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The School Breakfast Program Strengthens Household Food Security among Low-Income Households with Elementary School Children1,2

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Abstract
The School Breakfast Program is an important component of the nutritional safety net and has been linked to positive changes in meal patterns and nutritional outcomes. By offering a breakfast, which for low-income children is available either at no cost or reduced price, the program also has the potential to increase household food security. This study examined the relationship between availability of the School Breakfast Program and household food security among low-income third-grade students by using data from the Early Childhood Longitudinal Survey-Kindergarten Cohort. The primary sample included 3010 students. Availability of school breakfast was assessed by surveys of school administrators. Food security was assessed by parents’ reports by using the standard 18-item food security scale and considering 2 different food security thresholds. A probit model was estimated to measure the relationship between school breakfast availability and household food security while controlling for a range of other characteristics. Access to school breakfast reduced the risk of marginal food insecurity but not the risk of food insecurity at the standard threshold. That is, the program appeared beneficial in offsetting food-related concerns among at-risk families, although not necessarily in alleviating food insecurity once hardships had crossed the food insecurity threshold. Increasing the availability of school breakfast may be an effective strategy to maintain food security among low-income households with elementary school children. J. Nutr. 141: 470–475, 2011.

Introduction
Food insecurity, or the lack of assured access to sufficient food for a healthy and active life, has increased dramatically in the United States. Between 2007 and 2008, the rate of food insecurity increased from 11.1 to 14.6%, the largest annual increase, and the highest absolute level, since researchers began formally measuring food insecurity in the mid 1990s (1). Results are particularly striking for households with children, among whom food insecurity increased from 15.8 to 21% (1).

Federal nutritional safety net programs are among a variety of potential vehicles to combat food insecurity. The School Breakfast Program is 1 component of that safety net of particular relevance to households with children. Funded by the federal government and administered locally by schools and school districts around the country, the program offers all children in participating schools an opportunity to eat a low-cost, or sometimes free, breakfast either prior to or during the school day. The School Breakfast Program operates in >85,000 public and nonprofit private schools and residential child care institutions. School districts and independent schools that choose to take part in the program receive cash subsidies from the USDA for each meal they serve and agree to serve breakfasts that meet federal program requirements. Children whose families have an income < 130% of the federal poverty line receive free meals; children whose family incomes are between 130 and 185% of the poverty line receive reduced-price meals (costing no more than 30 cents); and children above this threshold pay full price. Schools are provided some federal reimbursement for all participating children, with higher reimbursement rates for children who are eligible for free or reduced price meals (2).

Decisions about whether to offer the School Breakfast Program are typically made at the school or district level, although some states have mandates requiring that all schools or, more commonly, schools with a specified share of low-income children, offer the program (3). Nationwide, ~86% of schools that offer school lunch also offer breakfast (3). This varies considerably among states from a low of 54% to a high of 100% (3), with the program most widely available in southern states and least in the Midwest and more commonly available in cities and rural areas than in suburbs (4). Economic factors are also important, with school breakfast much more widely available in schools with larger shares of low-income students as well as in less economically well-off communities (5).

When breakfast is available at school, participation tends to be low: among third-grade public school students with access to

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the program, 44% “usually” participate, according to parental report, compared with 88% who usually eat school lunch (4). Participation is much more common among low-income than higher income children (4,6).

The School Breakfast Program could potentially reduce the risk of household food insecurity in several ways: by providing meals to children who might otherwise be forced to forego them; by freeing up household resources to feed other family members; and by reducing the uncertainty surrounding availability of sufficient food. Although little research has examined the impact of the School Breakfast Program on food insecurity, there are reasons to hypothesize such a relationship. Participation in the School Breakfast Program is highly concentrated among the low income, where the greatest food insecurity risk is found (4,6). Furthermore, participation has been linked to positive changes in meal content and nutrition outcomes (7,8), although this is not consistent across all studies (9). And some research has found that children with access to the School Breakfast Program are less likely to skip breakfast in the morning, with greater benefits for lower income children (5,10,11), although research is inconsistent in this area as well (7,9). Finally, availability of the School Breakfast Program appears to contribute to improved diet quality among other family members, suggesting that participation affects broader patterns of food consumption in the household (7).

