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Acknowledgements

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Survey of Latino/Hispanic Adult Immigrants Living in the *Colonias* of Hidalgo County, Texas, Evaluating Reported Food Insecurity and Immigration-related Fear

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BACKGROUND

The *Colonias* and Food Insecurity

A *colonia* is defined as “a residential area along the Texas-Mexico border that may lack some of the most basic living necessities” according to the Texas Secretary of State.¹ There are approximately 2200 *colonias* along the Texas-Mexico border, with the majority of them located in Hidalgo, Cameron, El Paso, Maverick, Webb, and Starr counties.² In the past, half of all children in *colonias* have been identified as food insecure,^{3,4} which is defined by the United States Department of Agriculture (USDA) as “reduced quality, variety, or desirability of diet.” In cases of very low food security, this results in “disrupted eating patterns and reduced food intake.”⁵

Residents of *colonias* have a unique sociodemographic makeup. Along the Texas-Mexico border, 96% of the *colonias*' occupants are Latino/Hispanic and 73% are citizens of the United States.² *Colonias* have a high prevalence of poverty (about 42%), with a median household income of \$28,028 (compared to a U.S. median of \$52,762) and a 40% reliance on government assistance.^{2,6}

Immigrant families face multiple socioeconomic and geopolitical stressors — including income inequality, limited access to transportation, and concern regarding safety and legal status — that may contribute to food insecurity. *Colonia* residents have been found to consume fewer than the recommended daily intake of fruits and vegetables⁷ and have food insecurity rates as high as 51%-80% (compared to the U.S. average of 12%).^{4,8,9,10} Prior studies have found associations between food insecurity and Mexican nativity, reliance on school-based programs, parental unemployment, number of people living in the home, maternal poor health, family disruption and conflict, and parenting difficulties.^{4,11} When combatting food insecurity, it is important that food resources are “accessible,...available,...and affordable” without fear.⁹

The Food Desert Landscape of the *Colonias*

“Food desert” is a term used to describe areas with limited access to nutritious foods.⁷ This classification applies to many *colonias*, not only because of physical distance from food sources but also because of difficulty accessing transportation. Residents of *colonias* utilize several common sources of food, including grocery stores, dollar stores, flea markets, convenience stores, home markets, and large national chain stores.¹² Dollar stores have increasingly become a source of food, and the quality of this food can vary.⁷ A major concern is that access to supercenters and supermarkets, where there is a large selection of affordable and healthy options, is limited for many *colonias*.³ Proximity to supermarkets has been associated with increased intake of fruits and vegetables, regardless of socioeconomic status.^{6,7,9} In one survey of senior citizens living in *colonias* of Hidalgo County, the median distance to the nearest grocery store was 8.7 miles, to fresh fruit was 5.5 miles, and to fresh vegetables was 6.4 miles.⁷ Another major impediment to accessing any food source is lack of transportation. Public transportation is nonexistent in the *colonias*.⁷

OBJECTIVES

This convenience sample evaluation aimed to describe food insecurity in a subpopulation within the *colonias* of Hidalgo County, Texas by identifying barriers to consumption of fresh produce and assessing willingness to change dietary habits.

METHODS

In this descriptive evaluation, we partnered with health promoters from *Proyecto Azteca*, a local housing organization. This evaluation was conducted in October 2017.

Proyecto Azteca representatives discussed their need for a rapid assessment of food insecurity and interest in access to fresh fruits and vegetables. In coordination with organizational leadership and health promoters, a survey tool was developed to assess current eating habits, barriers to access to produce, and interest in dietary change. The survey also assessed food security using the Hunger Vital Sign,TM a previously validated two-question screening tool.¹³

The survey was translated into Spanish with the aid of bilingual health promoters as well as professional Spanish instructors. It was administered in English or Spanish, per the respondents' preference.

Verbal informed consent was obtained and respondents were given the option to opt out of the survey at any time. All responses were anonymous. The study was granted Institutional Review Board exemption by all academic institutions involved: Yale University, University of Texas Southwestern Medical Center, and University of Texas Rio Grande Valley.

The community organization identified four *colonias* in Hidalgo County in which to conduct the survey: Indian Hills East, Indian Hills West, Muñiz, and South Tower *colonias*. After developing the survey with the community organization, the authors accompanied the health promoters — who are known, bilingual residents of the *colonias* — to conduct door-to-door surveys. Eighty surveys in separate households were collected. Responses were recorded by the health promoters on paper survey tools, which were then destroyed after being entered into an Excel spreadsheet. The survey was administered over 4 consecutive weekdays during daytime hours to respondents who were available outside their home, as

well as through a snowball sampling technique of connections made between respondents.

Results were described as percentages or proportions.

