

NBER WORKING PAPER SERIES

THE CHILD AND ADULT CARE FOOD PROGRAM:
WHO IS SERVED AND WHAT ARE THEIR NUTRITIONAL OUTCOMES?

Rachel A. Gordon

Robert Kaestner

Sanders Korenman

Kristin Abner

Working Paper 16148

<http://www.nber.org/papers/w16148>

NATIONAL BUREAU OF ECONOMIC RESEARCH

1050 Massachusetts Avenue

Cambridge, MA 02138

July 2010

The authors gratefully acknowledge funding from the USDA Nutrition Research Innovation and Development Grants in Economics (RIDGE) Program. This paper benefited from two RIDGE workshops held at the Harris School at the University of Chicago and the 2009 RIDGE Conference, in Washington DC. We also thank seminar participants at Chapin Hall at the University of Chicago and the School of Public Affairs, Baruch College/CUNY for their comments. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

NBER working papers are circulated for discussion and comment purposes. They have not been peer-reviewed or been subject to the review by the NBER Board of Directors that accompanies official NBER publications.

© 2010 by Rachel A. Gordon, Robert Kaestner, Sanders Korenman, and Kristin Abner. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

The Child and Adult Care Food Program: Who is Served and What are Their Nutritional Outcomes?

Rachel A. Gordon, Robert Kaestner, Sanders Korenman, and Kristin Abner

NBER Working Paper No. 16148

July 2010

JEL No. I38, I13, I18

ABSTRACT

This paper addresses three basic questions about an under-studied food subsidy program, the Child and Adult Care Food Program (CACFP): (1) Does CACFP reach targeted low-income children? (2) How do eligible families and child care providers who participate differ from those who do not participate? (3) What is the association between attending CACFP-participating child care and children's food intake, weight, and food security? We use the Early Childhood Longitudinal Study, Birth Cohort to examine these questions for a representative sample of young children and their providers. We find that program eligibility rules leave many poor children outside the CACFP program. Yet, among poor preschoolers in center-based care, participation in the program is correlated with positive outcomes such as increased consumption of milk and vegetables, and healthier weight (BMI). We discuss the implications of our findings, especially in relation to other food and child care subsidy programs.

Rachel A. Gordon

Institute of Government and Public Affairs

University of Illinois

815 West Van Buren Street, Suite 525

Chicago, IL 60607

ragordon@uic.edu

Robert Kaestner

Institute of Government and Public Affairs

University of Illinois

815 West Van Buren Street, Suite 525

Chicago, IL 60607

and NBER

kaestner@uic.edu

Sanders Korenman

School of Public Affairs

Baruch College

135 E. 22nd Street, Box D-900

New York, NY 10010

and NBER

sanders.korenman@baruch.cuny.edu

Kristin Abner

Institute of Government and Public Affairs

University of Illinois

815 West Van Buren Street, Suite 410

Chicago, IL 60607

kabner2@uic.edu

In 2008, nearly 15% of households were food insecure—had inconsistent access to enough food for active healthy lives—including 6% with very low food security—reduced food intake and disrupted eating patterns due to lack of food; these are the highest rates of food insecurity recorded since the first national food security survey was conducted in 1995 (Nord, Andrews, and Carlson 2009: 8). Rates of food insecurity were higher for households with children, single-parent households, minority households, and poor households. Fully half of low-income female-headed households with children were food insecure in 2008 (Nord et al. 2009: 15). The extent of food insecurity is worrisome because child hunger can adversely affect children's health, and their cognitive and social development (Tanner and Finn-Stevenson 2002). Sustained child hunger can lead to short stature and low weight for height, which have been linked to worse adult health and reduced economic well being even in the U.S. (Case and Paxson 2008; Fogel 2004).

