



# Child Care Feeding Programs Associated With Food Security and Health for Young Children From Families With Low Incomes

Stephanie Ettinger de Cuba, PhD, MPH; Allison Bovell-Ammon, MDiv; Nayab Ahmad; Charlotte Bruce, MPH; Ana Poblacion, PhD, MSc; Lindsey J. Rateau, MPH; Sharon M. Coleman, MSPT, MPH; Maureen M. Black, PhD; Deborah A. Frank, MD; Félice Lê-Scherban, PhD, MPH; Geraldine Henchy, MPH; Eduardo Ochoa, Jr, MD; Megan Sandel, MD, MPH; Diana B. Cutts, MD

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## ABSTRACT

**Background** The Child and Adult Care Food Program is the primary national program that enables child-care settings to provide healthy meals for children. Associations between Child and Adult Care Food Program participation and child health and development and health care utilization are understudied.

**Objective** To assess associations between children's health, development, health care utilization and food security by meal source (child-care–provided vs parent-provided) among children from low-income families with a child care subsidy attending child-care in settings likely eligible to participate in Child and Adult Care Food Programs.

**Design** The study used repeat cross-sectional surveys (new sample at successive time points) conducted year-round.

**Participants and setting** Primary caregivers of 3,084 young children accessing emergency departments or primary care in Baltimore, MD; Boston, MA; Little Rock, AR; Minneapolis, MN; and Philadelphia, PA, were interviewed between 2010 and 2020. The sample was limited to children aged 13 to 48 months, receiving a child care subsidy and attending child-care centers or family child-care homes  $\geq 20$  hours per week.

**Main outcome measures** Outcomes included household and child food security; child health, growth, and developmental risk; and admission to the hospital on the day of the emergency department visit.

**Statistical analyses** Meal source and participant characteristics were analyzed using  $\chi^2$  tests; associations of outcomes with parent-provided meals were analyzed with adjusted logistic regression.

**Results** The majority of children had child-care–provided meals (87.2% child-care–provided vs 12.8% parent-provided). Compared with children with parent-provided meals, children with child-care–provided meals had lower adjusted odds of living in a food-insecure household (adjusted odds ratio 0.70, 95% CI 0.55 to 0.88), being in fair or poor health (adjusted odds ratio 0.61, 95% CI 0.46 to 0.81), or hospital admission from the emergency department (adjusted odds ratio 0.59, 95% CI 0.41 to 0.83), with no differences in growth or developmental risk.

**Conclusions** Compared with meals provided from home, child-care–provided meals likely supported by the Child and Adult Care Food Program are related to food security, early childhood health, and reduced hospital admissions from an emergency department among low-income families with young children.

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**N**UTRITION DURING EARLY CHILDHOOD IS AN essential foundation for healthy child growth and development.<sup>1</sup> Ensuring that young children have sufficient, nutritious food in early education and child care programs is important because many children, particularly those from families with low incomes, spend significant hours in these settings and potentially receive the majority of their dietary intake from meals in child-care

settings.<sup>2</sup> More than half of children younger than age 5 years attend child care.<sup>3</sup>

The Child and Adult Care Food Program (CACFP) is a federal program administered by states, which provides children from families participating in Head Start programs, family child care, child-care centers, and afterschool programs, or children living in emergency shelters<sup>4,5</sup> nutritious meals and snacks while in care. In 2019, CACFP served 4.7 million

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children across the United States.<sup>6,7</sup> Eligibility and reimbursement rates vary by the type of child-care setting, the type of meal (meal or snack) served, and family income.<sup>8</sup> Children are automatically eligible in the case that the provider participates in CACFP. Meals are reimbursed depending on family income and differ by type of child-care arrangement. Similar to policies for school-aged children who participate the School Breakfast Program and the National School Lunch Program, households and children who participate in certain programs, including the Supplemental Nutrition Assistance Program (SNAP), Temporary Assistance for Needy Families, Early Head Start, and Head Start are automatically income-eligible (“categorically eligible”) for child-care–provided meals through CACFP.

Provision of nutritionally balanced meals in child care is an early education and child care quality metric.<sup>9,10</sup> CACFP contributes to the overall quality of care in participating settings by providing meals based on nutrition standards set by the Dietary Guidelines for Americans, National Academy of Medicine recommendations, as well as input from stakeholders, and cost limitations.<sup>11</sup> In addition to ongoing training to providers on nutrition, food preparation, and healthy eating practices,<sup>11</sup> young children attending programs that participate in CACFP can receive up to two meals and one snack per day that meet National Academy of Medicine standards for nutrition, following age-appropriate meal patterns.<sup>12,13</sup>