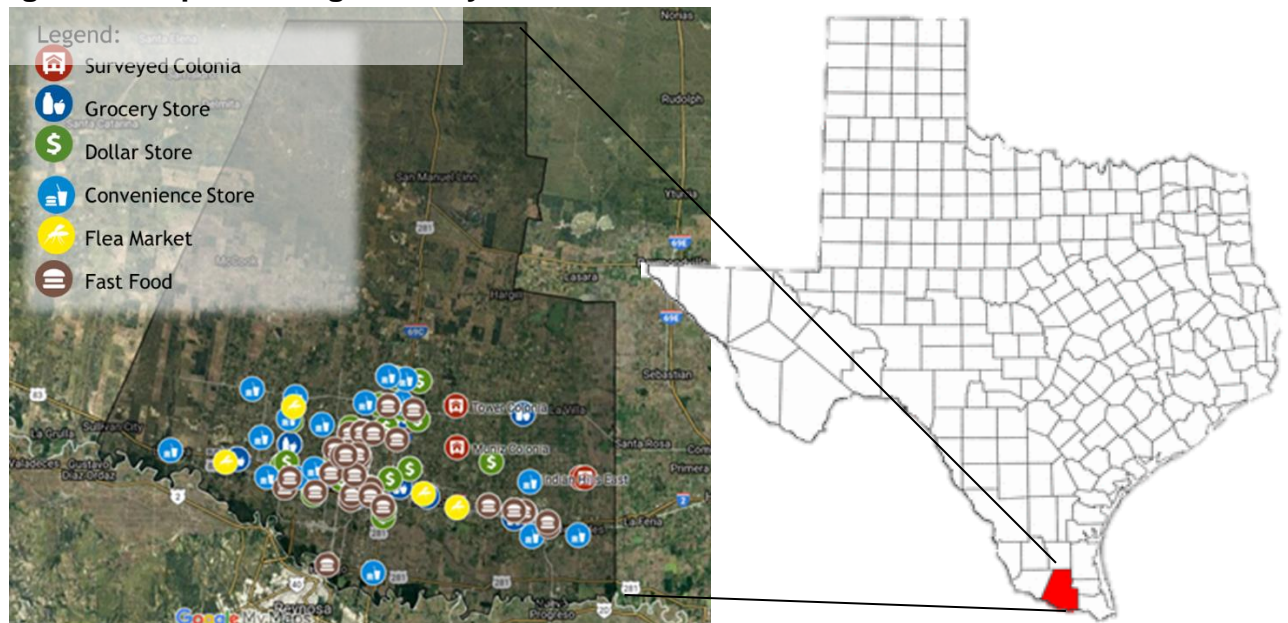
Additionally, Google mapping software was utilized to geolocate distance of these *colonias* from various food sources.

RESULTS

Geography of Hidalgo County and Colonias

Using Google mapping software, an interactive map was created to assess proximity of *colonias* surveyed (red house marker on map below) to grocery stores, dollar stores, convenience stores, flea markets, and fast-food restaurants. A composite image of this map (Figure 1) is hyperlinked to an interactive version of the map.¹⁴