To address inadequate child nutrition, more than a dozen federal programs provide food and nutrition to children and families (Fox, Hamilton, and Christenson 2004). In FY 2008, \$38 billion was spent on the Supplemental Nutrition Assistance Program (SNAP, formerly Food Stamps), which represents more than half of federal expenditures for nutrition programs. Expenditures on four other programs exceeded one billion dollars each: the National School Lunch Program (\$9.3 billion), the Special Supplemental Nutrition Program for Women, Infants and Children (WIC; \$6.2 billion), the Child and Adult Care Food Program (CACFP; \$2.4 billion), and the School Breakfast Program (\$2.4 billion; Oliveira, 2009). All of these programs have been widely studied, except for the CACFP. A review by Frederic Glantz (2004) identified only a handful of studies of the CACFP and concluded, "Some studies have assessed the nutrient contribution of CACFP meals and snacks to participants' overall diets. However, there has been no research on the impact of the program on participants' nutrition and health status, relative to

nonparticipants” (p. 236). In a comprehensive review of federal nutrition programs, Janet M. Currie (2006a) makes a similar point: “One of the most important [of the smaller food programs] is the Child and Adult Care Food Program, which operates somewhat like the school meals programs, but serves approximately 1.7 million low-income children in daycare centers. There has been little investigation of the benefits of participation in these programs, but the positive effects of the school meal programs suggests that providing meals to younger children...makes sense.” (86).

In this study, we begin to fill the gap in research about CACFP. We use a nationally-representative sample of children and their childcare providers to examine three research questions:

1. How well does the CACFP reach targeted low-income children who are most at risk of nutritional deficits?
2. How do eligible families and child care providers who participate in the CACFP differ from those who do not participate?
3. What is the association between attending CACFP-participating child care and children's consumption of food, food insecurity, and weight?

Our study makes two contributions. First, we add to the limited evidence about whether CACFP reaches targeted children and what characteristics of providers and families affect participation. Previous research on CACFP has examined only participating homes (or those which had recently participated) and has not included a comparison group of non-participating homes or centers. The evidence on coverage we present should help policymakers and analysts understand who is and is not being served by CACFP. Second, as far as we are aware, our study is the first to compare children attending CACFP participating child care to nonparticipants in terms of food intake, weight status and food insecurity of children.

]

CACFP Program Features

The Child and Adult Care Food Program reimburses caregivers for meals and snacks provided to children in child care centers or homes, after-school programs, and homeless shelters, and to adults in adult day care centers. In FY 2008, 97% of CACFP reimbursed meals and snacks were provided to children (as opposed to adults), including over 1.2 billion meals and snacks served in child care centers and over 600 million served in family day care homes (Oliveira, 2009).

Eligibility criteria are not very exclusionary; any child and most providers are eligible to participate in the program, although reimbursement rates are higher if certain eligibility criteria are met. Four central criteria determine eligibility and benefit levels: type of care (center vs. home, for-profit vs. non-profit, licensed vs. unlicensed), neighborhood income, provider income, and/or family income of children. Figure 1 describes these criteria.¹

Home-based Providers

All licensed, home-based providers (which we will also refer to as family day care) are eligible to participate, but they receive higher (Tier I) or lower (Tier II) reimbursement rates depending on some combination of their neighborhood income, their own income and the income of children in their care (U.S. Department of Agriculture 2002).² In 2004-2005, Tier I rates per child for breakfast, lunch/supper, and snack were \$1.04, \$1.92, and \$0.57 respectively; Tier II rates were \$0.39, \$1.16, and \$0.15 respectively (U.S. Department of Agriculture n.d.). Home-based providers participate through a local sponsoring agency, such as a local child care

¹ This description corresponds to the period of our study data (2001-2005).

² Federal guidelines allow states to extend eligibility to license-exempt homes, although a comprehensive list of the states that do and do not extend eligibility is not readily available. In our national data set, we

resource and referral agency, that determines eligibility and processes reimbursements. Family day care providers are eligible for Tier I rates if they are located in low-income areas (based on local elementary school free- and reduced-price lunch enrollment or census block-group income); or if the provider's household income is below 185% of the federal poverty line or she is categorically eligible (receives TANF or Food Stamps). Notably, providers eligible for Tier I reimbursement need not serve poor children.³ Licensed homes that do not meet the criteria for Tier I reimbursement are eligible for Tier II (lower) reimbursement. However, these providers can still be reimbursed at Tier I rates for children in their care who have low incomes. To receive the higher rate (Tier I) for a low-income child, a Tier II provider must document that the child's family income is below 185% of the federal poverty threshold or that the family is categorically eligible. Thus, all licensed family day care homes are eligible for some level of subsidy.