Research on CACFP is growing, but limited compared with other nutrition programs, including SNAP, School Breakfast Program, National School Lunch Program, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).<sup>13–15</sup> Although the program serves settings caring for infants, toddlers, and preschoolers, most evidence to date focuses on preschoolers’ participation in CACFP. One study demonstrated that CACFP is associated with a small but significant reduction in household food insecurity for families of children receiving CACFP meals.<sup>16</sup> Although another study found no difference in nutritional quality between parent-provided meals and center-provided meals in a CACFP-participating child care center,<sup>17</sup> other researchers have documented nutrition advantages of CACFP-participating child-care settings, likely due to program quality standards.<sup>18,19</sup> These include child-care settings modeling healthful eating during meals and provision of higher quality beverages, meals, and snacks compared with settings not participating in CACFP.<sup>5,14,18–21</sup> In addition to reducing food insecurity and providing nutritional benefits, evidence shows broader health benefits of CACFP, including reduced risk of underweight and overweight among children from low-income families attending CACFP-participating center-based care.<sup>11</sup> Compared with other children in a primary health care system, children who attended Head Start centers, which are required to participate in CACFP, were less likely to have obesity and, even in the case that they entered Head Start with an unhealthy weight (overweight, obese, or underweight) were more likely to have reached a healthy weight at kindergarten entry.<sup>14,22</sup> Collectively, these studies strengthen the emerging evidence base demonstrating the role of CACFP in supporting food security among households with preschool-aged children, nutrition and eating habits, and healthy weight trajectories. What is not known is whether child-care feeding programs are also associated with general

## RESEARCH SNAPSHOT

**Research Question:** Among young children in child care from low-income families with a child care subsidy, how are child-care–provided meals and snacks vs parent-provided meals and snacks associated with household food security and child health?

**Key Findings:** In a five-city sample of 3,084 children aged 13 to 48 months from low-income households and attending child care, children receiving child-care–provided meals and snacks had significantly lower odds of living in food-insecure households, being in fair/poor health, and being admitted to the hospital from the emergency department, compared with children receiving parent-provided meals and snacks.

health, development, and health care utilization outcomes among younger children, particularly children aged 1 to 3 years.

The objective of this study was to determine among a sample of very young children from low-income families receiving a child care subsidy whether children receiving child-care–provided meals had better health indicators and food security compared with children receiving parent-provided meals. It was hypothesized that young children receiving meals from their child-care provider would have better health and developmental outcomes and reduced likelihood of hospital admission from the emergency department (ED) as a result of receiving more consistent and potentially nutritious meals from their child-care provider than children relying on parent-provided meals. Further, given a sample of families with low incomes, it was hypothesized that households with young children receiving child-care–provided meals would have better food security status because the child’s access to a consistent supply of healthy food may ease the economic and anxiety burden on the family.

## METHODS

## Study Sample

Children’s HealthWatch is an ongoing multicity study conducted year-round in clinical settings investigating associations between economic hardships, public assistance programs, and health of young children and their caregivers.<sup>23</sup> The study employs a repeat cross-sectional survey (new samples at successive time points)<sup>24</sup> of caregivers of young children seeking medical care in EDs or hospital primary care clinics in Baltimore, MD; Boston, MA; Little Rock, AR; Minneapolis, MN; and Philadelphia, PA.

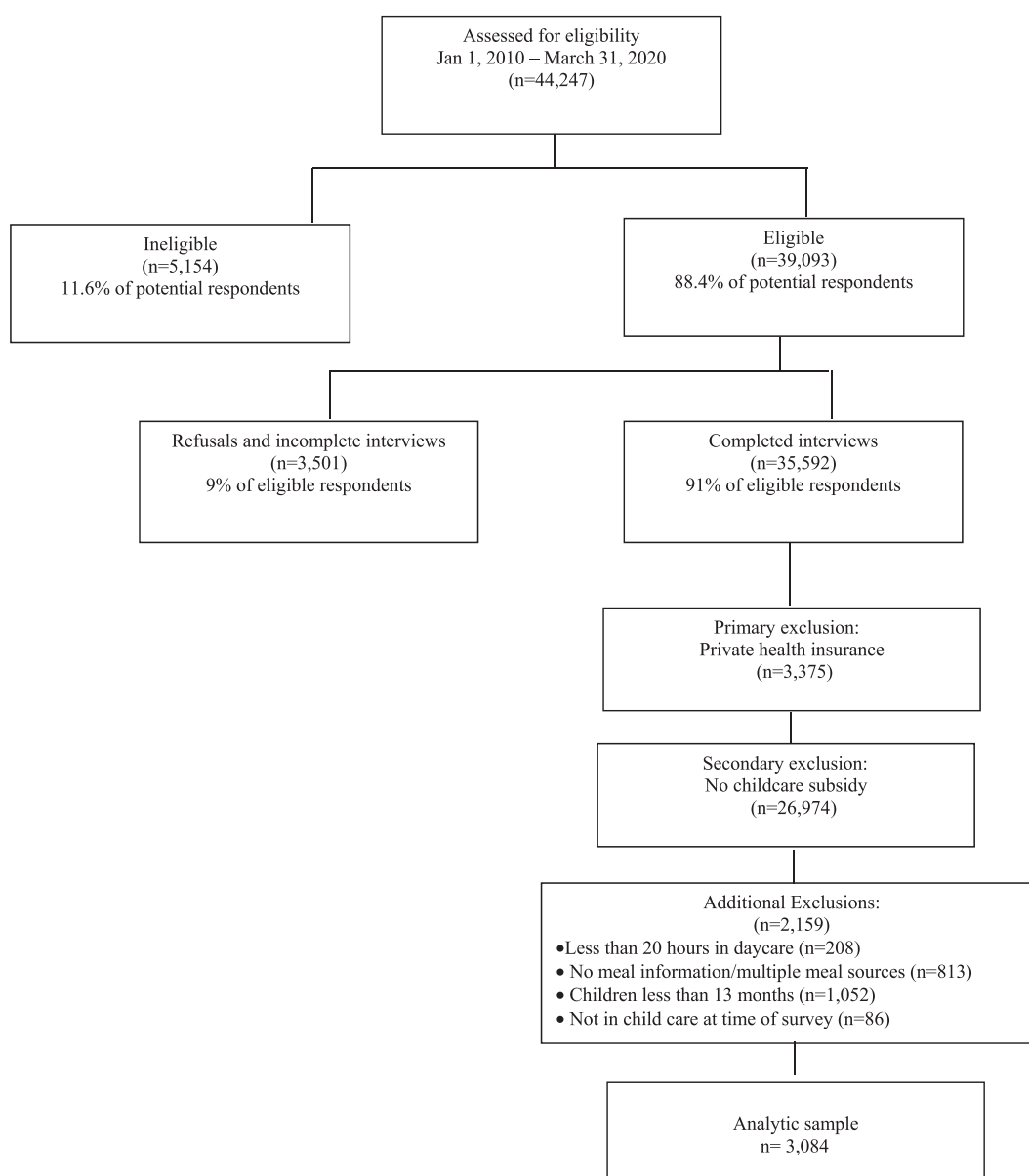
Eligibility for Children’s HealthWatch included primary caregivers of children aged <4 years; English, Spanish, and (Minneapolis only) Somali speakers; state residency; knowledge of the child’s household; and informed consent. All participating caregivers provided written or verbal informed consent, depending on local institutional review board requirements, after research assistants determined that other eligibility criteria had been met. Caregivers of critically ill or injured children were excluded, as were those previously interviewed within 6 months. Research assistants verbally interviewed caregivers face to face in private