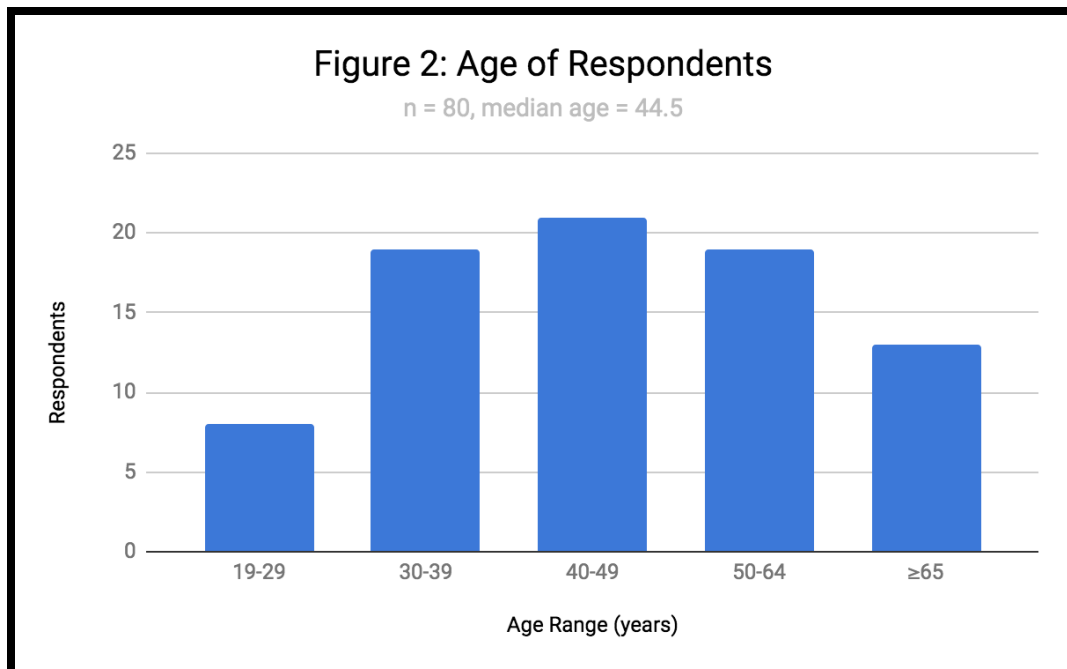
Figure 1: Map of Hidalgo County

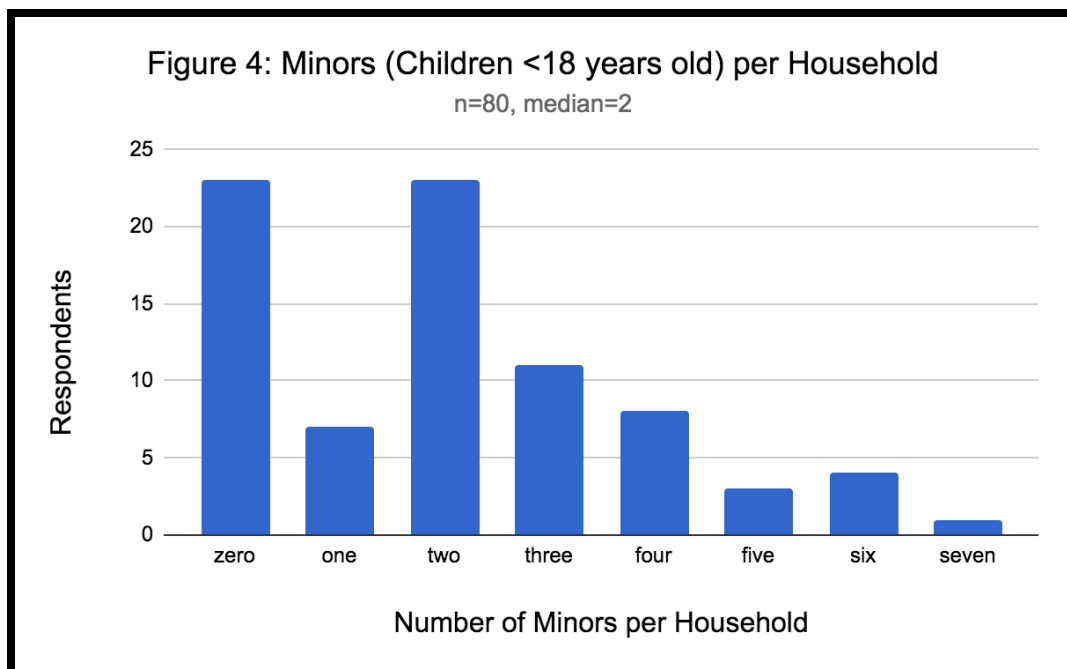
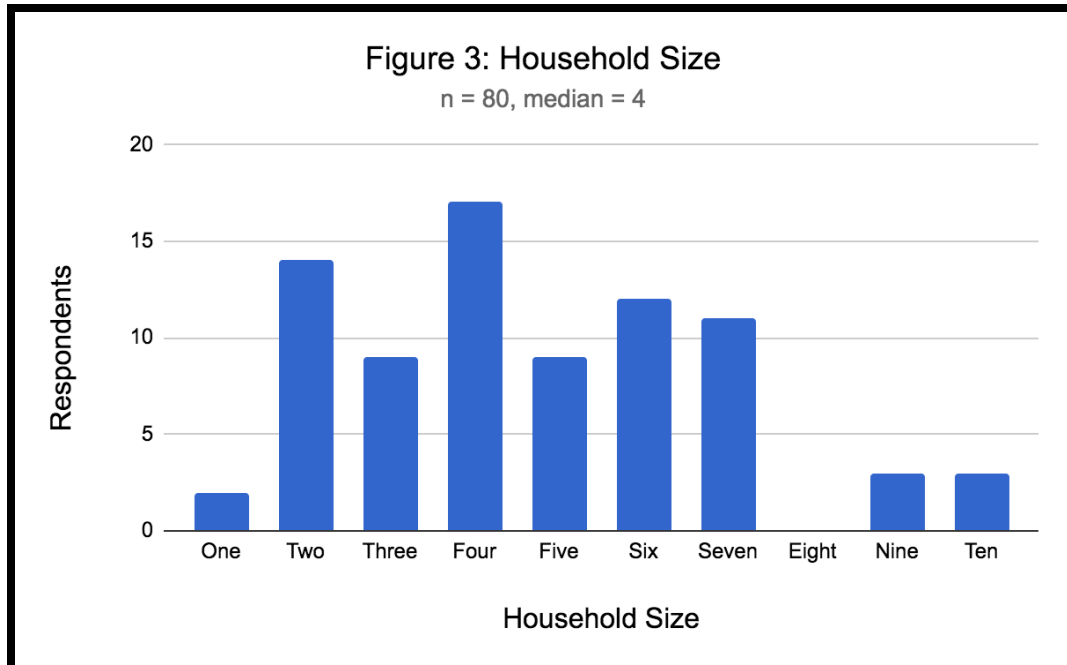


Demographics of Respondents

Of the 80 survey respondents, 34.6% were from South Tower *Colonia*, 30.9% were from Indian Hills East *Colonia*, 14.8% were from Indian Hills West *Colonia*, and 19.8% were from Muñiz *Colonia*.

All respondents were over 18 years of age. The majority (85%) were female. The median age was 44.5 years, the age range was between 19 and 90 years, and 13 respondents (16.3%) were ≥ 65 years of age (Figure 2). All respondents identified as Latino/Hispanic. Average household size was 4.7 people per household, with a median household size of 4 people per household (Figure 3). On average, there were 2.1 (median 2.0) individuals under 18 years old per household, with a range of 0-7 minors (children under 18 years old) per household (Figure 4). Most respondents (91.3%) preferred Spanish over English.

