

# Prevalence and predictors of food insecurity among low-income households in Los Angeles County

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## Abstract

*Objectives:* To assess the prevalence and identify the predictors of food insecurity among households in Los Angeles County with incomes below 300% of the federal poverty level.

*Methods:* The Six-Item Short Form of the US Department of Agriculture's Household Food Security Scale was used as part of a 1999 county-wide, population-based, telephone survey.

*Results:* The prevalence of food insecurity was 24.4% and was inversely associated with household income. Other independent predictors of food insecurity included the presence of children in the household (odds ratio (OR) 1.7, 95% confidence interval (CI) 1.2–2.3) and a history of homelessness in the past five years (OR 5.6, 95% CI 3.4–9.4).

*Conclusion:* Food insecurity is a significant public health problem among low-income households in Los Angeles County. Food assistance programmes should focus efforts on households living in and near poverty, those with children, and those with a history of homelessness.

**Keywords**  
Food security  
Low income  
Los Angeles  
Poverty  
Nutrition

Over the past two decades, food insecurity has increasingly been recognised as a serious public health problem in the developed world<sup>1</sup>. In USA, an estimated 12 million households, or 11.1% of all households, experienced food insecurity in 2002<sup>2</sup>, defined as 'limited or uncertain availability of nutritionally adequate and safe foods, or limited or uncertain ability to acquire acceptable foods in socially acceptable ways'<sup>3</sup>.

Potential public health consequences of food insecurity include hunger, malnutrition, and reduced health and quality of life<sup>4</sup>. Low levels of vitamin A, folate, iron and magnesium intake associated with severe food insecurity increase the risk of nutrient deficiencies<sup>5</sup>. Food insecurity has also been associated with compromised psychosocial functioning among low-income school-aged children in two large urban areas of the USA<sup>6</sup>.

National surveys have found considerable variation in the prevalence of food insecurity across states. For example, in 2000–2002, prevalence rates ranged from a low of 6.4% in Massachusetts to 15.2% in Utah, and were generally higher among states in the southern region of the country<sup>2</sup>. Although these national and state estimates provide important benchmarks, few data are available on food insecurity at the municipal or county level, where food programmes are most often implemented. The paucity of population-level data on food insecurity in urban settings is of particular concern given the high rates

of poverty in these communities. A recent survey in California found that of 2.2 million low-income adults in the state who experienced food insecurity in 2001, more than one-third resided in Los Angeles County<sup>7</sup>.

In this study, we used a validated food insecurity scale<sup>8</sup> to estimate the prevalence of food insecurity among low-income households in Los Angeles County and to identify predictors of food insecurity in this high-risk population.

## Methods

A county-wide, population-based telephone survey collected information on sociodemographic characteristics, health status, health behaviours and access to health services among adults and children in Los Angeles County between September 1999 and April 2000<sup>9</sup>. During March and April 2000, a follow-up survey was conducted among those households that had reported an annual income below 300% of the 1999 federal poverty level (FPL) in the initial survey. For a household with two adults and two dependants, this was equivalent to an annual income of less than \$50 685.

Of households identified as eligible based on their reported annual household income, 1898 (55.4%) completed the follow-up survey. Of the remaining eligible households, most were lost to follow-up. Respondents were administered the Six-Item Short Form of the US

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Department of Agriculture's (USDA) Household Food Security Scale, which has been shown to be a valid measure of food security (Table 1)<sup>8</sup>. An updated version of the form is now available in which the questions have been reordered<sup>3</sup>; however, this revised version was not available at the time of our study. Additional information was obtained on the presence of children (under 18 years of age) in the household, receipt of public assistance, and experience with homelessness in the past five years. Public assistance included California's Welfare-to-Work programme (CalWORKs), food stamps, Supplemental Food Program for Women, Infants, and Children (WIC), General Relief, or any other federal, state or county payment.

Households were classified as 'food-insecure' if the respondent answered affirmatively to two or more of the six household food security questions. 'Almost every' and 'some months' were considered affirmative responses to Question 2. 'Often' and 'sometimes' were considered affirmative responses to Questions 5 and 6<sup>8</sup>.