Although school breakfast could plausibly reduce household food insecurity, there are challenges to empirically documenting such an effect. Broadly speaking, efforts to identify the impact of public food assistance programs on food insecurity are complicated by self-selection into programs on the basis of unobservable characteristics, with persons at greater risk of food insecurity more likely to participate. This has been most widely documented in the food stamp program (now known as the Supplemental Nutrition Assistance Program). Indeed, bivariate statistics and many multivariate analyses reveal the counterintuitive finding that food stamp recipients have higher rates of food insecurity than do nonparticipants, even when limited to the low income and controlling for other observable differences, suggesting important underlying differences in risk of food insecurity between participants and nonparticipants (12–14).

Because the School Breakfast Program is available in only a subset of schools, it provides an opportunity to examine program impacts by focusing on program access rather than program participation. The purpose of this study was to determine whether having access to the School Breakfast Program reduced the risk of household food insecurity among a national sample of third-grade students. At the time of this writing, Congress is in the process of crafting reauthorization legislation for the Child Nutrition Programs, including the School Breakfast Program. Expanding access to school breakfast is emphasized as a legislative priority by advocates and policymakers (3,15); the current research provides new information about the potential benefits of more widespread availability of the program, focusing specifically on impacts on food security.

Methods

Data. Data are from the Early Childhood Longitudinal Survey-Kindergarten cohort (ECLS-K), wave 5 (third grade), restricted access file. The ECLS-K is a nationally representative longitudinal survey providing information about children who entered kindergarten in the fall of 1998. A multistage probability sample design was employed to select the ECLS-K sample, and students have been followed for multiple years, with a wide variety of information collected from children, caregivers, and schools (16). Data from wave 5, used in this study, were collected during spring 2002, when the children were in third grade. We used data from the parent surveys, which provide a range of information about socioeconomic characteristics of children’s households, as well as surveys of school administrators, which provide information about the children’s school (linked to parent surveys by student ID numbers).

The sample for these analyses was limited to public school students for whom parents and school administrators provided survey responses during wave 5 ($n = 8120$). We excluded 3840 students with missing parent surveys and/or administrator surveys. The data include weights to adjust for survey nonresponse. For most analyses, the sample was further limited to students with household income < 185% of the poverty line ($n = 3010$). These are the students most at risk for food insecurity and thus the group for whom the School Breakfast Program could potentially have a role in reducing food insecurity. Multivariate analyses further excluded 10 children whose schools did not offer school lunch. Because of regulations related to the use of the restricted access data, all sample sizes reported, including subsamples, were rounded to the nearest 10. This study was reviewed for ethical treatment of participants and was approved by the University of Wisconsin-Madison Social and Behavioral Sciences Institutional Review Board.

Measures and statistical analyses. Food security was assessed via the standard 18-item food security scale, which consists of questions describing conditions and behaviors that characterize households having difficulty meeting food-related needs due to financial constraints (17). Two measures were used to characterize household food security over the previous 12 mo. For the first measure, households were classified as food secure or food insecure, where the latter includes those who responded affirmatively at least 3 of the 18 items on the scale, in accordance with standard food security measurement guidelines (17). For the second and less restrictive measure, households were classified as food secure or marginally food insecure, where the latter includes those who responded affirmatively to any of the 18 items. This is a comparatively mild threshold: a household would be classified as marginally food insecure, for instance, if responding in the affirmative to the statement, “I worried whether our food would run out before we got money to buy more.” This alternative measure has also been used in other research with the ECLS-K and has been found to be a predictor of a variety of negative developmental outcomes, including impaired social skills development and reading development (18,19).

Descriptive statistics were calculated to compare household food insecurity rates, using both measures, among students with and without access to the School Breakfast Program. Descriptive results were weighted to adjust for survey nonresponse and design effects, using the weighting variable specified for analyses that use data from nonmissing parent surveys in conjunction with data from the administrator questionnaire (16). Chi-squared tests were used to test for significant differences in food insecurity rates with respect to program access, utilizing SE adjusted for design effects. Significance was assessed at the 5% level.

To control for observable differences between students with and without program access, probit regression models were then estimated, with food security status as the dependent variable, coded 1 if food insecure or marginally food insecure when using the less restrictive measure) and 0 if food secure. Models were estimated with robust SE to account for clustering of households within schools. Z-tests were used to assess significance of coefficients, with significance assessed at the 5% level.