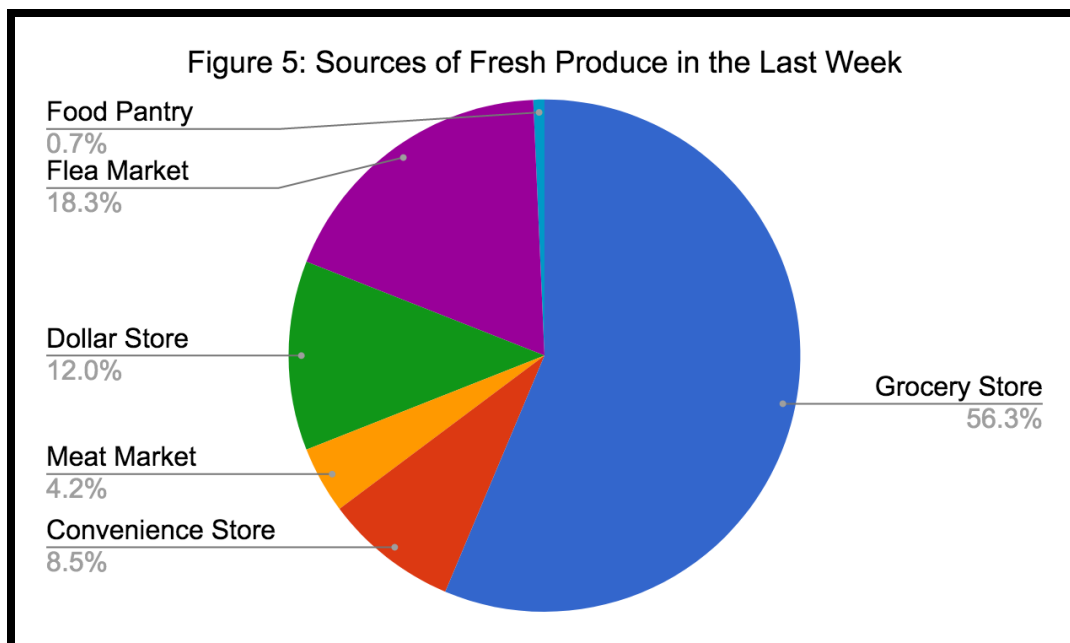




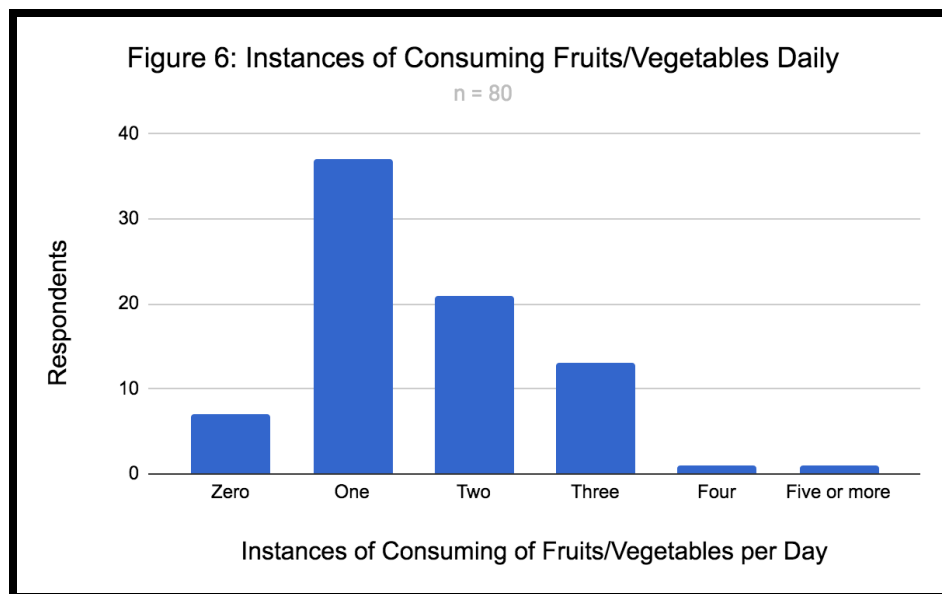
Current Habits

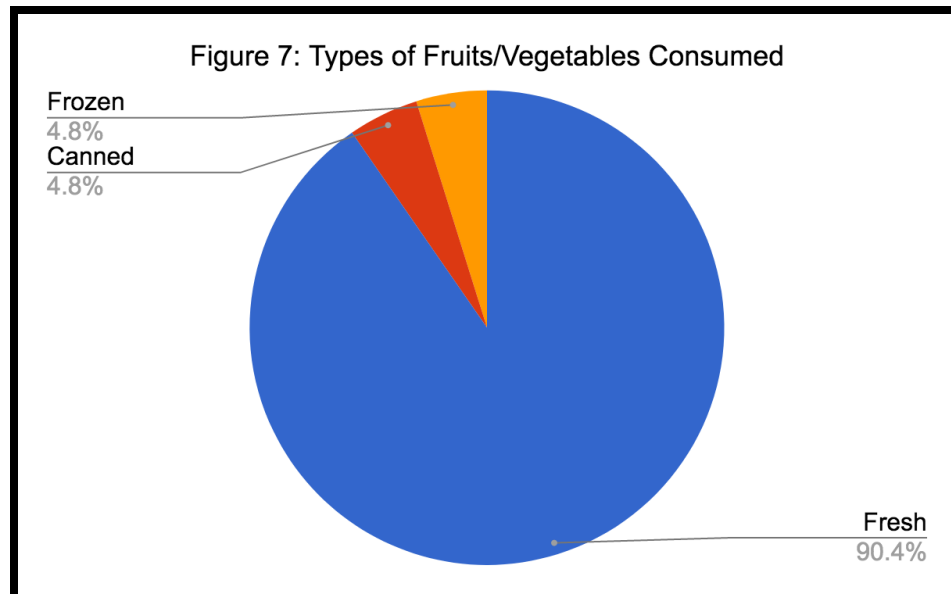
When asked to recall the previous night's dinner, most respondents reported eating a home-cooked meal (52.5%). Other reported meal choices included fast food, snacking, and pre-prepared meals. Ten percent reported not eating dinner.

When asked about source of fresh produce, over half (56.3%) of those surveyed reported purchasing produce in the prior week from a grocery store. Responses also included local convenience stores, dollar stores, flea markets, and meat markets. One person reported using a food pantry (Figure 5).



