.R. Campbell (2000). "Predictors of cigarette and alcohol susceptibility and use among Hispanic migrant adolescents." Preventive Medicine: An International Journal Devoted to Practice and Theory **31**(2, Pt.1.): 115-123.

Essa, J. S. (2001). Nutrition, health, and food security practices, concerns, and perceived barriers of Latino farm/industry workers in Virginia. Master's thesis, Virginia Polytechnic Institute and State University.

Kaiser, L., Martinez, N. M., Harwood, J. O., & Garcia, L. C. (1999). Child feeding strategies in low income Latino households: Focus group observations. Journal of the American Dietetic Association, 99*,* 601-603.

Kendall, A., Olson, C., Frongillo, E. A., & Kepple, A. (1994). Validation of the Radimer/Cornell hunger and food insecurity measures (Final Project Report to the New York State Department of Health). Ithaca, NY: Cornell University, Division of Nutritional Sciences.

Kupersmidt, J. B. and S. L. Martin (1997). "Mental health problems of children of migrant and seasonal farm workers: A pilot study." Journal of the American Academy of Child and Adolescent Psychiatry **36**(2): 224-232.

Larson, O. W., J.Doris et al. (1990). "Migrants and maltreatment: Comparative evidence from central register data." Child Abuse and Neglect **14**(3): 375-385.

Larson, O. W. and e. a. J.Doris (1987). "Child maltreatment among U.S. east coast migrant farm workers." Child Abuse and Neglect **11**(2): 281-291.

Lee, C. V., SW. McDermott, et al. (1990). "The delayed immunization of children of migrant farm workers in South Carolina." Public Health Reports **105**: 317-20.

Litrownik, A. J., J. P. Elder, et al. (2000). "Evaluation of a tobacco and alcohol use prevention program for Hispanic migrant adolescents: Promoting the protective factor of parent-child communication." Preventive Medicine: An International Journal Devoted to Practice and Theory **31**(2, pt.2): 124-133.

Marier, A. E. (1996). "A health education program for migrant children." American Journal of Public Health **86**: 590-1.

Marshall, C., & Rossman, G.B. (1999). Designing qualitative research, 3rd Edition. Thousand Oaks: Sage.

Martin, S. L., T. E. Gordon, et al. (1995). "Survey of exposure to violence among the children of migrant and seasonal farm workers." Public Health Reports **110**: 268-76.

Martinez, Y. G. and A. G. Gingras (1996). "Migrant farmworker students and the educational process: Barriers to high school completion." High School Journal **80**(1): 28-38.

Mobed, K., Gold, E.B., Schenker, M.B. (1992). Occupational health problems among migrant and seasonal farm workers. Cross Cultural Medicine: A Decade Later (Special Edition). *West J. Med*. 157:367-373.

Moretti, E. and J. M. Perloff (2000). "Use of Public Transfer Programs and Private Aid by Farmworkers." Industrial Relations **39**(1): 26-47.

Muhib, F.B., Lin, L.S., Stueve, A., Miller, R.L., Ford, W.L., Johnson, W.D., Smith, P.J. (2001). "Community Intervention Trial for Youth Study Team: A Venue-Based Method for Sampling Hard-to-Reach Populations." Public Health Reports **116**: 216-222.

Oliveira, V. and C. Gundersen (2000). WIC and the Nutrient Intake of Children. Washington, D.C., Economic Research Service, USDA**:** 22.

Pennsylvania Agricultural Statistical Service, 2001. (Report can be found on the internet at: http://www.nass.usda.gov/pa/)

Perez-Escamilla, R., Himmelgreen, D. A., & Ferris, A. (1997). Community nutritional problems among Latino children in Hartford, Connecticut (Connecticut Family Nutrition Program Technical Report No. 1, Vol. 52.). Hartford, CT: University of Connecticut and the Hispanic Health Council.

Radimer, K. L. (1990). Understanding hunger and developing indicators to assess it. Ithaca, NY: Cornell University.

Radimer, K. L., Olson, C. M., Greene, J. C., Campbell, C. C., & Habicht, J. P. (1992). Understanding hunger and developing indicators to assess it in women and children. Journal of Nutrition Education, 24(Suppl. 1), 36S-44S.

Reichard, L. (2002). Undocumented No More: Demand for Matriculas Intensifies in the Wake of 9/11. Rural California Report. **13:** 3-9.

Runsten, D. and M. Kearney (1994). A Survey of Oaxacan Village Networks in California Agriculture. Davis, California Institute for Rural Studies**:** 42.