settings. Institutional review board approval was obtained at each site before data collection and renewed annually.

Although Children's HealthWatch began in 1998, this analysis uses data collected over 10 years, between January 2010 and March 2020. Of 44,247 caregivers approached during that period, 5,154 (11.6%) were ineligible for the study and 3,501 (9% of eligible) refused or were unable to complete the interview, leaving 35,592 (80.4%) caregiver–child dyads. To ensure a sample with approximately similar household income and to address potential selection bias, the analytic sample was restricted to children with public or no health insurance.

Because CACFP administration flows through child-care providers and caregivers are thus frequently unaware of whether or not their child's child-care setting participates in

CACFP or not, study authors worked with CACFP program and policy experts to define sample selection criteria that would most likely capture children who would be in settings eligible for CACFP. Therefore, the sample for this analysis was limited to children between ages 13 and 48 months whose diets would have already shifted to solid foods, children attending child-care centers or family child-care homes for at least 20 hours/week and thus more likely to be in care long enough to receive a meal, and families receiving a child care subsidy because centers and family child-care homes that accept subsidies have a high likelihood of serving children eligible for CACFP and participating in CACFP.<sup>25</sup> Caregivers with no meal information or who reported multiple sources of meals were excluded from analysis. These selection criteria left a final sample of 3,084 caregiver-child pairs (see the [Figure](#)).



**Figure.** Sample selection diagram: Young children in child care from low-income families (Children's HealthWatch data, January 2010-March 2020).

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As a logic check for the premise of study criteria, overlapping individual family or child-care center CACFP eligibility criteria (eg, Head Start programs receive meal reimbursement through CACFP and SNAP participants are eligible to receive CACFP meals) were examined to assess child-care–provided meals in this analytic sample as a potential proxy for CACFP eligibility. The majority of children in the sample attended center-based care (78.2%) and another 8.2% attended Early Head Start or Head Start. In addition, 76% of children in the total sample were in households that participated in SNAP. Thus, the sample identified by the proxy measure would identify a substantial proportion of children eligible for CACFP, although this does not definitively determine whether or not their child-care providers participate in CACFP or not.

### Measures

Child sex assigned at birth was obtained from the child's medical record. Caregivers provided information on their age, educational attainment, marital and employment status, and child's health insurance, birth weight, and breastfeeding history. Caregivers responded to the Children with Special Health Care Needs screener,<sup>26</sup> defined as a child with a special health care need has or is at risk for having a physical, developmental, behavioral, or emotional condition and requires health or related services of a type or amount beyond that required by children generally (collected starting in 2013). Caregivers also reported on their child's lifetime history of hospitalizations, excluding birth. Children born at <2,500 g were classified as having low birth weight. Birth mothers' race and ethnicity were elicited using questions from the US Census asking separately about Latina/Hispanic heritage and race. The answers were combined into the following categories: Latina, Black/African American non-Latina, White non-Latina, and Other/multiple races non-Latina for groups too small in this sample to analyze independently. Birth mothers also identified their country of birth (nativity), subsequently categorized as US-born or immigrant. Caregivers also provided information on the household's public program participation and the child's child-care setting, subsidy status, and number of hours in child care.

**Exposure.** Caregivers reported on the child's source of meals in child care. The sample was divided into two groups based on meal source: meals supplied by the child care provider (child-care–provided meals) and meals supplied by the caregiver (parent) (parent-provided meals) (see the [Figure](#)).

