

# Hospitalization: Are We Missing an Opportunity to Identify Food Insecurity in Children?



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The author has no conflicts of interest to disclose.

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## ABSTRACT

**OBJECTIVE:** Food security is the ability to access sufficient food to maintain a healthy, active life. Previous studies link food insecurity with adverse health outcomes. Our objectives were to determine the prevalence of food insecurity, identify sociodemographic risk factors, and quantify receipt of public nutrition assistance among recently hospitalized children in the United States.

**METHODS:** Cross-sectional analyses of a representative sample of the US population aged 0 to 19 years from the National Health and Nutrition Examination Survey, 2007 to 2012 (N = 12,627). Consistent with previous literature, households were defined as food insecure if they answered "yes" to 3 or more of 18 food security questions. Children were considered recently hospitalized if admitted overnight in the past year (n = 706). Descriptive statistics characterized food insecurity and receipt of nutrition assistance. Multiple logistic regression analyses evaluated associations of food insecurity with age, sex, race/ethnicity, insurance status, family income, and hospitalization.

**RESULTS:** One-quarter (25.3%) of recently hospitalized children lived in food insecure households. More than one-third of recently hospitalized low-income, uninsured, or Hispanic children lived in food insecure households. In the adjusted analysis, recently hospitalized low-income children and girls had significantly greater odds of living in food insecure households. Of potentially eligible hospitalized children, 26.9% had not received Women, Infants, and Children benefits and 31.0% had not received Supplemental Nutrition Assistance Program benefits in the past year.

**CONCLUSIONS:** One-quarter of recently hospitalized children lived in food insecure households. Many eligible families were not enrolled in public nutrition programs. Hospitalization represents a potential opportunity to identify these children and help families access nutrition assistance.

**KEYWORDS:** food security; hospitalization; nutrition; pediatrics

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## WHAT'S NEW

One quarter of recently hospitalized children lived in food insecure households, and many eligible families did not receive Women, Infants, and Children or Supplemental Nutrition Assistance Program benefits. At minimal cost, hospitals could implement screening programs and assist families in accessing nutrition assistance.

APPROXIMATELY 15.9 MILLION children in the United States live in food insecure households.<sup>1</sup> These households have limited access to nutritionally adequate and safe foods, or their ability to obtain sufficient food in socially acceptable ways might be uncertain.<sup>2</sup> Food insecurity might prevent families from providing balanced meals, force them to reduce portions, or to skip meals entirely.<sup>1</sup> Adults might shoulder the greatest burden, shielding children from hunger whenever possible.<sup>1</sup> Still, 8.3 million US children reside in households with food insecurity severe enough to extend to the children themselves.<sup>1</sup>

Food insecurity has been associated with a variety of negative health effects, including chronic disease.<sup>3</sup> Families might be forced to choose between eating and paying for medications.<sup>4</sup> Even after controlling for confounders like income, food insecure children were more likely to have iron-deficiency anemia, headaches, stomachaches, and frequent upper respiratory infections.<sup>5</sup> They were at higher risk of anxiety, depression, and behavioral problems.<sup>6,7</sup> They were also more likely to have developmental concerns, low test scores, or be suspended from school.<sup>8,9</sup> Children suffered adverse effects even when food insecurity existed only at the household level, perhaps because of a combination of altered food selection patterns and the stress, depression, or poor physical health of the parent.<sup>10</sup> In their multisite study of children aged 3 years and younger, Cook et al<sup>10</sup> reported that children with household food insecurity had significantly greater odds of poor health and hospitalization compared with children living in food secure households.<sup>10</sup> Participation in public nutrition assistance programs like Women, Infants, and Children (WIC) or the Supplemental Nutrition Assistance Program (SNAP) helps temper

these negative effects.<sup>10,11</sup> Unfortunately many families underutilize these resources, and even full participation might not be enough to completely meet nutritional needs.<sup>11,12</sup> For these reasons, the American Academy of Pediatrics (AAP) recently released a policy statement recommending that pediatricians screen for food insecurity at scheduled health maintenance visits.<sup>13</sup>

Among hospitalized children, neither the prevalence of food insecurity nor the sociodemographic groups at risk have been well defined. These data would provide hospitals with information about the magnitude of the problem among their patients. Further, a description of the extent to which potentially eligible hospitalized children have received public nutrition assistance could help guide interventions, yet these data are limited. Our objectives were to determine the prevalence of food insecurity, identify sociodemographic risk factors, and quantify receipt of public nutrition assistance among recently hospitalized children in the United States.