When asked about the quantity of fruits and/or vegetables eaten daily, 8.8% reported eating none. Most (46.3%) reported eating fruits and/or vegetables once daily, 26.3% reported eating twice, and 18.9% reported three instances of eating fruits and/or vegetables daily (Figure 6). The majority (90.4%) of fruits and vegetables consumed were fresh, but some did report canned or frozen fruit/vegetable consumption (Figure 7).



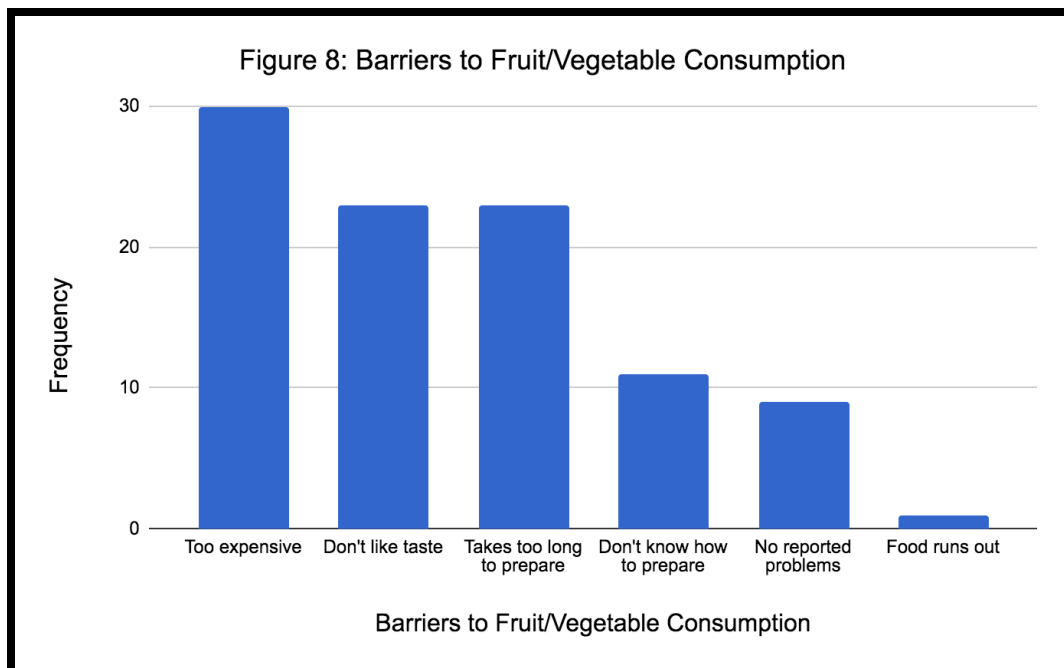


Transportation

Most respondents reported a 10- to 19-minute commute by car or carpool to the nearest grocery store and that they frequented a grocery store once a week, on average. The most frequent mode of transportation for grocery shopping was a shared family car (75.3%) or carpool (referred to in both English and Spanish as a “ride”) (23.5%). One respondent reported the use of a bicycle (1.2%). No respondents reported using public transportation (0%) or walking (0%) to obtain groceries.

Barriers to Consumption of Fruits and Vegetables

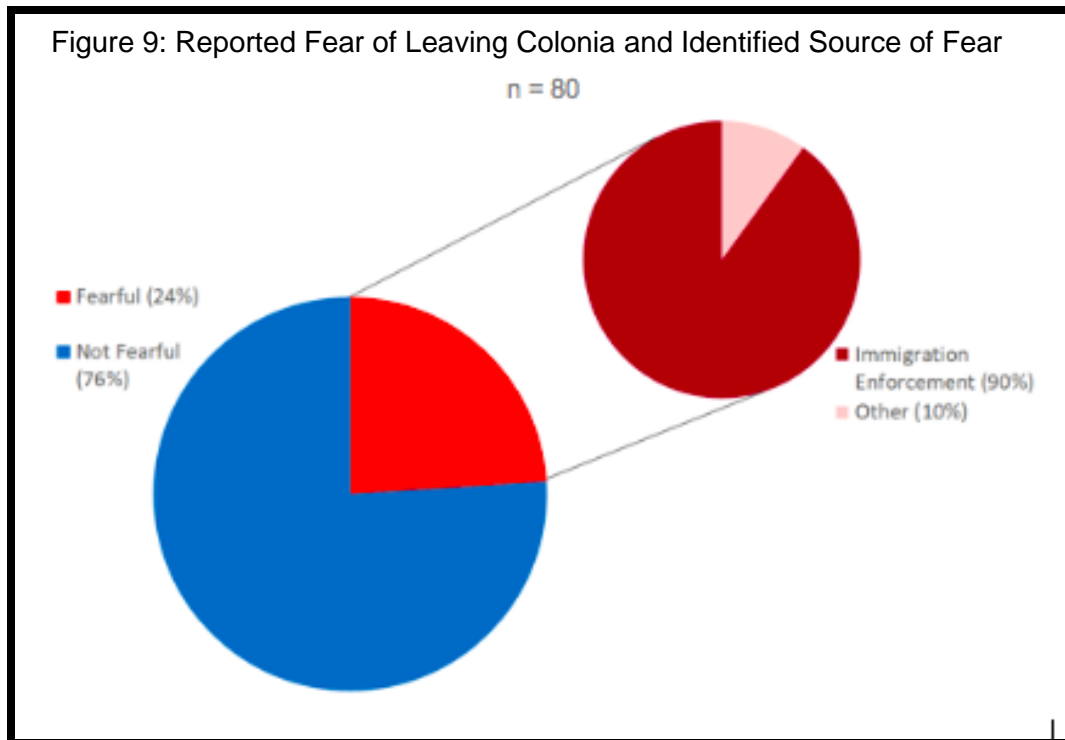
When asked about barriers to eating more fruits or vegetables, respondents reported cost, taste, and preparation time as prohibitive. Other answers included lack of knowledge about how to cook produce and that the produce runs out before the next grocery store trip. Nine percent reported that they had no concern with their fruit/vegetable consumption (Figure 8).