**Outcomes.** Caregivers reported their perception of their child's health as fair, poor, good, or excellent, adapted from the single, validated question from the National Health and Nutrition Examination Survey, and dichotomized for analysis as fair/poor or good/excellent.<sup>27</sup> In research sites that interview caregivers in the ED (Boston, Little Rock, Baltimore, and Philadelphia), research assistants abstracted from the medical record whether or not the child was subsequently hospitalized on the day of interview (admission from the ED). In all sites, children's weight and length (height for children aged >2 years) was abstracted from the medical record. At risk of underweight was based on weight-for-age <5th percentile or weight-for-length/height <10th percentile using Centers for Disease Control and Prevention standards.<sup>28</sup>

At risk of overweight was based on weight-for-length  $\geq 95\%$  for children under 24 months and body mass index for age >85% for children aged 24 months or older. If length data were not available, weight-for-age  $\geq 95\%$  was used.<sup>29–31</sup>

Developmental risk was measured with the Parents' Evaluation of Developmental Status, which meets standards set by the American Academy of Pediatrics for developmental screening tests for young children.<sup>32</sup> This is a validated 10-item questionnaire designed for children aged  $\geq 4$  months to 8 years that elicits parental concerns. Children with two or more concerns were considered to be at developmental risk.

The Household Food Security Survey Module is an 18-item scale used to assess food security status in households with children in the 12 months before the interview.<sup>33</sup> Households were food insecure if caregivers indicated they could not consistently afford enough food for active, healthy lives for all household members due to constrained resources. Following standard methods for coding responses,<sup>34</sup> households were classified as food secure in the case that caregivers indicated zero, one or two affirmative responses. Households were classified as food insecure in the case that caregivers indicated three or more affirmative responses. In addition, based on the eight child-referenced questions, households were classified as having food insecurity among children or child food insecurity in the case that caregivers indicated two or more affirmative responses.

### Statistical Analysis

Descriptive statistics for demographic characteristics were generated for the overall sample and stratified by meal source. Groups were compared using  $\chi^2$  analysis and analysis of variance. Similar analyses were performed for food security and child health. Effect estimates and robust SEs using parent-provided meals as the reference group were obtained using logistic regression. For all models, adjusted odds ratios (aORs) are reported with corresponding 95% CI. Covariates were selected based on significant association with meal source as well as associations with health and food insecurity outcomes. To address potential concerns that children receiving parent-provided meals may have preexisting health conditions or a condition necessitating special meals we adjusted all models for lifetime hospitalizations and conducted a sensitivity analysis adjusting for children with special health care needs (Model 2). Main models were adjusted for: site, maternal race/ethnicity, caregiver marital status and education, child's age, birth weight status, and lifetime hospitalizations. Sensitivity analyses additionally adjusted for SNAP and WIC participation to isolate the effect of the CACFP proxy measure—parent vs child-care–provided meals (Models 1 and 2). All analyses were performed using a two-tailed significance level of 0.05 with SAS version 9.4.<sup>35</sup>

### RESULTS

The majority of children in the sample ( $n = 3,084$ ) attended center-based care (78.2%), 8.2% attended Early Head Start or Head Start, 8.2% were in early intervention programs, and 5.4% in a family child-care home. The majority of children in the sample received child-care–provided vs parent-provided meals (87.2% vs 12.8%, respectively). Children who had child-care–provided meals were significantly older than children with parent-provided meals ( $29.0 \pm 10.0$  months vs



26.8 ± 10.1 months) and significantly fewer were born with low birth weight (15.6% vs 20.1%) and had special health care needs (29.6% vs 42.1%). Ninety-two percent of caregivers were mothers. There were significant differences in race/ethnicity between the child-care and parent-provided meal groups; a greater proportion of children with child-care vs parent-provided meals had Latina mothers (26.1% vs 20.3%), a lower proportion had mothers who were White, non-Latina (10.1% vs 15.4%) and equal proportions had mothers who were Black, non-Latina (60.4% vs 60.8%), or reported another race/ethnicity (3.5% vs 3.6%). There was no significant difference by mothers' nativity. Fewer caregivers of children with child-care–provided vs parent-provided meals were married or partnered (22.3% vs 26.5%) or had education beyond high school (45.6% vs 51.8%), although these differences were not statistically significant. Differences between meal groups by nutrition assistance program participation were statistically significant. More caregivers in the child-care–provided compared with parent-provided meal group participated in SNAP at the time of interview (76.6% vs 71.6%). WIC participation showed the opposite pattern (62.4% vs 67.6%) (Table 1).

In unadjusted analyses, significantly fewer children with child-care–provided compared with parent-provided meals were in the household food insecurity category, but the proportion was similar and not statistically significant across both meal source groups for the child food insecurity category. Children with child-care–provided compared with parent-provided meals had significantly lower rates of fair/poor health, developmental risk, lifetime hospitalizations, and admission from the ED. There were no significant differences in the prevalence of at risk of underweight or overweight (Table 1).

After controlling for covariates, compared with young children with parent-provided meals, young children with child-care–provided meals had lower odds of living in a food-insecure household (aOR 0.70, 95% CI 0.55 to 0.88), being in fair or poor health (aOR 0.61, 95% CI 0.46 to 0.81), or admitted from the ED (aOR 0.59, 95% CI 0.41 to 0.83). Associations with child food insecurity, developmental risk, at risk of underweight, and at risk of obesity were not statistically significant, although all were in the expected direction except for risk of underweight (Table 2).

Two sets of sensitivity analyses were conducted. The first model included all covariates from the main analysis and additionally controlled for SNAP and WIC in comparisons between children with parent-provided vs child-care–provided meals. In Model 1 there were no changes in results compared with the main model. The second model included all covariates from the main model, SNAP, and WIC, and additionally controlled for children with special health care needs. Results from Model 2 demonstrated slight attenuation in odds but no change in significance for household food insecurity and fair/poor child health. Odds were strengthened for admission from the ED (Table 3).