Rural Opportunities, Inc., 2002. Available at: http://www.ruralinc.org.

Sherman, J., D. Villarejo, et al. (1997). Finding the Invisible Farm Workers: The Parlier Survey. Davis, The California Institute for Rural Studies**:** 44.

Slesinger, D. P. (1992). "Rural Health Care: Innovation in a Changing Environment: Review."

Slesinger, D. P. (1985). "Migrant Farmworkers in Wisconsin." Rural Development Perspectives: 35-38.

Slesinger, D. P. (1992). "Health Status and Needs of Migrant Farm Workers in the United States: A Literature Review." The Journal of Rural Health **8**(3): 227-234.

Slesinger, D. P., B. A. Christenson, et al. (1986). "Health and Mortality of Migrant Farm Children." Social Science and Medicine **23**(1): 65-74.

Slesinger, D.P. and Monson, R.A. (1994). Health Status and Barriers to Care Among Wisconsin's Farm Households. *As you Sow: Social Issues in Agriculture*. No. 32 Dept of Rural Sociology, University of Wisconsin.

Slesinger, D. P. and C. Ofstead (1993). "Economic and Health Needs of Wisconsin Migrant Farm Workers." Rural Health Policy **9**(2): 138-148.

Slesinger, D. P. and Y. Okada (1984). "Fertility Patterns of Hispanic Migrant Farm Women: Testing the Effect of Assimilation." Rural Sociology **49**(3): 430-440.

Slesinger, D. P. and M. J. Pfeffer Migrant Farm Workers. Poor People and Poor Places.

Tan, G. G., M. P. Ray, et al. (1991). "Migrant farm child abuse and neglect within an ecosystem framework." Family Relations: Journal of Applied Family and Child Studies **40**(1): 84-90.

U.S. Department of Labor (2000). "Findings from the National Agricultural Workers Survey (NAWS) 1997-1998: A Demographic and Employment Profile of United States Farmworkers." Research Report No. 8, March 2000.

Van Hightower, N. R., J. Gordon, et al. (2000). "Predictive Models of Domestic Violence and Fear of Intimate Partners Among Migrant and Seasonal Farm Worker Women." Journal of Family Violence **15**(2): 137-154.

Vega, W. A., B. Kolody, et al. (1998). "Lifetime Prevalence of DSM-III-R Psychiatric Disorders Among Urban and Rural Mexican Americans in California." Archives of General Psychiatry **55**: 771-778.

Villarejo, D. and Baron, S. (1999). The occupational health status of hired farm workers. *Occupational Medicine: State of the Art Review*. 14 (3): 613-635.

Watkins, E. L., C. Harlan, et al. (1994). "Assessing the effectiveness of lay health advisors with migrant farmworkers." Family and Community Health **16**(4): 72-87.

Winicki, J. (2001). "Low-Income Families Participating in Fewer Assistance Programs." Food Review **24**(2): 38-44.

Young, F. (1999). *Small towns in multilevel society*. New York: University Press of America.