Child Care Centers

The eligibility rules for centers are also shown in Figure 1. All centers are reimbursed on a per-child basis and must determine each child's rate based on family income. Centers can either determine children's eligibility directly or participate through a sponsor. Each child's reimbursement is either *full* (if the child's family income is below 130% of poverty), *reduced* (if family income is between 130% and 185% of poverty), or *paid* (if family income is above 185% of poverty). Full rates were \$1.23 for breakfast, \$2.24 for lunch, and \$0.61 for snacks in 2004-2005. Reduced rates were \$0.93, \$1.84 and \$0.30, respectively. Paid rates were \$0.23, \$0.21, and \$0.05 respectively (U.S. Department of Agriculture n.d.). Children who participate in

observed unlicensed homes to participate in just 21 of 46 states, and the percentage participating exceeded 10 percent in only 5 of those 21 states.

TANF, Food Stamps or Head Start are categorically eligible for full reimbursement. For-profit centers can participate only if at least 25% of enrolled children are income-eligible or their care is funded through Title XX (Social Services Block Grant funds; U.S. Department of Agriculture 2008).⁴ In short, all centers are eligible to receive some level of subsidy, except for-profit providers that serve few poor children.

Nutritional Requirements

Providers receive information about federal nutritional guidelines for reimbursable meals and snacks, although providers retain discretion in menu planning (Fleischhacker, Cason, and Achterberg 2006; Oakley et al. 1995). For children aged 3 to 5, USDA meal patterns require that children have three-fourths cup of milk, a half cup of a fruit or vegetable, and a half slice or half serving of a grain for breakfast. For lunch or supper, they should consume three-fourths cup milk, two half-cup servings of a fruit or vegetable, one serving of a grain or bread, and one serving of meat or meat alternative. A snack must include two of the following four components: one half cup of milk, one fruit or vegetable, one grain or bread, or 1 meat or meat alternative (U.S. Department of Agriculture 2009). Providers must keep daily documentation of planned menus and any variations from them, specifically what kinds of foods and drinks are served at meals and snacks. They must also keep records of program enrollment, attendance, and number of meals served. These records must be available for sponsors to review during visits.

□

³ Throughout the paper, when we refer to *poor* or *low-income* children we mean those who meet any individual eligibility criteria for the CCFAP (household income below 185% of the federal poverty line (FPL) or participation in the TANF or Food Stamp program).

⁴ As with license-exempt homes, states vary in which types of centers are not required to be licensed. But, unlike license-exempt homes, which are typically small (3-4 children in care) and outside of any regulatory scrutiny, states typically exempt from licensing centers and preschool programs overseen by organizations such as schools, churches or local governments (National Child Care Information Center

Implications of Program Rules

Determinants of Child Receipt of CACFP Benefits

An important feature of CACFP is that participation is ultimately determined by the provider rather than the family, although families can seek out a participating provider. Thus, unlike other nutritional entitlement programs (e.g., Food Stamps/SNAP), many poor children are not served by CACFP because of provider ineligibility, and receipt of CACFP benefits will vary among similar low-income children according to the characteristics and behavior of their care providers. Ineligible children include those with no non-parental child care arrangements, which includes at least half of children ages 0 to 2 and one-quarter of children ages 3 to 4 (Iruka and Carver 2006). In addition, most children cared for by license-exempt caregivers such as neighbors, friends or relatives are not eligible, which, in one three-city study, included over half of low-income children (Li-Grining and Coley 2006). For children cared for in licensed family day care or in centers, provider eligibility and program reimbursement levels depend significantly on characteristics of providers. For centers, eligibility and reimbursement levels depend on ownership (e.g., for-profit) status and the income levels of children served. For licensed homes, eligibility and reimbursement levels depend on the provider's income, the poverty rate of the provider's neighborhood or the income levels of children served. Because provider characteristics influence eligibility and take up, even among children cared for in licensed homes and centers, we expect to find that a significant portion of poor children do not receive CACFP and a portion of non-poor children receive CACFP.