## DISCUSSION

This study demonstrates that among children from families with low incomes in child care, compared with children who received parent-provided meals and snacks, children who received child-care–provided meals and snacks had lower

adjusted odds of living in a food-insecure household, had lower odds of fair or poor health, and were less likely to need hospital admission from the ED. There were no significant differences between groups in child food insecurity, at risk of underweight or overweight, or developmental risk. Sensitivity analyses supported the main findings. Prior research has demonstrated that children with special health care needs are at higher risk of food insecurity than households without children with special health care needs,<sup>37</sup> so the findings demonstrating decreased odds of food insecurity even when controlling for children with special health care needs add strength to the potential buffering effect of child-care feeding programs. The findings of this study with a sample selected intended to capture CACFP participants add to the growing body of research that documents the vital role of child care feeding programs to support health in early childhood and household food security through increased access to essential nutrition in child care,<sup>14,16</sup> although children's participation in CACFP in this sample is not directly known. Few studies have evaluated the relations between child-care–provided meals vs parent-provided meals on outcomes of child health, developmental risk, and health care utilization among families with low incomes. Most studies of CACFP have focused on preschool-aged children, which makes this study's sample of children as young as age 13 months unique, filling a gap in research by documenting the role child-care feeding plays in protecting very young children's health and food security during a highly sensitive period of rapid growth and development.

These findings have several clinical and policy implications. Household and child food insecurity are a known risk factors for young children's developmental delays and poor health.<sup>38</sup> Moreover, food insecurity is associated with increased hospitalizations among young children and greater hospital charges for infants once hospitalized, due to longer lengths of stay.<sup>39,40</sup> One possible reason for the lack of significant association with child food insecurity, although the direction of effect was as hypothesized, might be that child-care feeding reduced severity of food insecurity but was only reflected at the household level due to caregiver shielding behaviors to prioritize feeding children.<sup>41–43</sup> Therefore, policies and practices that reduce food insecurity are beneficial for young children's ongoing health and cognitive/behavioral development and reduce health care costs.

This study's demonstrated association between child-care–provided meals and better child health and decreased risk of acute health concerns requiring inpatient care following an ED visit has benefits to young children, their families, and society as a whole. Excellent/good child health status has been linked to decreased avoidable inpatient and outpatient health care services and costs.<sup>44</sup> In addition to children being less severely ill and not needing to be admitted from the ED, families benefit from reductions in stress and avoiding the expenses associated with inpatient care and society benefits from potentially significant health care cost savings.

Although data for this study were collected before the coronavirus disease 2019 pandemic, this study's findings are relevant in the pandemic recovery environment. During the pandemic, national data showed significant decreases in CACFP participation due to closures of child-care facilities and instability in the child-care market, coupled with significant

**Table 1.** Child and caregiver characteristics and outcome measures by meal source among young children in child care from low-income families (Children's HealthWatch data, January 2010-March 2020<sup>36</sup>)

Characteristic	Total	Child care-provided meals	Parent-provided meals	P value
	← <i>n (%)</i> →			
<b>Total category</b>	3,084	2,689 (87.2)	395 (12.8)	
<b>Child characteristics</b>	← <i>mean ± SD</i> →			
<b>Age (mo)</b>	28.7 ± 10.1	29.0 ± 10.0	26.8 ± 10.1	< 0.001
	← <i>n (%)</i> →			
<b>Low birthweight, &lt;2,500 g</b>	481 (16.2)	404 (15.6)	77 (20.1)	0.03
<b>Female sex assigned at birth</b>	1,409 (45.7)	1,232 (45.8)	177 (44.8)	0.71
<b>Child health insurance</b>				0.002
Public	3,023 (98.2)	2,644 (98.5)	379 (96.2)	
No insurance	56 (1.8)	41 (1.5)	15 (3.8)	
<b>Children with special health care needs<sup>a</sup> (n = 1,969)</b>	613 (31.1)	511 (29.6)	102 (42.1)	< 0.001
<b>Early childhood education and care setting</b>				< 0.001
Center-based care	2,413 (78.2)	2,090 (77.7)	323 (81.8)	
Early Head Start/Head Start	252 (8.2)	237 (8.8)	15 (3.8)	
Family child care home	166 (5.4)	151 (5.6)	15 (3.8)	
Early intervention program	253 (8.2)	211 (7.9)	42 (10.6)	
<b>Caregiver characteristic</b>				
<b>Relationship to child</b>				0.38
Mother, biologic	2,836 (92)	2,483 (92.3)	353 (89.4)	
Father, biologic	121 (3.9)	99 (3.7)	22 (5.6)	
Other	127 (4.1)	107 (4)	20 (5)	
<b>Race/ethnicity</b>				0.004
Latina	772 (25.4)	693 (26.1)	79 (20.3)	
Black, non-Latina	1,839 (60.4)	1,602 (60.4)	237 (60.8)	
White, non-Latina	327 (10.7)	267 (10.1)	60 (15.4)	
Other/multiple, non-Latina	106 (3.5)	92 (3.5)	14 (3.6)	
<b>Nativity</b>				0.42
US-born	2,626 (85.6)	2,294 (85.8)	332 (84.3)	
Immigrant	442 (14.4)	380 (14.2)	62 (15.7)	
<b>Married</b>	702 (22.9)	598 (22.3)	104 (26.5)	0.07
<b>Education</b>				0.07
Less than high school	482 (15.7)	426 (15.9)	56 (14.2)	
High school diploma/GED <sup>b</sup>	1,165 (37.9)	1,031 (38.5)	134 (34)	
Tech school/college	1,426 (46.4)	1,222 (45.6)	204 (51.8)	
<b>Enrolled in SNAP<sup>c</sup></b>	2,337 (76.0)	2,054 (76.6)	283 (71.6)	0.03
<b>Enrolled in WIC<sup>d</sup></b>	1,939 (63.1)	1,672 (62.4)	267 (67.6)	0.04
	← <i>mean ± SD</i> →			
<b>Age (y)</b>	27.2 ± 5.6	27.2 ± 5.5	27.3 ± 5.8	0.62