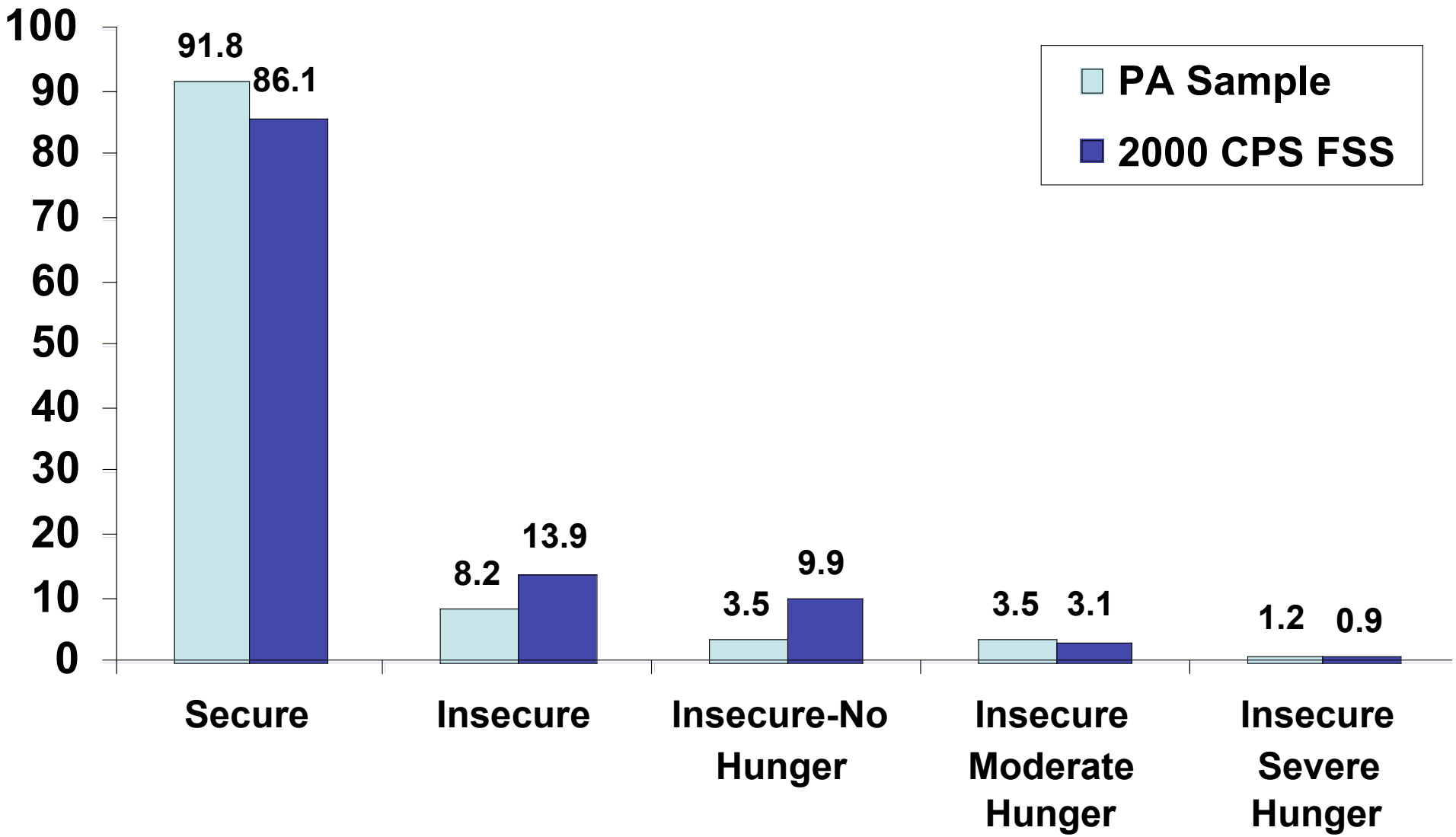

Figure 2. Comparing Food Security among the PA and CPS Samples

Table 1. Demographic Characteristics.

Questions	N	%
Age		
Mean (std. dev.)	32.0 (10.5)	
Gender		
Male	190	47.4
Female	211	52.6
Total	401	100.0
Where were you born		
Mexico	308	76.8
United States	24	6.0
Other country	69	17.2
Total	401	100.0
How many years have you lived in the US		
All my life	17	4.2
Number of years (mean, std. dev.)	384 (8.1, 7.6)	95.8
Total	401	100.0
What language do you usually speak at home?		
Mostly English	17	4.2
Mostly Spanish	325	81.0
Both equally	59	14.7
Total	401	100.0
Do you consider yourself to be Hispanic, Mexican, or Latino		
Yes	400	99.8
No	1	0.2
Total	401	100.0
How many years of school have you completed		
Mean (std. dev.)	8.0 (3.7)	
Where did you receive all or most of your education		
Mexico	301	75.8
United States	37	9.3
Other country	59	14.9
Total	397	100.0
In which assistance programs does your family currently participate		
WIC	112	27.9
Head Start	41	10.2
Food Pantries	3	0.7
SSI	4	1.0
Medicaid	0	0.0
CHIP	0	0.0
School lunch	98	24.4
School breakfast	67	16.7
Summer food program	5	1.2
TANF (Temporary Assistance to Needy Families)	2	0.5
Food Stamps	26	6.5
Other	9	2.2

What is the approximate monthly income for your household		
Less than $500 per month	8	2.0
$501-750 per month	17	4.3
$751-1,000 per month	49	12.3
$1,001-1,250 per month	73	18.3
$1,251-1,500 per month	56	14.0
$1,501-1,750 per month	42	10.5
$1,751-2,000 per month	40	10.0
$2,001-2,500 per month	39	9.8
More than $2,500 per month	43	10.8
Declined to state	28	7.0
Doesn't know	3	0.8
Doesn't work	2	0.5
Total	400	100.0
How much did you pay for housing last month		
Mean (std. dev.)	323.9 (251.8)	

Table 2. Frequency of responses to the food security questionnaire.