We expect costs and benefits (broadly defined) of participation to influence provider participation. Provider size and eligibility for different reimbursement levels are key

and the National Association for Regulatory Administration 2009). In our national data set, we observed unlicensed centers to participate in CACFP in 38 of the 44 states.

determinants of participation benefits to providers. Because the costs of participation are relatively fixed (e.g., a menu must be planned for three or three hundred children), but reimbursement increases linearly with the number of children, especially poor children, participation should become more attractive when the provider cares for more children, particularly low-income children.

Table 1 illustrates how CACFP reimbursements vary according to type of care (home or center), the total number of children in care and the number of low-income children (who are reimbursed at a higher rate, except in Tier I homes). Amounts shown are monthly and assume 23 days of care per month per child, and reimbursement for breakfast, lunch and snack for each child, which is the most common configuration of meals and snacks (Crepinsek et al. 2002). If one assumes that centers and home-based care providers would serve meals and snacks in the absence of the program, then it is clear that homes and centers that serve large numbers of poor children (Tier I or full reimbursement) have very substantial monetary incentives to participate. For many mid-size to large centers, benefits as high as \$9,000 to \$14,000 per month would likely far exceed administrative costs of CACFP. Likewise, a large home would receive nearly \$1,000 per month at the Tier I rate.

Comparing across columns of Table 1 shows how incentives for providers to participate vary according to the incomes of children in their care. Monthly reimbursement levels increase much more steeply with different reimbursement levels for centers than homes, giving centers that serve poor children a greater incentive to participate than those serving non-poor children, and also creating strong incentives for centers to serve more poor children. For homes, the ratio of Tier I to Tier II reimbursement is only 2 to 1. For centers, in contrast, the ratio of reduced to paid reimbursement is 6 to 1, and the ratio of full to paid reimbursement is 8 to 1.

One study provides evidence that providers respond to the financial incentives of

different reimbursement rates. Abt Associates conducted a large national study of the switch from one to two reimbursement tiers for home-based providers was introduced as part of the 1996 welfare reform legislations in order to better target low-income children (Glantz 2004; U.S. Department of Agriculture 2002). The new category of Tier I homes was not affected by the change, but homes in the new Tier II category received a lower rate. The Abt study reported that the number of participating homes fell by about 14% following the introduction of tiering, relative to projected trends (U.S. Department of Agriculture 2002). Among providers who participated at the lower Tier II rate, nearly two-thirds reported that meal reimbursement rates were unsatisfactory, compared to about ten percent of Tier I providers. Tier II providers also reported spending about \$20 less per week on food, on average, than Tier I providers (\$110 versus \$91).

Among similar children, several provider and family characteristics may influence participation. For example, although the cost of participation is low for home-based providers in low-income areas because all licensed home providers in the area are eligible and validation of their income or the income of children in their care is not required, providers must still find out about the program, be willing to work with a sponsor, and complete the required paperwork (e.g., submit menus to sponsors). These considerations suggest that characteristics related to access to information such as participation in professional networks, or characteristics that make paperwork and scrutiny less daunting such as participation in other public programs, should increase participation. Licensed homes are predicted to have high participation rates because licensing itself entails oversight procedures and the licensing agency likely provides many kinds of information.