(continued on next page)

**Table 1.** Child and caregiver characteristics and outcome measures by meal source among young children in child care from low-income families (Children's HealthWatch data, January 2010-March 2020<sup>36</sup>) (continued)

Characteristic	Total	Child care-provided meals	Parent-provided meals	P value
<b>Unadjusted outcome measures by meal source among young children in child care from low-income families</b>				
	←————— n (%) —————→			
Household food insecurity <sup>e</sup>	840 (27.2)	711 (26.4)	129 (32.7)	0.01
Child food insecurity <sup>f</sup>	429 (13.9)	368 (13.7)	61 (15.4)	0.35
Child health fair/poor <sup>g</sup>	439 (14.3)	350 (13)	89 (22.5)	< 0.001
Developmental risk <sup>h</sup>	917 (29.7)	783 (29.1)	134 (33.9)	0.05
Admission from emergency department <sup>i</sup> (n = 2,866)	253 (8.8)	200 (8)	53 (14.6)	< 0.001
Lifetime hospitalizations <sup>j</sup>	1,048 (34.2)	897 (33.6)	151 (38.7)	0.04
At risk of underweight <sup>k</sup>	370 (12.3)	320 (12.2)	50 (12.9)	0.69
At risk of overweight <sup>l</sup>	572 (19)	496 (18.9)	76 (19.6)	0.73

<sup>a</sup>Children with special health care needs added to survey in 2013.

<sup>b</sup>GED = General Educational Development Test (high school equivalency credential).

<sup>c</sup>SNAP = Supplemental Nutrition Assistance Program.

<sup>d</sup>WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

<sup>e</sup>Household food insecurity: Caregivers indicated three or more affirmative responses to the Household Food Security Survey Module.

<sup>f</sup>Child food insecurity: Caregivers indicated two or more affirmative responses to eight child-referenced questions on the Household Food Security Survey Module.

<sup>g</sup>Child health fair/poor: Caregiver perception of their child's health as fair, poor, good, or excellent.

<sup>h</sup>Developmental risk two or more parent-identified concerns on the Parents' Evaluation of Developmental Status.

<sup>i</sup>Admission from emergency department: Whether or not the child was subsequently hospitalized on the day of interview, abstracted from the medical record.

<sup>j</sup>Lifetime hospitalizations: Child had 1 or more hospitalizations other than at birth or on the day of the interview.

<sup>k</sup>At risk of underweight: Weight-for-age <5th percentile or weight-for-length/height <10th percentile using Centers for Disease Control and prevention standards.<sup>28</sup>

<sup>l</sup>At risk of overweight: Weight-for-length ≥95th percentile for children younger than age 24 months and body mass index for age >85th percentile for children aged 24 months or older.

increases in family financial strain and food insecurity. For child-care providers themselves, who often face barriers to accessing CACFP, the loss of funding from the program during the pandemic further increased financial hardships as providers struggled to afford rent, utilities, insurance, and staff wages.<sup>45–47</sup> These losses may have contributed to exacerbated financial distress, constraint, and closures among child-care providers throughout the pandemic, further limiting capacity to continue operation and provide care and meals.<sup>47</sup>

Health care providers, including food and nutrition practitioners, can support families in connecting to resources that can help with identifying and addressing barriers to accessing high quality child-care settings that are licensed, provide meals, and participate in CACFP. Opportunities for advocacy and policy action exist through support of enhancements to CACFP made through the Child Nutrition Act Reauthorization,<sup>48</sup> as well as other proposed legislation that seeks to improve healthy dietary habits and access to healthy food for young children through evidence-based revisions to CACFP. Allocation of adequate funding for CACFP is critical for sustaining the high-quality nutrition standards required for participation, outlined in the 2010 Healthy, Hunger-Free Kids Act.<sup>49</sup> These changes enhanced the nutritional quality of meals by increasing the consumption of fruits, vegetables, and whole grains, reducing the consumption of added sugars and saturated fats, and allowing for more nutritious substitutions.<sup>50</sup> Although these are positive steps, evidence suggests the current funding levels are inadequate for full implementation of the program, including insufficient reimbursement rates that do not meet the real cost of healthy

foods (especially in light of recent inflation in food prices) and support for provider training and technical assistance.<sup>51,52</sup> Higher reimbursement rates allow providers to purchase significantly more nutritionally adequate meals, potentially further improving child dietary intake.<sup>53</sup> Despite efforts to simplify paperwork, administrative burden is a continued barrier to child-care provider participation in CACFP, and thus program access for children.<sup>54,55</sup> Enhanced funding for child-care provider expense associated with program training, required reporting, and technical assistance would reduce administrative burdens and potentially facilitate more providers' participation.<sup>56</sup>