The key independent variable was the availability of the School Breakfast Program at the child’s school. Information on program availability was provided by school administrators in response to the question, “Does your school participate in the USDA’s School Breakfast Program?” The models also included contextual characteristics selected to capture underlying differences between the schools and communities of students with and without the School Breakfast Program (Table 1). These included the free and reduced price certification rate in the child’s school; the median rent at the ZIP code level; the region of the country; indicators of urban, suburban, or rural character of the community; an indicator for whether the school received federal Title I funds, which...
School has after-school childcare, marginally food-insecure households compared with 6.1% of children; likewise, 30.1% of the low-income children were in Location, nearest 10.

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Table 1: Contextual characteristics of low-income third-grade public school students with and without access to the School Breakfast Program

<table>
<thead>
<tr>
<th></th>
<th>With school breakfast</th>
<th>Without school breakfast</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>2800</td>
<td>210</td>
</tr>
<tr>
<td>Median rent in ZIP code, USD/mo</td>
<td>432 ± 5.7</td>
<td>585 ± 26.1</td>
</tr>
<tr>
<td>School certification rate for free or reduced price school meals, %</td>
<td>50.6 ± 0.9</td>
<td>22.0 ± 2.9</td>
</tr>
</tbody>
</table>

Region, %
- Northeast: 10.9
- Midwest: 17.8
- South: 48.5
- West: 22.7

Location, %
- City: 35.0
- Town: 11.3
- Suburbs: 27.6
- Rural area: 26.1

School receives federal Title I funds, %
- 86.5

School has after-school childcare, %
- 57.0

1 Values are means ± SE or percent and are weighted to adjust for design effects and nonresponse.
2 Limited to households with data available from parent survey and school administrator survey. Due to data licensing requirements all sample sizes are rounded to the nearest 10.
3 Mean ± SE.

Table 2: Household food insecurity and marginal food insecurity among third-grade public school students

<table>
<thead>
<tr>
<th></th>
<th>Food insecure</th>
<th>Marginally food insecure</th>
</tr>
</thead>
<tbody>
<tr>
<td>All students</td>
<td>8120</td>
<td>8.8</td>
</tr>
<tr>
<td>&lt;185% poverty line</td>
<td>3010</td>
<td>16.6</td>
</tr>
<tr>
<td>≥185% poverty line</td>
<td>4340</td>
<td>2.6</td>
</tr>
<tr>
<td>Limited to households &lt;185% of poverty line</td>
<td>School offers breakfast</td>
<td>2800</td>
</tr>
<tr>
<td>School doesn't offer breakfast</td>
<td>210</td>
<td>24.5</td>
</tr>
</tbody>
</table>

1 Values are percent. Limited to households with data available from parent survey and school administrator survey. Due to data licensing requirements all sample sizes are rounded to the nearest 10.
2 Weighted to adjust for design effects and nonresponse. *Different from students in schools that do not offer breakfast, P < 0.05.
3 Households are considered food insecure if the respondent answered at least 3 items on the 18-item food security scale in the affirmative, and marginally food insecure if the respondent answered at least 1 item in the affirmative.

Higher income children. As a result, subsequent analyses were limited to the low-income group; the low rate of food insecurity and marginal food insecurity among higher income children makes it unlikely that the School Breakfast Program would have a meaningful or measurable impact on that group. Among the low-income children, the marginal food insecurity rate of those with access to the School Breakfast Program was lower than those without access, 29.2% compared with 42.2% (P < 0.05). Differences between groups in the standard food insecurity rate were not significant.

Multivariate analysis of School Breakfast Program and food insecurity. We estimated probit models of standard food insecurity and marginal food insecurity (Table 3). In the standard food insecurity model, the coefficient denoting school breakfast availability was negative but not significant; in the marginal food insecurity model, on the other hand, the coefficient was also negative, but larger in magnitude and highly significant (P < 0.01), indicating reduced risk of marginal food insecurity when the breakfast program was offered. Other variables in the model had coefficients largely in keeping with the extant literature on food security, with minor differences between the 2 models. The probability of household food insecurity and marginal food insecurity declined as household income and education increased, was greater for renters compared with homeowners, and increased with poorer health status and more children. In the standard food insecurity model, we found no differences by race or ethnicity, net of other factors; however, blacks had significantly greater risk of marginal food insecurity than did non-Hispanic whites. We did not find significant differences according to household composition or employment status, with the exception of higher probability of marginal food insecurity among children of single, not-employed parents. Turning to contextual characteristics, higher median rent was strongly associated with a heightened risk of food insecurity but was not significant in the marginal food insecurity model. There were no significant differences according to the share of low-income students in the school, as captured by the eligibility rate for free and reduced price meals. Net of other factors, we found no evidence of remaining regional differences in food insecurity. Compared with rural areas, the risk of food insecurity was greater in small towns, mid-sized suburbs, and mid-sized cities, with no significant differences in the risk of marginal food insecurity. Finally, there were no
TABLE 3  Probit models of household food insecurity and marginal food insecurity among low-income third-grade public school students 1–3