**Table 1** Six-Item Short Form of the US Department of Agriculture's Household Food Security Scale

1.	In the last 12 months, did you or any other adults in your household ever have to cut the size of your meals or skip meals entirely because there wasn't enough money for food?
a.	Yes
b.	No
c.	Don't know
d.	Refused
2.	How often did this happen?
a.	Almost every month
b.	Some, but not every month
c.	Only one or two months
d.	Don't know
e.	Refused
3.	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?
a.	Yes
b.	No
c.	Don't know
d.	Refused
4.	In the last 12 months, were you ever hungry but didn't eat because you could not afford enough food?
a.	Yes
b.	No
c.	Don't know
d.	Refused
5.	The food that I/we bought just didn't last, and I/we didn't have money to get more. Was this often, sometimes, or never true for you or the other members of your household in the last 12 months?
a.	Often
b.	Sometimes
c.	Never
d.	Don't know
e.	Refused
6.	I/we couldn't afford to eat balanced meals. Was this often, sometimes, or never true for you or the other members of your household in the last 12 months?
a.	Often
b.	Sometimes
c.	Never
d.	Don't know
e.	Refused

Data were weighted by age group, race/ethnicity, sex and geographic region, using 1999 Los Angeles County population estimates to adjust for differential participation rates across demographic groups. To examine the association between food insecurity and selected characteristics, the chi-square test and unconditional logistic regression modelling were done using Epi Info (Centers for Disease Control and Prevention, Atlanta, GA, USA) Version 6.04d and SAS (SAS Institute Inc., Cary, NC, USA) Version 8.2, respectively. Food insecurity was used as the dependent variable and the following were used as independent variables: self-reported annual household income (<100% FPL, 100–199% FPL, 200–299% FPL), race/ethnicity (white, Latino, African-American, Asian/Pacific Islander), presence of children in the household, current use of public assistance, and past homelessness. The Hosmer and Lemeshow goodness-of-fit test was used to test the model fit and Wald confidence intervals were used for the adjusted odds ratios.

## Results

Food insecurity was reported by 24.4% of households. The prevalence of food insecurity decreased with increasing household income. Food insecurity was reported by 34.7% of households living below 100% FPL, 23.7% of households at 100–199% FPL, and 15.8% of households at 200–299% FPL (Table 2).

The prevalence of food insecurity was higher among African-American (32.8%) and Latino (28.4%) respondents than among white (17.3%) and Asian/Pacific Islander (10.9%) respondents. In addition, the prevalence of food insecurity was higher among households with children

**Table 2** Prevalence of food insecurity by selected household characteristics

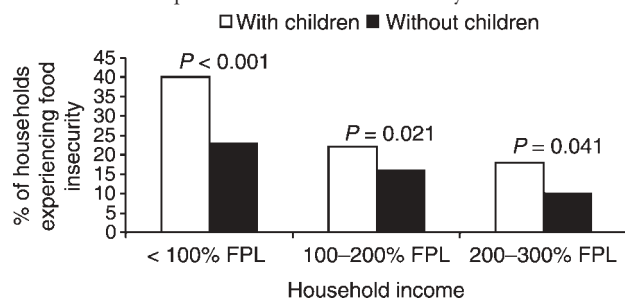
Household characteristic	Prevalence (%)	P-value
Income*		
200–300% FPL ( <i>n</i> = 544)	15.8	–
100–200% FPL ( <i>n</i> = 741)	23.7	<0.001
< 100% FPL ( <i>n</i> = 502)	34.7	<0.001
Race/ethnicity†		
White ( <i>n</i> = 541)	17.3	–
Latino ( <i>n</i> = 869)	28.4	<0.001
African-American ( <i>n</i> = 218)	32.8	<0.001
Asian/Pacific Islander ( <i>n</i> = 80)	10.9	0.179
Children in household		
Yes ( <i>n</i> = 858)	28.4	–
No ( <i>n</i> = 549)	16.3	<0.001
Public assistance		
Yes ( <i>n</i> = 209)	36.4	–
No ( <i>n</i> = 1573)	22.7	<0.001
Past homelessness‡		
Yes ( <i>n</i> = 116)	56.4	–
No ( <i>n</i> = 1588)	22.3	<0.001

FPL – federal poverty level.

\* 100–200% FPL and < 100% FPL versus 200–300% FPL.

† Latino, African-American and Asian/Pacific Islander all versus white.

‡ Within the past five years.



**Fig. 1** The prevalence of food insecurity by household income and the presence of children. FPL – federal poverty level

**Table 3** Independent variables associated with food insecurity

Independent variable*	OR (95% CI)†
Income‡	
< 100% FPL	3.0 (2.0–4.5)
100–200% FPL	1.6 (1.1–2.4)
Race/ethnicity§	
Latino	1.4 (0.9–2.1)
African-American	1.3 (0.8–2.2)
Asian/Pacific Islander	0.3 (0.1–1.0)
Children in household	1.7 (1.2–2.3)
Public assistance	0.8 (0.6–1.2)
Past homelessness¶	5.6 (3.4–9.4)

OR – odds ratio; CI – confidence interval; FPL – federal poverty level.

\* Dependent variable is food insecurity.

† Wald CIs for adjusted OR.

‡ < 100% FPL and 100–200% FPL versus 200–300% FPL.

§ Latino, African-American and Asian/Pacific Islander all versus white.

¶ Within the past five years.