Funding that allows child-care providers the option of serving a fourth meal for children who are in care for 8 hours or more better reflects the reality of working parents' lives and the optimal eating schedules of young children needed to meet nutrition and child-feeding recommendations from the Academy of Nutrition and Dietetics.<sup>57</sup> Strategies to reduce administrative burden, cost barriers, and simultaneously increase participation include policies that enable child-care providers in areas with high rates of low-income families to automatically receive the highest tier of CACFP reimbursement rates.<sup>58,59</sup>

Future research on child-care feeding should include a focus on differential access and participation by race/ethnicity and nativity. Young children of color disproportionately live in families with low incomes and experience food insecurity—at higher rates than White children, and women of color, particularly Black women, have greater difficulty finding child care compared with White women.<sup>60,61</sup>

**Table 2.** Adjusted associations of meal source and household and child outcomes among young children in child care from low-income families<sup>a</sup> (Children's HealthWatch data, January 2010-March 2020<sup>36</sup>)

	Child care-provided meals (n = 2,689)	Parent-provided meals (n = 395)	P value
	← Adjusted odds ratio (95% CI) →		
Household food insecure <sup>b</sup>	0.70 (0.55-0.88)	1.00	0.003
Child food insecure <sup>c</sup>	0.84 (0.62-1.15)	1.00	0.28
Child health fair/poor <sup>d</sup>	0.61 (0.46-0.81)	1.00	0.001
Developmental risk <sup>e</sup>	0.90 (0.69-1.17)	1.00	0.43
Admission from emergency department <sup>f</sup>	0.59 (0.41-0.83)	1.00	0.003
At risk of underweight <sup>g</sup>	1.28 (0.90-1.83)	1.00	0.17
At risk of overweight <sup>h</sup>	0.82 (0.62-1.08)	1.00	0.16

<sup>a</sup>Model controlled for site, maternal race/ethnicity, caregiver marital status, caregiver educational attainment, child's age, birthweight status, and lifetime hospitalizations.<sup>1</sup>

<sup>b</sup>Household food insecurity: caregivers indicated three or more affirmative responses to the Household Food Security Survey Module.

<sup>c</sup>Child food insecurity: caregivers indicated two or more affirmative responses to eight child-referenced questions on the Household Food Security Survey Module.

<sup>d</sup>Child health fair/poor: Caregiver perception of their child's health as fair, poor, good, or excellent.

<sup>e</sup>Developmental risk two or more parent-identified concerns on the Parents' Evaluation of Developmental Status.

<sup>f</sup>Admission from emergency department: whether or not the child was subsequently hospitalized on the day of interview, abstracted from the medical record.

<sup>g</sup>At risk of underweight: Weight-for-age <5th percentile or weight-for-length/height <10th percentile using Centers for Disease Control and Prevention standards.<sup>28</sup>

<sup>h</sup>At risk of overweight: Weight-for-length ≥95% for children younger than age 24 months and body mass index for age >85% for children aged 24 months or older.

<sup>1</sup>Lifetime hospitalizations: Child had one or more hospitalizations other than at birth and on the day of the interview.

**Table 3.** Sensitivity analyses: Adjusted associations of meal source and household and child outcomes among young children in child care from low-income families additionally controlling for Supplemental Nutrition Assistance Program (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (Children's HealthWatch data, January 2010-March 2020<sup>36</sup>) and children with special health care needs (Children's HealthWatch data, June 2013-March 2020)

Reference: Parent-provided meals	Model 1: <sup>a</sup> Child care-provided meals, additionally controlling for SNAP and WIC (n = 3,084)	Model 2: <sup>b</sup> Child care-provided meals, additionally controlling for children with special health care needs and SNAP and WIC (n = 1,969)
	← Adjusted odds ratio (95% CI) →	
Household food insecure <sup>c</sup>	0.70 (0.55-0.88)**	0.73 (0.54-0.99)*
Child food insecure <sup>d</sup>	0.84 (0.62-1.15)	0.70 (0.49-1.01)
Child health fair/poor <sup>e</sup>	0.61 (0.46-0.82)**	0.64 (0.43-0.95)*
Developmental risk <sup>f</sup>	0.92 (0.70-1.19)	1.37 (0.96-1.96)
Admission from emergency department <sup>g</sup>	0.59 (0.42-0.84)**	0.52 (0.34-0.81)**
At risk of underweight <sup>h</sup>	1.29 (0.91-1.85)	1.00 (0.64-1.57)
At risk of overweight <sup>i</sup>	0.84 (0.63-1.10)	0.77 (0.54-1.10)

<sup>a</sup>Model 1 controlled for site, maternal race/ethnicity, caregiver marital status, caregiver educational attainment, child's age, birthweight status, lifetime hospitalizations,<sup>1</sup> SNAP, and WIC.

<sup>b</sup>Model 2 controlled for site, maternal race/ethnicity, caregiver marital status, caregiver educational attainment, child's age, birthweight status, lifetime hospitalizations,<sup>1</sup> SNAP, WIC, and children with special health care needs.

<sup>c</sup>Household food insecurity: caregivers indicated three or more affirmative responses to the US Household Food Security Survey Module.

<sup>d</sup>Child food insecurity: Caregivers indicated two or more affirmative responses to eight child-referenced questions on the Household Food Security Survey Module.

<sup>e</sup>Child health fair/poor: Caregiver perception of their child's health as fair, poor, good, or excellent.