When asked about governmental aid, 63.8% reported using the Supplemental Nutrition Assistance Program (SNAP), Women Infants and Children (WIC), or other governmental assistance for food.

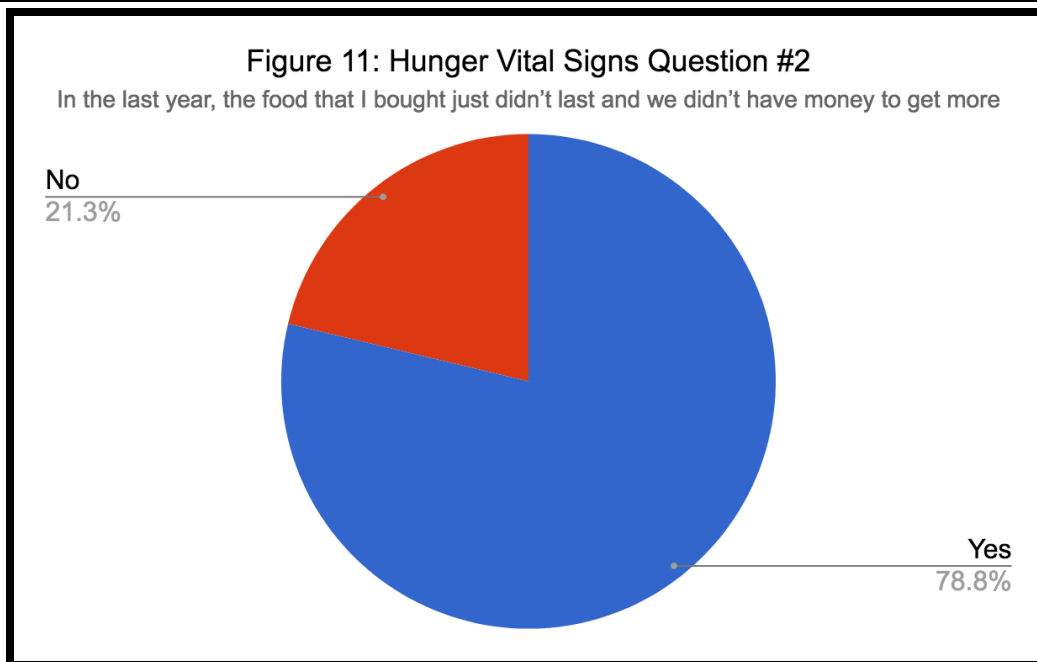
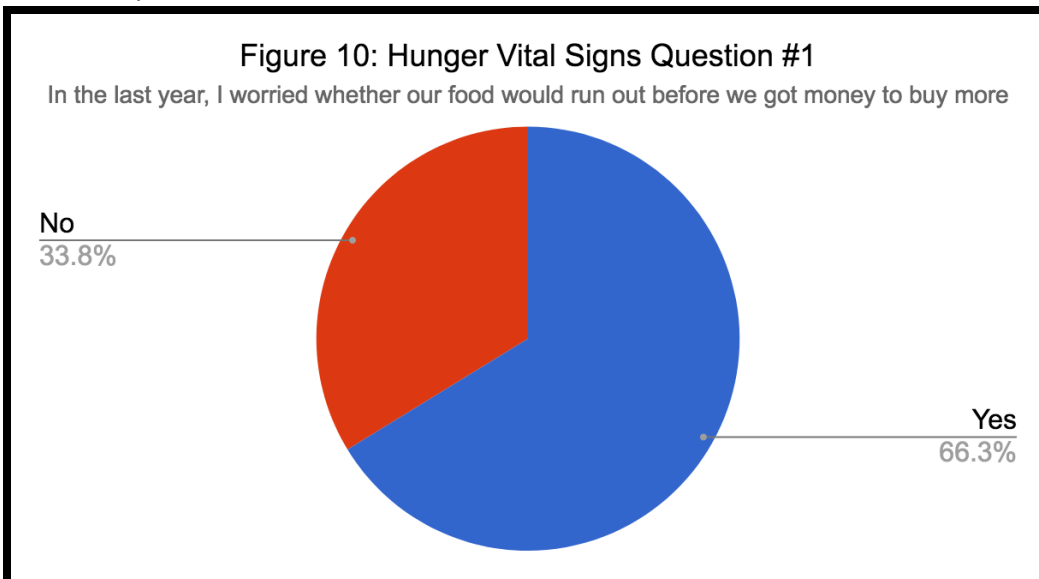
Fear of Leaving the Colonias