Questions	N	%
Which of the following best describes your situation		
We had enough of the kinds of food we wanted to eat	109	27.2
We had enough but not always what we wanted to eat	139	34.7
Sometimes there was not enough food	98	24.4
Often there was not enough food	55	13.7
Total	401	100.0
Which best describes the food eaten in your household		
Always have enough to eat and the kinds of food we want	348	87.4
Have enough to eat but not always the kinds of foods we want	31	7.8
Sometimes we don't have enough to eat	18	4.5
Often we don't have enough to eat	1	0.3
Total	398	100.0
Worried whether our food would run out		
Often	8	2.0
Sometimes	32	8.0
Never	360	90.0
Total	400	100.0
The food we bought just didn't last		
Often	2	0.5
Sometimes	36	9.0
Never	362	90.5
Total	400	100.0
Couldn't afford to eat balanced meals		
Often	5	1.3
Sometimes	23	5.8
Never	360	90.0
Doesn't know	12	3.0
Total	400	100.0
Relied on a few kinds of low-cost food		
Often	4	0.99
Sometimes	20	4.98
Never	376	93.76
Doesn't know	1	0.245
Total	401	100.0
Couldn't feed our children a balanced meal		
Often	2	0.498
Sometimes	15	3.74

Never	379	94.51
Doesn't know	5	1.24
Total	401	100.0
Children were not eating enough		
Often	1	0.25
Sometimes	15	3.74
Never	385	96.0
Total	401	100.0
Did you ever cut the size of your meals or skip meals		
Yes	20	4.99
If yes, how often did this happen:		
Almost every week	0	
Some weeks but not every week	16	
Only 1 or 2 weeks	4	
No	381	95.01
Total	401	100.0
Did you ever eat less than you felt you should		
Yes	20	4.98
No	381	95.02
Total	401	100.0
Were you ever hungry but didn't eat		
Yes	18	4.48
No	383	95.52
Total	401	100.0
Did you lose weight because you didn't have enough money to buy food		
Yes	5	1.25
No	396	98.75
Total	401	100.0
Did you ever not eat for a whole day		
Yes	2	1.7
If yes, how often:		
Almost every week	0	
Some weeks but not every week	1	
Only 1 or 2 weeks	1	
No	399	99.51
Total	401	100.0
Did you ever cut the size of your child's meals		
Yes	7	1.74

No	394	98.25
Total	401	100.0
Did your child ever skip meals		
Yes	10	2.49
If yes, how often:		
Almost every week		
Some weeks but not every week	6	
Only 1 or 2 weeks	4	
No	391	97.5
Total	401	100.0
Was your child ever hungry, but you couldn't afford more food		
Yes	8	1.99
No	381	98.01
Total	401	100.0
Did your child ever not eat for a whole day		
Yes	0	0.0
No	401	100.0
Total	401	100.0

Table 3. Levels of food security

Levels of food security	Number	(%)*
Food secure	368	91.8
Food insecure without hunger	14	3.5
Food insecure with hunger, moderate	14	3.5
Food insecure with hunger, severe	5	1.2

* The percentage was calculated based on the total number of 401.

Table 4. 1999/2000 CPS Farm Worker Sample	
Gender	
Male	81.9
Female	18.1
Total	
Where were you born	
Mexico	20.9
United States	72.9
Other country	6.2
Total	
How many years have you lived in the US	
All my life	72.9
5 years or less	10.3
5-10 years	6.3
10 or more years	10.6
Do you consider yourself to be Hispanic, Mexican, or Latino	
Yes	28.5
No	71.5
Educational Attainment	
Less than high school	45.5
High school education	30.7
More than high school, no college	17.2
College education or higher	6.6
In which assistance programs does your family currently participate	
WIC	6.9
Food Pantries	3.0
School lunch	12.1
School breakfast	8.2
Food Stamps	6.1
Median dollars usually spent on food each week	$100.00
Poverty Status	40.2