Centers typically have greater access to information and existing oversight relationships than homes. Most center-based care is licensed or associated with larger organizations (e.g.,

public and private schools or religious organizations) that regularly provide information to center directors including information about CACFP. Still, broader professional networking may also affect center participation. Because centers must determine the correct level of reimbursement for each child, participation may be viewed as costly, especially when most children in care are not poor. However, centers tend to have more formal administrative relationships with parents than do home-based caregivers, which would facilitate income-eligibility checks. Also, poor families may already be participating in other programs involving the provider such as general child care subsidies or Head Start. Referral relationships with Head Start may be associated with higher participation either because poverty rates are high among Head Start children, which increase financial incentives to participate, or due to network/information ties to Head Start providers or families, virtually all of whom are served by CACFP.

We also expect family characteristics to affect whether children participate. Families affect participation in three ways: by their poverty status or other program participation, by their residence in areas with more poor children, and by their choice of provider. In choosing care, some parents may directly seek out a provider who participates in CACFP or who has characteristics that may correlate with participation (like a higher quality care environment, including higher nutritional quality). Other parents may avoid care settings with numerous poor children, taking this as a signal of lower quality. Furthermore, providers may factor such parental choices into their decisions about participation in CACFP. For example, a provider in a mixed income area may, on the one hand, be able to raise revenues in the form of larger reimbursements from the CACFP by serving more low-income children but, on the other hand, may worry about the potentially adverse market signal this sends to some parents.

In sum, participation in CACFP depends on eligibility rules and characteristics of both families and providers, particularly characteristics linked to the costs and benefits of provider

participation. Below, we provide the first national portrait of participation in relation to the key determinants of eligibility and reimbursement levels: type of care (center vs. home, for-profit vs. non-profit, licensed vs. unlicensed), neighborhood income, provider income, and family income. We then focus on a set of similar eligible children (low income children attending centers) and employ multiple regression analyses that include characteristics of providers and families (such as the center's referral relationships with Head Start and willingness to accept child care subsidies and the mother's education level and reasons for choosing care) that may determine who among these eligible children participates in the program.

CACFP Participation and Child Nutritional Outcomes

We also assess whether the CACFP is associated with child nutritional outcomes. As described above, participating providers must develop menus that meet USDA meal patterns, including requirements for serving nutritious foods such as vegetables, fruits, and milk. If providers follow these patterns, children's consumption of nutritious foods should increase when cared for in a participating setting. Children's consumption of less nutritious foods (such as drinking soda or fruit-flavored drinks or eating sweet snacks) might also be reduced. Reimbursements from CACFP may also allow providers to increase food portions, which may help some poor children meet their calorie needs and reduce food insecurity. Whether and how these changes in diet affect weight, however, is unclear, as weight is determined by caloric intake; and, whereas some nutritious foods (e.g., fruit and whole milk) are high in calories, other nutritious foods (like vegetables) are low in calories. Children in full-time care typically consume half to two-thirds of their daily meals and snacks in the care setting (Ziegler et al. 2006). Thus, to the extent the program improves nutrition, food security, and appropriate caloric intake, we expect the associations to be greater for children who are in care for longer hours.

On the other hand, CACFP participation might not be associated with child nutritional

outcomes because providers have latitude in food menus and their meals are infrequently monitored (i.e., one time per year). Some studies find relatively good adherence to menu requirements. For example, a study by Abt Associates found that in Tier II homes over 90% of breakfasts, lunches and snacks met the meal pattern requirements (Crepinsek et al. 2002). In addition, the Feeding Infants and Toddlers Study (FITS) showed that children consumed more milk, fruits and vegetables at lunches served at child care than at lunches served at home (Ziegler et al. 2006).⁵ However, other studies that observed the meals served in CACFP-participating settings reveal that meal patterns are sometimes not followed; substitutions from planned menus are not documented, or children do not consume the food served. One study of participating homes and centers in Texas found that no provider met the meal patterns all of the time, and the only meal components served 100% of the time were milk at breakfast and meat at lunch (Kuratko et al. 2000). In a study of Head Start centers, only four meals served out of 269 perfectly matched menu descriptions (Fleischhacker et al. 2006).