<table>
<thead>
<tr>
<th></th>
<th>Food insecure</th>
<th>Marginally food insecure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>SE</td>
</tr>
<tr>
<td>Intercept</td>
<td>−1.036**</td>
<td>0.273</td>
</tr>
<tr>
<td>School breakfast available</td>
<td>−0.148</td>
<td>0.125</td>
</tr>
<tr>
<td>Income ≤$15,000$ (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$15,001–$20,000</td>
<td>−0.038</td>
<td>0.090</td>
</tr>
<tr>
<td>$20,001–$25,000</td>
<td>−0.124</td>
<td>0.094</td>
</tr>
<tr>
<td>$25,001–$30,000</td>
<td>−0.477**</td>
<td>0.107</td>
</tr>
<tr>
<td>$30,001–$35,000</td>
<td>−0.366**</td>
<td>0.121</td>
</tr>
<tr>
<td>$35,001–$40,000</td>
<td>−0.447**</td>
<td>0.139</td>
</tr>
<tr>
<td>$40,001–$50,000</td>
<td>−0.551**</td>
<td>0.172</td>
</tr>
<tr>
<td>$50,001–$75,000</td>
<td>−0.713</td>
<td>0.593</td>
</tr>
<tr>
<td>Highest education in household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;High school (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>−0.151</td>
<td>0.083</td>
</tr>
<tr>
<td>Some college</td>
<td>−0.182*</td>
<td>0.086</td>
</tr>
<tr>
<td>College degree</td>
<td>−0.398**</td>
<td>0.145</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>−0.680**</td>
<td>0.244</td>
</tr>
<tr>
<td>Housing arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rent</td>
<td>0.170*</td>
<td>0.069</td>
</tr>
<tr>
<td>Temporary</td>
<td>0.846*</td>
<td>0.414</td>
</tr>
<tr>
<td>Parent’s health status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>−0.192**</td>
<td>0.071</td>
</tr>
<tr>
<td>Good (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>0.505**</td>
<td>0.078</td>
</tr>
<tr>
<td>Number of children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.045</td>
<td>0.112</td>
</tr>
<tr>
<td>3</td>
<td>0.158</td>
<td>0.112</td>
</tr>
<tr>
<td>4 or more</td>
<td>0.253*</td>
<td>0.116</td>
</tr>
<tr>
<td>Race/ethnicity of children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>0.073</td>
<td>0.095</td>
</tr>
<tr>
<td>Hispanic</td>
<td>−0.068</td>
<td>0.092</td>
</tr>
<tr>
<td>Asian</td>
<td>0.027</td>
<td>0.139</td>
</tr>
<tr>
<td>Other</td>
<td>0.223</td>
<td>0.121</td>
</tr>
<tr>
<td>Household structure and employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single parent, not employed</td>
<td>0.086</td>
<td>0.114</td>
</tr>
<tr>
<td>Single parent, employed</td>
<td>−0.010</td>
<td>0.089</td>
</tr>
<tr>
<td>2 parents, 1 employed (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 parents, both employed</td>
<td>−0.119</td>
<td>0.082</td>
</tr>
<tr>
<td>2 parents, neither employed</td>
<td>0.114</td>
<td>0.156</td>
</tr>
<tr>
<td>Other</td>
<td>−0.298</td>
<td>0.184</td>
</tr>
<tr>
<td>Median rent</td>
<td>0.0005*</td>
<td>0.0002</td>
</tr>
<tr>
<td>Region</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeast (referent)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td>0.172</td>
<td>0.113</td>
</tr>
<tr>
<td>South</td>
<td>0.055</td>
<td>0.106</td>
</tr>
<tr>
<td>West</td>
<td>0.188</td>
<td>0.109</td>
</tr>
<tr>
<td>Urban vs. rural status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large city</td>
<td>0.034</td>
<td>0.121</td>
</tr>
<tr>
<td>Mid-size city</td>
<td>0.224*</td>
<td>0.113</td>
</tr>
<tr>
<td>Large suburban</td>
<td>0.098</td>
<td>0.115</td>
</tr>
<tr>
<td>Mid-size suburban</td>
<td>0.383**</td>
<td>0.138</td>
</tr>
<tr>
<td>Large town</td>
<td>0.193</td>
<td>0.177</td>
</tr>
<tr>
<td>Small town</td>
<td>0.415**</td>
<td>0.126</td>
</tr>
</tbody>
</table>