(28.4%) than among households without children (16.3%). This difference was observed across all income groups, with the highest prevalence among households with children and with incomes below the FPL (Fig. 1). The prevalence of food insecurity was also higher among households receiving public assistance (36.4%) and reporting past homelessness (56.4%), compared with households not receiving public assistance (22.7%) and not reporting past homelessness (22.3%).

Independent predictors of food insecurity were income < 100% FPL (odds ratio (OR) 3.0, 95% confidence interval (CI) 2.0–4.5) and income 100–200% FPL (OR 1.6, 95% CI 1.1–2.4), with income 200–300% FPL as the reference group for both; having children in the household (OR 1.7, 95% CI 1.2–2.3); and past homelessness (OR 5.6, 95% CI 3.4–9.4) (Table 3). Asian/Pacific Islander race was associated with a lower prevalence of food insecurity (OR 0.3, 95% CI 0.1–1.0).

## Discussion

This is the first population-based study to use the Six-Item Short Form of the USDA's Household Food Security Scale to estimate the prevalence and identify predictors of food insecurity in a local public health jurisdiction. Although several studies have examined the relationship between food insecurity and important health and nutrition

outcomes in the USA, few have used a valid and reliable measure of food insecurity relevant to food-rich countries, and even fewer have tried to quantify the burden of food insecurity at the local population level.

Our estimate of the prevalence of food insecurity among low-income households in Los Angeles County is consistent with the findings of a prior survey of low-income adults in the county, although our study included a more expanded definition of low income<sup>7</sup>. In addition, the prevalence in the county is more than twice the rates reported in the general population, both nationally and in California<sup>2</sup>. If we assume that no households in the county with incomes at or above 300% FPL experienced food insecurity, the prevalence remains approximately 35% higher in Los Angeles County than nation-wide. A recent study examined hunger among legal immigrants in California, Texas and Illinois, and found that 80% of households were food-insecure using a more detailed USDA food security scale<sup>10</sup>. However, that study was limited to a convenience sample of 630 respondents and therefore may have limited generalisability.

Previously reported predictors of food insecurity include low income, drug use, receipt of food stamps, a reduction in food stamps, Latino ethnicity, and poor English-speaking ability<sup>10–12</sup>. Our results show that, among households surveyed in Los Angeles County, independent predictors of food insecurity include low income but not Latino ethnicity or use of public assistance. As in other studies, the prevalence of food insecurity was significantly lower among Asians/Pacific Islanders. We also found that having children in the household and past homelessness were both significantly associated with food insecurity, findings that are consistent with those of several other studies<sup>2,13</sup>.

The findings in this report are subject to the following limitations. First, the results are based on a short form of the 18-item Household Food Security Scale. Although this short form has been shown to be a useful tool to assess food insecurity, it may have missed some food-insecure households that the long form would have correctly identified.

Second, the low survey participation rate (55.4%) may have introduced non-response bias. For example, participating households were less likely to report incomes < 100% FPL or to be Asian/Pacific Islander and Latino, and were more likely to be white, without children and receiving public assistance. However, the data were weighted using census-based population estimates to reduce potential bias by making the sample more comparable to the county population living below 300% FPL. Although income was not included in the weighting procedure, race/ethnicity was included and would be expected to reduce some of the bias introduced by differential participation across income groups.

Third, telephone surveys are subject to coverage bias from non-inclusion of households without telephones.

Lack of telephone service is more common among low-income households than among other income groups, so they may not be adequately represented in this survey. Therefore, we may have missed those households at highest risk of food insecurity.

Fourth, the race/ethnicity findings are limited because we collected race/ethnicity information on the respondent only and, therefore, were not able to identify mixed race/ethnicity households. Finally, we did not collect information on specific types of public assistance programme participation and, therefore, were only able to assess public assistance as a dichotomous variable in our analysis.

Although food insecurity affects people of all ages, it is of particular concern for pregnant women, children, elderly persons and other nutritionally vulnerable subgroups<sup>14</sup>. In Los Angeles County, where food insecurity is a significant public health concern, the prevalence was higher among three such vulnerable subgroups – those households with the lowest income, those with children, and those that have experienced homelessness within the past five years. Data such as these can be used to guide food assistance programming and highlight the importance of targeting efforts to those who are most vulnerable.

Furthermore, food insecurity appears to affect a larger segment of the population than is included in federal assistance programmes. The prevalence of food insecurity in Los Angeles County among households at 200–299% FPL was 15.8%, yet the federal standard for food stamp eligibility is a household income less than 130% FPL. High housing costs, low-paying jobs, high utility costs, unavailability of transportation and problems associated with access to food may all affect the prevalence of food insecurity in urban settings<sup>15</sup>. Data such as these can therefore be used to lobby for expansion of eligibility for food assistance programmes in high-risk settings and for additional local interventions that target vulnerable subpopulations not currently covered by federal programmes.

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