## METHODS

### DATA COLLECTION AND SAMPLE

The National Health and Nutrition Examination Survey (NHANES) is a cross-sectional survey designed to be nationally representative of the civilian, noninstitutionalized US population.<sup>14</sup> The National Center for Health Statistics uses a multistage, clustered, stratified sampling design and collects the data via individual in-home interviews. Details of the NHANES survey design are described elsewhere.<sup>15</sup> This study used NHANES data from 2007 to 2012. More recent NHANES food security data have yet to be released. We restricted our analysis to children and adolescents, ages 0 to 19 years. A proxy (usually the parent) answered demographic, hospitalization, and health insurance questions separately for each subject younger than 16 years, and information for subjects 16 years and older was obtained by self-report. An adult answered all household food security questions including questions about WIC and SNAP. The NHANES survey was approved by the Institutional Review Board of the National Center for Health Statistics. Informed consent was obtained from all participants.

### FOOD SECURITY

During the home interview, surveyors administered the United States Department of Agriculture (USDA) Food Security Survey Module, a well validated questionnaire designed to measure household food security over the preceding 12 months.<sup>16</sup> The module consists of 18 questions for the household, 10 pertaining to adults and 8 pertaining to children. We chose to evaluate food insecurity at the household level rather than at the level of the individual child because household food insecurity, even in its mildest forms, has been shown to have a strong effect on the health of children.<sup>10</sup> Consistent with previous literature, households answering “yes” to 3 or more of the 18 items were considered food insecure (also termed low and very low food security).<sup>16</sup>

### HOSPITALIZATION

As part of the home interview, subjects were asked if the child had been a patient in a hospital overnight in the past 12 months. They were specifically asked to exclude overnight stays in the emergency department. In our study, children were defined as recently hospitalized if they had spent at least 1 night in the hospital in the preceding year.

### RECEIPT OF NUTRITION ASSISTANCE

During the home interview, NHANES respondents were asked if they or any member of their households had received Special Supplemental Nutrition Program for WIC benefits in the past 12 months. In 2008, the name of the food stamp program was officially changed to the “Supplemental Nutrition Assistance Program.”<sup>17</sup> Until 2008, NHANES asked, “In the past 12 months, did you or any member of your household receive Food Stamp benefits?” Beginning in 2009, NHANES asked, “In the past 12 months, did you or any member of your household receive SNAP or Food Stamp benefits?”

The poverty index ratio (PIR) is calculated by dividing family income by the Department of Health and Human Services’ poverty guidelines adjusted for family size and year.<sup>15</sup> Children up to their fifth birthday are eligible for WIC if they live in the state in which they apply, have a  $PIR \leq 1.85$ , and are determined to be at “nutrition risk” by a health professional.<sup>18</sup> Nutrition risk can include, for example, anemia, overweight, underweight, or a poor or inadequate diet.<sup>18</sup> Subjects with a  $PIR \leq 1.85$  and age younger than 5 years were considered potentially eligible for WIC, and for the purposes of this study, presumed at nutritional risk on the basis of their poverty index. People of all ages are eligible for SNAP if they are US citizens, have a household  $PIR \leq 1.3$ , and minimal countable resources (in 2015 this was \$2250 or less, not including the home).<sup>19</sup> In our study, subjects with a  $PIR \leq 1.3$  and US citizenship were considered potentially eligible for SNAP.

### VARIABLES

Our covariates included sex, age, race/ethnicity, insurance status, and family income, selected because they are previously described correlates of food insecurity.<sup>1</sup> Consistent with the NHANES sample design recommended by the National Center for Health Statistics, age was used as a categorical variable combining ages 0 to 5, 6 to 11, and 12 to 19 years.<sup>15</sup> Respondents self-identified race/ethnicity, categorized according to NHANES as non-Hispanic white, non-Hispanic black, Mexican American, other Hispanic, or other race including multiracial. For this study, Mexican American and other Hispanic groups were combined. Respondents were asked if they were covered by health insurance or some other kind of health care plan. Those who answered “yes” were considered insured. Participants were also asked their household income. PIR was calculated. For this study, incomes were dichotomized as  $PIR \leq 1.85$  versus  $> 1.85$ . A  $PIR \leq 1.85$  was considered low-income because this is the threshold at which families

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