As far as we are aware, no prior study has examined how food intake, weight status and food insecurity differ between children who attend CACFP-participating settings and those who do not. Although our study has some limitations, including reliance on parental reports (except for child height and weight) and non-random assignment of children to CACFP settings, it provides the first estimates of associations between CACFP participation and nutrition-related outcomes of preschool aged children.

Summary

In summary, the CACFP is clearly understudied compared to other federal nutritional programs. In the remainder of this paper we present the first national portrait of participation in the CACFP in relation to key program eligibility and reimbursement rules. An important feature

⁵ The study did not identify which child care providers participated in CACFP.

of the CACFP is that eligibility for the program and the benefits and costs of participation are linked to provider as well as family characteristics. We therefore describe how numerous characteristics of providers and families correlate with participation for similar low-income children in center care. We also compare nutrition-related outcomes for low income children who attend a participating center to low income children who attend a non-participating center, adjusting for other characteristics of providers and families that we found to be associated with participation. We conclude with a detailed discussion of the implications of our findings, especially in the context of other nutritional and child care subsidy programs.

□

Sample, Measures, and Methods

Sample

We use the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), which is a longitudinal study of a nationally representative sample of children from birth onward.⁶ Children in the sample were born in 2001 in 46 states. The sample size was 10,700, resulting from a response rate of 74% at the initial 9-month interview. At the two- and four-year follow up interviews, sample sizes were 9,850 and 8,950, respectively. The ECLS-B oversampled children born with a low birth weight or a twin as well as American Indian and Asian children. At two-years, 43% of children in the sample were non-Hispanic white, 16% non-Hispanic black, 20% non-Hispanic other, and 21% were Hispanic. At the two- and four-year follow-ups the child's primary non-parental care provider, the person who cared for the child for the most hours per week, was contacted for an interview. The weighted response rate in the two year follow-up was 70% for the child care provider interview (Bethel et al. 2007: 3-25). The weighted response rate

⁶ A data-sharing agreement is required for the restricted-use ECLS-B data. All sample sizes reported in the text and tables are rounded to the nearest 50, as per the data-sharing agreement.

in the four year follow-up was approximately 90% for center-based providers and 80% for home-based providers (Snow et al. 2007: 306). We use sampling weights in all analyses that were created to adjust for the initial sampling design, initial nonresponse, and differential nonresponse over time (Snow et al. 2007).

Measures and Methods

To answer our three research questions, we constructed measures of CACFP participation, child nutritional outcomes, child care provider characteristics, and child and family characteristics, including information about the family, provider, and ZIP code poverty to approximate eligibility rules and reimbursement levels. We present descriptive statistics and details about variable measurement in Appendix A.

Our analyses have three overarching purposes: to describe the populations served by CACFP, to identify correlates of participation, and to estimate associations between participation in CACFP and nutritional outcomes among low-income children. For the first purpose, we present simple descriptive statistics. We calculate the percentage of children who are in different types of care and, within these types of care, the percentage who receive CACFP and whose families are poor. To examine the importance of area income, we then calculate CACFP participation rates by area and family poverty, separately for homes and centers. Because we anticipate age differences in types of care arrangements, we report all descriptive statistics separately for two year olds and four year olds. We apply the appropriate sampling weight so that these statistics are nationally representative of children born in 2001.

To identify which provider and area characteristics have independent associations with take up among similar children, we estimate a series of four OLS linear probability models that predict whether low income children who attend centers participate in CACFP or not (OLS is used for simplicity of interpretation; the pattern of statistical significance is highly similar for

logistic regression models; results are available from the authors). Standard errors are adjusted for heteroskedasticity and for clustering at the ZIP code level. Our first model includes key determinants of the financial benefits to centers of participating, including area poverty, for-profit status, licensure status and licensed capacity, but with only minimal controls (for the sampling weight, dummy variables for child age in months, and dummy variables for geographic state or region). In our second model, we add center covariates that may indicate organizational capacity to find out about and enroll in the program, such as referral relationships with Head Start and the director's tenure at the center. In the third model, we add child and family characteristics that may influence whether parents choose participating centers, such as the mother's reasons for selecting care and her education level. In the fourth model, we add lagged (measured at age two) child milk consumption, BMI, and food insecurity to study whether or not children who participate in CACFP are nutritionally selected, conditional on other characteristics of their families and care providers. Evidence of such selectivity has been found for other nutritional programs, such as Food Stamps, where families most in need are also most likely to take up (Burstein et al., 2004; Gibson-Davis & Foster 2006).