Table 5. Food Security Among the 1999/2000 Farm Worker Sample	%
Worried whether our food would run out	
Often	3.9
Sometimes	14.0
Never	82.1
The food we bought just didn't last	
Often	2.5
Sometimes	13.8
Never	83.7
Couldn't afford to eat balanced meals	
Often	1.9
Sometimes	9.8
Never	88.3
Relied on a few kinds of low-cost food	
Often	1.8
Sometimes	9.8
Never	88.3
Couldn't feed our children a balanced meal	
Often	.80
Sometimes	6.0
Never	93.2
Children were not eating enough	
Often	.80
Sometimes	4.1
Never	95.1
Did you ever cut the size of your meals or skip meals	
Yes	.80
No	99.2
Did you ever eat less than you felt you should	
Yes	7.8
No	92.2
Were you ever hungry but didn't eat	
Yes	2.9
No	97.1
Did you lose weight because you didn't have enough money to buy food	
Yes	1.6
No	98.4
Did you ever not eat for a whole day	
Yes	1.4
No	98.6

Did you ever cut the size of your child's meals	
Yes	.80
No	99.2
Did your child ever skip meals	
Yes	.80
No	99.2
Was your child ever hungry, but you couldn't afford more food	
Yes	.6
No	99.4
Did your child ever not eat for a whole day	
Yes	.20
No	99.8

Table 6. Demographic Characteristics.

Questions	N	%
Age		
Mean (std. dev.) Range 18 to 68 years	32.07 (10.15)	
Gender		
Male	192	47.8
Female	210	52.2
Total	402	100.0
Where were you born		
Mexico	308	76.6
United States	25	6.2
Other country	69	17.2
Total	402	100.0
How many years have you lived in the US		
Number of years (mean, std. dev.) Range: 1 month-45 years	8.37 (7.44)	
Total		
What language do you usually speak at home?		
Most English	11	2.7
Most Spanish	324	80.6
Both equally	67	16.7
Total	402	100.0
Do you consider yourself to be Hispanic, Mexican (or country of origin), orLatino		
Yes	402	100.0
No	0	0.0
Total	402	100.0
How many years of school have you completed		
Mean (std. dev.) Range 0 to 18 years	8.08 (3.72)	
Where did you receive all or most of your education		
Mexico	317	79.6
United States	46	11.6
Other country	35	8.8
Total	398	100.0
In which assistance programs does your family currently participate		
WIC	126	31.3
Head Start	44	10.9
Food Pantries	3	0.7
SSI	7	1.7
Medicaid	2	0.5
CHIP	0	0.0
School lunch	112	27.9

School breakfast	85	21.1
Summer food program	3	0.7
TANF (Temporary Assistance to Needy Families)	11	2.7
Food Stamps	3	2.8
Unemployment	1	0.2
Housing Welfare	11	2.7
What is the approximate monthly income for your household		
Less than $500 per month	8	2.0
$501-750 per month	15	3.7
$751-1,000 per month	51	12.7
$1,001-1,250 per month	68	16.9
$1,251-1,500 per month	55	13.7
$1,501-1,750 per month	36	9.0
$1,751-2,000 per month	47	11.7
$2,001-2,500 per month	43	10.7
More than $2,500 per month	52	12.9
Declined to state, does not know, or does not work	27	6.7
How much did you pay for housing last month		
Mean (std. dev.)	333.89(264.07)	
How much money do you spend weekly on food		
Mean (std. dev.) Range 11.67 to 150 dollars	39.38 (21.20)	
How many people are in your household		
Mean (std. dev.)	5.31(3.17)	
How many states have you lived in the USA		
Mean (std. dev.) Range 1 to 9 states	1.60 (1.04)	
Do you send money to your country of origin		
Yes	108	26.9
No	294	73.1
Total	402	100.0
Are you pregnant		
Yes	15	3.7
No	387	96.3
Total	402	100.0
Are you breastfeeding		
Yes	14	3.5
No	388	96.5
Total	402	100.0
Are you taking supplements		
Yes	86	21.4
No	316	78.6

Total	402	100.0
Do you have any physical activity (some people mentioned their job as a physical activity)		
Yes	137	34.1
No	265	65.9
Total	402	100.0
Did you gain weight when you just got to the USA		
Yes	231	57.5
No	145	36.1
Not applicable, do not remember	26	6.5
Total	402	100.0
Have you gained weight in the last year		
Yes	135	33.6
No	251	62.4
Not applicable, do not remember	16	4.0
Total	402	100.0
Did you change your eating habits and food choices when you got to the USA		
Yes	258	64.2
No	125	31.1
Not applicable, do not remember	19	4.7
Total	402	100.0

Table 7. Mean macronutrients intake and percentage of calories of migrant workers in PA.