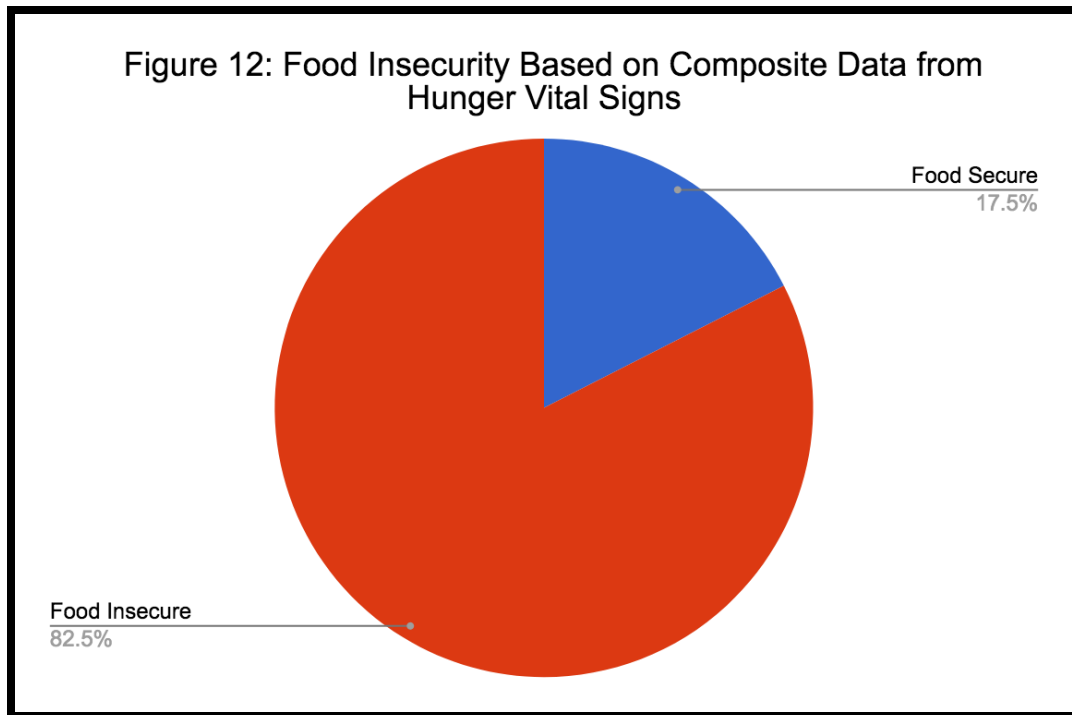
While 76.3% of respondents reported they had no apprehension about travel outside of their neighborhood, 23.8% reported fear of leaving their neighborhood due to a variety of issues. Immigration enforcement was the primary reported source of fear for 89.5% of respondents (Figure 9). Other sources of fear included safety concerns and street dogs.



Food Insecurity

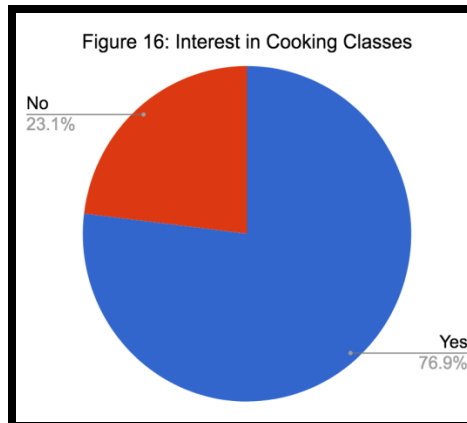
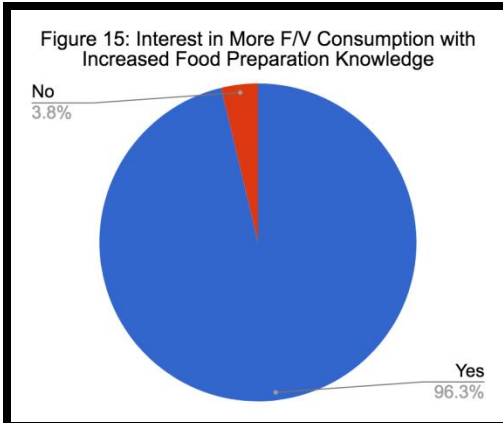
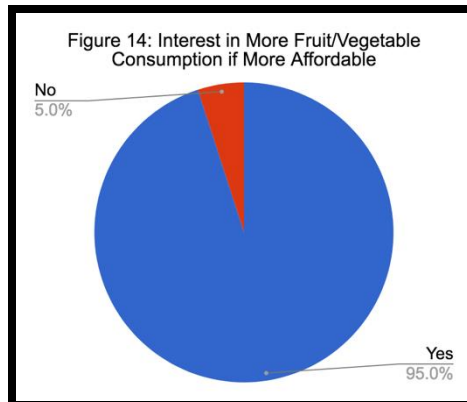
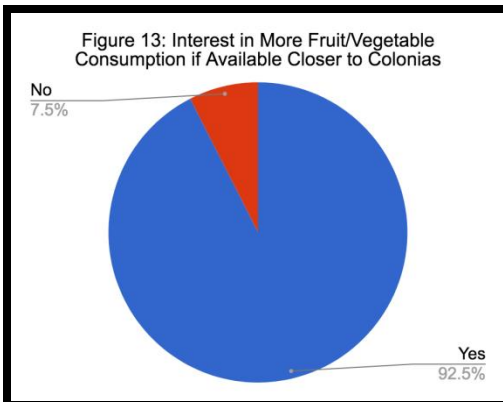
Two nationally recognized household food security questions (the Hunger Vital Sign™) were administered as part of the survey. The majority (82.5%) of respondents screened positive for food insecurity by responding “yes” to at least one of the two survey questions (Figures 10,11, 12).





Interest in Consumption of Fresh Produce

Of those surveyed, 98.8% reported that healthy eating was important to them. The one respondent who answered “No” clarified by stating that she was more concerned about having the opportunity to feel full than healthy eating habits. A vast majority also expressed a willingness to increase fresh produce consumption if the perceived barriers to access and affordability were decreased. For example, if fruits and vegetables were available closer to the *colonias* or were cheaper, 92.5% and 95% of respondents, respectively, believed they would eat more fruits and vegetables (Figures 13,14). Ninety-six percent reported that they would be willing to eat more fruits and vegetables if they knew how to prepare them and 76.9% reported interest in cooking classes (Figures 15,16).