For our third research question, examining associations between CACFP participation and child nutritional outcomes, we estimate another series of OLS linear probability models in which four year olds' food consumption, food insecurity and weight status are outcomes and a dummy indicator of attending a CACFP-participating center is the central predictor (the pattern of significance is again highly similar for logistic regression models; results are available from the authors). Similar to our models predicting participation, we estimate a series of four models. The first child outcome model includes an indicator of CACFP participation and minimal controls for the sampling weight and dummy variables for child age in months, for geographic state or region, and for whether the parent respondent is the mother. The second model adds the

child and family covariates described above and shown in Appendix A, which may select children into participating settings based on health, nutritional or socioeconomic status and also be correlated with child outcomes. The third model adds controls for center characteristics that are potential confounders; for example, directors with a longer tenure at the center may be more likely to seek reimbursements from CACFP and already deliver effective care in other ways, such as better health practices. Our fourth model includes controls for child outcomes measured at age two (i.e., lagged child outcomes) to adjust for unmeasured stable characteristics associated with child health and nutrition at age four as well as age two. We do not use child fixed effects (i.e., first differences) because we do not have exact repeated measures for all outcomes and because we anticipate that the association between CACFP participation and child outcomes might vary for two and four year olds (but standard fixed-effects models constrain the associations to be identical at age two and age four).

For the participation and outcome regression models, we restrict our analysis to low-income four-year olds who are cared for in non-Head Start centers. We focus on centers because a small percentage of children, and small numbers of children in our sample, are in licensed homes at ages two or four. We study four-year olds because many more children are in centers at age four than two. We drop children in Head Start centers from our analyses because virtually all Head Start centers participate in CACFP, so it is difficult to distinguish effects of CACFP from those of the Head Start program; we lack a comparison group of Head Start participants who are not CACFP participants. We study low-income children in order to increase comparability between participating and non-participating children.

We also re-estimated the participation and outcome regressions for children who were not in care at age two, to assess whether covariates of CACFP participation and associations of participation with preschoolers' outcomes were similar among those who had not been in care as

two year olds. In addition, anticipating that associations with child nutrition and calorie consumption might be larger for children who spend more time in care (and thus who eat more meals and snacks in care) we re-estimated the outcome models for children who were in care 30 or more hours per week and who were in community centers (which are often full day, as opposed to school or church based preschool programs, which are often part day).

]

Results

How Well Does the CACFP Reach Targeted Low-Income Children?

According to the ECLS-B data, the overall rate of participation in the CACFP is low, including among poor children. Among two years olds, just 9% receive CACFP, and receipt varies little by poverty status (10% of non-poor two-year-olds and 8% of poor two-year-olds receive CACFP). Among four year olds, participation is higher, especially among poor children, although it is still the case that the majority do not receive CACFP. Overall, 28% of four-year olds receive CACFP; 20% of non-poor four-year-olds and 37% of poor four-year olds. We now turn to more detailed descriptive analyses by type of care and area poverty in order to better understand the sources of low participation overall, the modest differences in participation by poverty status, and much better coverage and targeting of benefits on poor children at the preschool age.

To begin, Table 2 shows basic information about the percentage of two year old children in each type of care arrangement, the CACFP participation rate (in relevant care types), and the family poverty rate (overall in each type of care and, where relevant, within CACFP participation status). The results show that many poor two-year olds are missed because they are not in eligible settings, and that coverage of poor children is better in centers than licensed homes. In particular, most two-year olds are cared for in settings that are either ineligible for CACFP (61%

are in exclusive maternal care), or that are either ineligible or participate at low rates; one fifth of all two-year olds, and one-half of those in child care, are in unlicensed homes, and just 5% of unlicensed providers said they participate in CACFP.