	Mean (std dev)	
	N	**%**
Carbohydrates	**50.5 (10.6)**	
<25%	6	1.5
25-49%	173	43.0
50-60%	160	39.8
>60%	63	15.7
Total	402	100.0
Fat	**32.1 (7.8)**	
<20%	17	4.2
20-29%	138	34.3
30-34%	100	24.9
35-39%	75	18.7
>39%	72	17.9
Total	402	100.0
Protein	**15.9 (4.7)**	
<5%	3	0.7
5-9%	19	4.7
10-14%	141	35.1
15-19%	163	40.5
>19%	76	18.9
Total	402	100.0
Ranges of Dietary Fiber Intake	**20.4 (13.8)**	
< 4 grams	28	7.0
5-15 grams	145	36.1
16-24 grams	98	24.4
25+ grams	131	32.6
Total	402	100.0

Table 8. Usual intake distribution for selected nutrients of males and females aged 19 to 50 years.

Nutrient	N	EAR^ or AI*	UL**	Mean	Percentile of usual intake distribution								Comments
					5th	10th	25th	50th	75th	90th	95th	99th	
MALES													
Calcium*	162	1000*	2500	1027.15	353.05	444.9	667.5	948.5	1276.75	1699.3	1928.8	3058.13	<75% but >50% have intakes below EAR <1% is at potential risk of risk effect
Iron	162	6	45	16.52	7	8	11	15	21.25	27	29	47.74	Prevalence of inadequacy is <1% <1% is at potential risk of risk effect
Vitamin A	162	625	3000	738.64	128.65	183.8	378.25	597	1073.75	1371.7	1749.4	2537.69	<75% but >50% have intakes below EAR
Vitamin C	162	75	2000	142.36	12	22	39	90	224.75	330.5	435.65	594.59	<50% but >25% have intakes below EAR
Vitamin B6	162	1.1	100	2.3204	0.9	1.1	1.5	2.05	3.1	3.87	4.7	6.1	Prevalence of inadequacy is at 10% or less
FEMALES													
Calcium*	168	1000*	2500	782.01	162.8	237.6	403	729	1021.5	1370.9	1860.25	2399.59	Median and mean intakes are below the AI No assumptions about inadequacy can be made
Iron	168	8.1	45	15.96	4	5	8	11	15	19.1	23	253.49	<50% but >25% have intakes below EAR <1% is at potential risk of risk effect
Vitamin A	168	500	3000	798.12	76.25	117.5	254.75	590.5	1234	1587	1995.4	4685.34	<50% but >25% have intakes below EAR <1% is at potential risk of risk effect
Vitamin C	168	60	2000	137.61	9.9	18	37	100.5	206	303.3	345.55	702.67	<50% but >25% have intakes below EAR
Vitamin B6	168	1.1	100	1.769	0.345	0.6	1.025	1.7	2.3	3.1	3.6	5.3	<50% but >25% have intakes below EAR

*=Adequate intake
^=Estimated Average Requirements
**= Upper Limit

Table 9. Mean and percent of participants eating a specific number of servings of each food group.

Food Group	Mean (Std Dev)	
	N	%
Breads and Cereals	**7.8 (5.3)**	
0 servings	14	3.5
1-3 servings	71	17.7
4-5 servings	75	18.7
6-11 servings	156	38.8
12+ servings	86	21.4
Total	402	100.0
Fruits	**2.2 (5.3)**	
0 servings	151	37.6
1 serving	75	18.7
2+ servings	176	43.8
Total	402	100.0
Vegetables	**1.9 (1.8)**	
0 servings	73	18.2
1 serving	126	31.3
2 servings	86	21.4
3+ servings	117	29.1
Total	402	100.0
Calcium/Dairy	**1.4 (1.5)**	
0 servings	133	33.1
1 serving	122	30.3
2 servings	80	19.9
3+ servings	67	16.7
Total	402	100.0
Meats & Alternatives	**2.1 (2.0)**	
0 servings	72	17.9
1 serving	114	28.4
2+ servings	216	53.7
Total	402	100.0
Other Servings	**17.2 (12.1)**	
0-4 servings	29	7.2
5-9 servings	81	20.1
10-14 servings	94	23.4
15-19 serving	65	16.2
20+ servings	133	33.1
Total	402	100.0

Note: Each “other serving” is approximately equal to 35 calories, or 1 tsp. Fat, or 2 tsp. Sugar.