(Continued)
significant differences in either food security or marginal food insecurity according to school receipt of title I funds or availability of after-school care for children.

To illustrate the magnitude of the estimated impact of the School Breakfast Program, we used the coefficients from the marginal food insecurity model to estimate the predicted probability of marginal household food insecurity for a prototypical student with and without access to the program. Specifically, we considered the predicted probability of marginal food insecurity for a non-Hispanic white student in the rural Midwest in a county with a median rent of $600/mo at a school with a 25% certification rate for free and reduced price meals, receiving Title I funds, and offering after-school care; we further assumed the student lives with a single employed mother who is in good health, has a high school education, rents her home, and has 2 children and an annual income of $15,001–$20,000. In this case, the predicted probability of marginal food insecurity was 48% if the school did not offer breakfast, decreasing to 33% if breakfast was offered.

We compared the characteristics of low-income children with and without access to the School Breakfast Program, focusing on household-level risk factors for food insecurity and marginal food insecurity as identified in the model (Table 4). This illustrates whether the 2 groups tended to differ systematically and thus provides insight into the relative underlying risk of food insecurity in the 2 groups. Overall, children with access to the program tended to come from households with lower income (note that the sample by definition is limited to households < 185% of the poverty line) and lower levels of parental education and included a higher share of minorities. At least by measurable characteristics, students with access to school breakfast had a higher risk profile for experiencing food insecurity or marginal food insecurity than did those without program access.

### Discussion

In this study, we addressed the policy question of whether making the School Breakfast Program available, such that students may choose to participate based on their own needs and preferences, reduces the prevalence of food insecurity and marginal food insecurity. Findings suggest that School Breakfast Program availability is linked to a lower probability of marginal household food insecurity among low-income third-grade children, although not to a difference in food insecurity at the standard threshold. That is, the program appears beneficial in offsetting food-related concerns among at-risk families, although not necessarily in alleviating food insecurity once hardships have crossed the food insecurity threshold. The magnitude of the estimated impact is substantial, with availability of school breakfast reducing the predicted probability of marginal food insecurity from 48 to 33% in the hypothetical case considered here.

The apparent impact on marginal food insecurity, but not food insecurity at the standard threshold, suggests that the program is effective at reducing the least severe of the conditions associated with food insecurity. These include, for instance, worrying that food will run out before there is money to buy more and not being able to afford balanced meals compared

### TABLE 3

<table>
<thead>
<tr>
<th>Food insecure</th>
<th>Marginally food insecure</th>
</tr>
</thead>
<tbody>
<tr>
<td>β</td>
<td>SE</td>
</tr>
<tr>
<td>Rural area in MSA (referent)</td>
<td>0.147</td>
</tr>
<tr>
<td>Rural area outside MSA (referent)</td>
<td></td>
</tr>
<tr>
<td>School free/reduced price meal certification rate</td>
<td>−0.001</td>
</tr>
<tr>
<td>School receives Title I funds</td>
<td>−0.097</td>
</tr>
<tr>
<td>School offers afterschool childcare</td>
<td>−0.049</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>−1175.062</td>
</tr>
<tr>
<td>n</td>
<td>2960</td>
</tr>
</tbody>
</table>

1 Limited to households with data available from parent survey and school administrator survey, including nonmissing data for variables in model. Excludes 10 children whose school does not offer school lunch. Due to data licensing requirements all sample sizes are rounded to the nearest 10.
2 Asterisks denote coefficient differs from zero: *P < 0.05, **P < 0.01.
3 Households are considered food insecure if the respondent answered at least 3 items on the 18-item food security scale in the affirmative, and marginally food insecure if respondent answered at least 1 item in the affirmative.