<sup>f</sup>Developmental risk: Two or more parent-identified concerns on the Parents' Evaluation of Developmental Status.

<sup>g</sup>Admission from emergency department: whether or not the child was subsequently hospitalized on the day of interview, abstracted from the medical record.

<sup>h</sup>At risk of underweight: Weight-for-age <5th percentile or weight-for-length/height <10th percentile using Centers for Disease Control and Prevention standards.<sup>28</sup>

<sup>i</sup>At risk of overweight: Weight-for-length ≥95% for children younger than age 24 months and body mass index for age >85% for children aged 24 months or older.

\*P ≤ 0.05.

\*\*P ≤ 0.01.



This study's strengths included its diverse, multicity sample and unique data linking child-care feeding and child health, health care utilization, and food security measures among very young children. Limitations to this study include the repeat cross-sectional design, which demonstrates association, not causation. In addition, there is potential for sample selection bias because participants were caregivers of young children seeking health care in EDs or primary care clinics, which could limit findings' generalizability. Additional research should clarify whether or not parent-provided meals are in response to children's medical or dietary restrictions or other reasons. Collecting self-reported information on CACFP participation from parents is challenging, thus the authors relied on an expert-informed proxy measure rather than direct knowledge of participation. Although the child-care centers and family-care homes accepting child care subsidy were likely eligible for CACFP participation, the authors cannot be sure that they were participating in the program nor that children in center-based care were categorically eligible. In addition, other than for children attending Head Start or Early Head Start, it is not known whether the center-based or family day care programs were licensed and thus adhering to the licensure requirements for child nutrition. Several key measures in this study, including child care type, hours in child care and source of children's meals, depend on caregiver report, and thus are subject to reporting bias. Lastly, unmeasured factors may have affected the associations.

## CONCLUSIONS

Child-care–provided meals were associated with household food security, excellent/good child health, and lower odds of hospital admission from the ED among young children from families with low incomes receiving child care subsidy. Thus, policies that focus on strengthening and expanding access to nutrition in child-care settings, of which CACFP is the primary national program, are important for promoting positive outcomes for toddlers in child care. Registered dietitian nutritionists, public health professionals, and health providers are uniquely positioned to advocate for evidence-based improvements to CACFP and overall investment in high-quality child care.

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## AUTHOR INFORMATION

S. Ettinger de Cuba is executive director, Children's HealthWatch, Boston Medical Center, Boston, MA; a research associate professor, Department of Health Law, Policy, and Management, Boston University School of Public Health, Boston, MA, and a research associate professor, Department of Pediatrics, Boston University Chobanian and Avedisian School of Medicine, Boston, MA. A. Bovell-Ammon is director of policy and communications, N. Ahmad is program manager, C. Bruce is a senior research and policy analyst, A. Poblacion is a research scientist and director of multisite operations, Children's HealthWatch, Boston Medical Center, Boston, MA. L. J. Rateau, is a statistical analyst, and S. M. Coleman is a senior project manager, Biostatistics and Epidemiology Data Analytics Center, Boston University School of Public Health, Boston, MA. M. M. Black is a professor emeritus, Department of Pediatrics, University of Maryland School of Medicine, Baltimore, and a distinguished fellow, early child development, RTI International, Research Triangle Park, NC. D. A. Frank is a professor of child health and well-being, and M. Sandel is a professor, Department of Pediatrics, Boston University Chobanian and Avedisian School of Medicine, Boston, MA. F. Lê-Scherban, is an associate professor, Department of Epidemiology and Biostatistics, and training core lead, Urban Health Collaborative, Dornsife School of Public Health, Drexel University, Philadelphia, PA. G. Henchy is director of early childhood nutrition, Food Research and Action Center, Washington, DC. E. Ochoa Jr is an associate professor and vice chair for diversity and health equity, Department of Pediatrics, University of Arkansas for Medical Sciences, Little Rock. D. B. Cutts, MD is an associate professor of pediatrics, University of Minnesota, Minneapolis, and chair of pediatrics, Department of Pediatrics, Hennepin Healthcare, Minneapolis, MN.

Address correspondence to: Stephanie Ettinger de Cuba, PhD, MPH, Boston University School of Public Health, 715 Albany St, 3rd floor, Boston, MA 02118. E-mail: [sedc@bu.edu](mailto:sedc@bu.edu)

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S. Ettinger de Cuba, conceptualized and designed the study, supervised data collection, drafted the initial manuscript, and reviewed and revised the manuscript. D. B. Cutts conceptualized and designed the study, supervised data collection, and critically reviewed the manuscript for important intellectual content. A. Bovell-Ammon provided policy expertise, assisted in drafting the manuscript, and critically reviewed the manuscript for important intellectual content. N. Ahmad assisted in drafting the manuscript and critically reviewed and revised the manuscript for important intellectual content. C. Bruce managed data collection and critically reviewed and revised the manuscript for important intellectual content. A. Poblacion provided clinical expertise and critically reviewed and revised the manuscript for important intellectual content. L. J. Rateau and S. M. Coleman conducted the data analysis and reviewed and revised the manuscript for important intellectual content. G. Henchy helped conceptualize the study and critically reviewed and revised the manuscript for important intellectual content. M. Black, D. A. Frank, F. Le Scherban, E. Ochoa, and M. Sandel supervised data collection and critically reviewed and revised the manuscript for important intellectual content. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.