LIMITATIONS

This descriptive evaluation has several limitations.

From a practical standpoint, during the surveying process, there was a credible fear of attack from street dogs, so surveyors were not able to systematically select random houses to approach or to perform the survey during nighttime hours.

This was a convenience sample of primarily adult female residents of *colonias* interviewed during daytime workday hours, so we could neither generalize these specific findings to all *colonia* residents nor to other settings in the US. The respondents who were available during daytime hours may have been home because of unemployment (27% of *colonia* households do not earn income from wages¹⁵), shiftwork, challenges finding or affording childcare, or fear. Although respondents answered the survey as representatives of their families, it is possible that those who were at home during the day had responses different from those who would have been available in the evening. For example, fear of immigration and food insecurity may have been more common in those who did not leave their *colonia* during the day. Because this was a descriptive assessment, we did not control for sociodemographic characteristics including age of respondents, although age was found to be normally distributed in the sample (Figure 2). It is possible that certain demographics of individuals, including female gender or older age, are associated with food insecurity. Similarly, we did not control for household size nor minors per household when assessing food insecurity. It is possible that, in our convenience sample, those we surveyed did not represent typical *colonia* household size or composition. Also, given that interviewers were known members of the community, respondents may have under- or over-reported food insecurity and/or fear. We were also unable to assess consistency of survey administration and responses elicited between the two surveyors.

DISCUSSION

According to the Pew Hispanic Research Center, 9.8% of residents in the McAllen-Edinburg-Mission metro area (within Hidalgo County) are undocumented,¹⁶ and this number is expected to be higher in the *colonias* of this area. This tenuous legal status highlights a serious concern that may be impeding access to nutritious options in the *colonias* — that of *fear*. Twenty-four percent (n = 19) of the survey respondents endorsed fear of leaving their *colonias*. General fear, as well as specific fear of immigration enforcement was reported. With perceived and real threats of immigration enforcement, residents of the *colonias* may have genuine fear of leaving their home.

Deportation looms as a real and persistent threat for many families,¹⁷ and associated stressors may impede many opportunities to improve health, including hesitancy to find employment, fear of seeking medical care, and avoidance of traveling to grocery stores. The association between food insecurity and fear is likely one of many detrimental effects on health that come from exposure to the toxic stress of living in *colonias* near border enforcement.

With national food insecurity reported at 11.8% and a Texas-specific food insecurity prevalence reported to be 14%,¹⁰ this convenience sample showed that, in this subpopulation, there may be alarmingly high rates of food insecurity in the Hidalgo County *colonias*. In this survey, 82.5% of respondents screened positive for food insecurity, which is more than 5 times the overall rate of food insecurity in Texas.

Previous research indicates that limited access to grocery stores that are far from an individual's home residence is a major obstacle to promoting and maintaining nutritious habits. This barrier exists in the *colonias* due to nonexistent public transportation and isolation from healthy food sources such as grocery stores.⁷ Although 75.3% of respondents identified having a family car to use, such cars are often shared among extended family and may not be readily accessible.

Geomapping of food sources and proximity to housing in the *colonias* demonstrate food deserts (Figure 1). Multiple prior studies have shown that proximity to supermarkets is associated with increased intake of fruits and vegetables.^{6,7,9}

Systematic studies need to be developed to assess food insecurity in *colonias* and to determine what interventions would be supportive for the *colonia* communities. One possible mechanism to address the fruit/vegetable gap would be to utilize a mobile food van that would service the *colonias* with quality, affordable produce. Such programs could be subsidized with SNAP/WIC enrollment, could involve community organizations (including nutrition education initiatives), and could incorporate local vendors.

Many prior efforts to improve access to fresh produce in low-income neighborhoods have been studied.^{18–21} While further research is needed, preliminary data on certain incentives, markets, and public-private partnerships are promising.¹⁸ These studies demonstrate the benefits of subsidies, collaborative efforts, behavioral interventions, and educational initiatives. Promising programs have included WIC coupons for farmers' markets,¹⁸ fruit/vegetable vendors outside of schools,¹⁹ public-private partnerships bringing fresh produce to low-income communities,²⁰ and behavior-based interventions.²¹

While the underlying problems of food insecurity are complex and multifactorial, community-based initiatives such as these could be mutually beneficial for all parties involved and could begin to mitigate the nutritional challenges faced by *colonias*. Multifaceted initiatives to address barriers to food access – including initiation of public transportation that services the *colonias*, expansion of food vouchers, and education on healthy eating – could also decrease the food insecurity in this region.

Although our survey cannot be generalized to all US immigrant communities, fear of immigration enforcement could potentially be a factor affecting food access in immigrant-rich communities in the US. Initiatives to help alleviate this fear – such as access to accurate information and

legal aid services within the *colonias* – could be studied as additional, potential strategies to mitigate the high burden of food insecurity.

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We thank the Community for Children at the University of Texas Rio Grande Valley School of Medicine and Proyecto Azteca for their support of this research project. Many thanks to the health promoters from Proyecto Azteca, Lourdes Salinas and Denise Martinez, as well as the Proyecto Azteca team of Ann Cass and Amber Arriagas-Salinas. We also thank the entire Community for Children team, including Dr. Minette Son, Dr. Cathi Monserrat, Judith Livingston, and Michael Seifert.

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