### TABLE 4

<table>
<thead>
<tr>
<th>With school breakfast</th>
<th>Without school breakfast</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>2800</td>
</tr>
<tr>
<td>Household income*, %</td>
<td></td>
</tr>
<tr>
<td>≤$10,000</td>
<td>13.9</td>
</tr>
<tr>
<td>$10,001–$15,000</td>
<td>15.2</td>
</tr>
<tr>
<td>$15,001–$20,000</td>
<td>16.8</td>
</tr>
<tr>
<td>$20,001–$30,000</td>
<td>31.2</td>
</tr>
<tr>
<td>$30,001–$40,000</td>
<td>18.2</td>
</tr>
<tr>
<td>&gt;$40,000</td>
<td>4.7</td>
</tr>
<tr>
<td>Highest household education*, %</td>
<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>21.5</td>
</tr>
<tr>
<td>High school</td>
<td>35.2</td>
</tr>
<tr>
<td>Some college</td>
<td>34.8</td>
</tr>
<tr>
<td>College</td>
<td>6.0</td>
</tr>
<tr>
<td>Graduate degree</td>
<td>2.4</td>
</tr>
<tr>
<td>Race/ethnicity*, %</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>39.0</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>23.6</td>
</tr>
<tr>
<td>Hispanic</td>
<td>28.8</td>
</tr>
<tr>
<td>Asian</td>
<td>2.8</td>
</tr>
<tr>
<td>Other</td>
<td>5.9</td>
</tr>
</tbody>
</table>

1 Limited to households with data available from parent survey and school administrator survey. Due to data licensing requirements all sample sizes are rounded to the nearest 10.
2 Values are percent, and are weighted to adjust for design effects and nonresponse.
*Characteristics differ for students with and without access to school breakfast, P < 0.05.
with more severe conditions such as cutting the size of meals or skipping meals because there was no money for food. Because school breakfast provides a dependable meal for children at little or no cost each schoolday, it may strengthen food security among families at the margin of security by reducing the uncertainty around meeting at least a portion of the their food needs, while not necessarily affecting actual food intake. Although marginal food insecurity is a comparatively mild condition, it has been linked to worse developmental trajectories for children, including impaired social skills development and reading development, in the ECLS-K data (18,19), suggesting that it is a meaningful indicator of child wellbeing.

There are potential limitations to the findings reported here. Results only address the impact of the School Breakfast Program on third-grade children; the benefits may differ for other ages. In particular, older children are less likely to participate in the program and therefore any benefit of program availability may be lower. Furthermore, only a small share of our sample does not have access to school breakfast. With a larger sample size for children in non-breakfast schools, we would have more power to detect any relationships between school breakfast and food security outcomes.

Finally, there may be remaining biases associated with differential availability of school breakfast. On the one hand, the focus on program availability rather than participation avoids inherent selection problems stemming from the tendency of higher-need student to select into the program, a problem endemic to efforts to link voluntary participation in food assistance programs to measures of food-related hardship. At the same time, there remain potential selection problems to the extent that there are unobserved differences among children with and without access to the program that also are associated with food insecurity. Although it is possible that this is the case, we find it more plausible that any resulting bias would result in underestimates, rather than overestimates, of the true impact, given that school breakfast is disproportionately available to higher need students, at least based on observable characteristics. In particular, our results indicated that children in our sample with access to school breakfast were, on average, lower income, more likely to have less educated parents, and more likely to be members of minority groups, all attributes that emerged from our models as predictors of marginal food insecurity and/or food insecurity. Empirical evidence suggests, then, that the schools that choose to offer school breakfast tend to be those whose students have the greatest need. That we found a significant negative association between the availability of school breakfast and the risk of marginal food insecurity, despite the higher risk profile of students with access to the program, provides strong evidence in favor of a beneficial impact. Nonetheless, there may remain unobserved differences that could bias our results in undetermined fashion.

While there remains much to learn about program impacts, and evolution of the program makes such knowledge a moving target, the results reported here contribute to a growing body of literature documenting beneficial impacts of school breakfast on eating patterns and nutritional outcomes among children as well as other household members (8,10,11). In considering the range of potential benefits of program expansion, it is also notable that concerns about possible detrimental impacts of school breakfast on child weight have not been substantiated in the existing literature (9,20,21), with some evidence of lower BMI among participants relative to nonparticipants (20). Increasing access to school breakfast was an important component of discussions around the recently completed upcoming congressional reau-

thorization of the Child Nutrition Programs; the current study provides new information of direct relevance to that discussion.

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Literature Cited