Many children who are not served are poor, including over half (55%) of children in exclusive maternal care and over one-third of those in unlicensed homes (46% of those cared for at home or by a relative; 37% of those care for by a nonrelative outside of the child's home). In contrast, although nearly two-thirds of licensed home providers participate in CACFP, just 5% of all two-year olds and 13% of two-year olds in care are in this type of setting. In addition, just over one-quarter (28%) of two-year olds in licensed homes are poor, and the poverty rate is the same among children in participating and non-participating settings. In terms of centers, two-year olds are nearly evenly split between for-profit and non-profit centers; together, over one-third of two-year olds who are in child care are cared for in centers (17% in non-profit centers; 19% in for-profit centers). Coverage of poor children is better in for-profit and non-profit centers than in licensed homes. The majority of centers do not participate in CACFP—just under one out of every three for-profit centers and about two out of five non-profit centers participate—but children who attend participating centers are more likely to be poor than those in non-participating centers (about half versus one-fifth to one-quarter).

Participation is higher, and coverage of poor children is better, at age four than at age two. The primary explanation is that more children are cared for in centers than in exclusive maternal care or unlicensed care. As Table 3 shows, less than one-quarter of four-year olds are in exclusive maternal care and only 16% are in unlicensed homes (13% with a relative or in their own home; 3% with nonrelatives outside their own home). Yet poverty rates remain high in these settings: two-thirds of children who are in exclusive maternal care at age four are poor, as are over half of those in unlicensed care provided by a relative or in their own home and over

one-third of those in unlicensed care by a non-relative away from home.

Coverage of poor children remains better in centers than licensed homes at four years.

Although a high proportion of licensed home providers who care for four-year olds participate in CACFP (66%), the percentage of children in this type of care is low (4% of all children; 5% of children in care) and the child poverty rate is similar in homes that participate in CACFP and those that do not (27% and 34% respectively). In contrast, family poverty is much higher for children attending CACFP-participating centers than non-participating centers, especially non-profit centers where coverage of poor children is particularly good. About one-third of all four-year olds (34%) and nearly half of those in care (45%) are cared for in non-profit centers. And, whereas 63% of those at CACFP-participating non-profit centers are poor, just 21% of those at non-participating non-profit centers are poor. Also as expected, participation in CACFP is nearly universal for Head Start centers (94%), and most children in Head Start centers are poor (88%).

To assess the role of area poverty, we focus our attention on licensed homes and non-Head Start centers because virtually all Head Start centers participate and almost no unlicensed homes participate. Table 4 shows CACFP participation rates by both family and area-level poverty for licensed homes at ages two and four. The table also shows whether participating providers are low income (with incomes under \$40,000). Strikingly, among licensed home providers, there is little consistent association between participation in CACFP and either area poverty levels or the poverty status of the children in their care. Regardless of the poverty status of the child's family or the fraction of children who are eligible for free or reduced lunch in local schools, generally about two-thirds of children who attend licensed homes receive CACFP. In terms of provider income, in most cases less than half of licensed home providers who participate in CACFP have incomes below \$40,000 regardless of family and area poverty levels.

Although our approximation of provider poverty is crude because we do not know the providers' household size, it is striking that among CACFP participating providers who serve non-poor children in areas with no poor schools just one-fifth (at age two) to half (at age four) fall below this income cutoff. Of course, if we could have identified whether the provider received Tier I or Tier II reimbursement rates, we may have found a stronger link between area poverty and participation, since Tier I eligibility is linked to local poverty rates (see again Figure 1).

Among children in centers (Table 5), in most cases, those who live in a lower-income area are more likely to receive CACFP; the exception is non-profit centers serving poor two-year olds, where the majority participates regardless of the area poverty level. Presumably this gradient reflects the fact that the incentive for any center to participate is greater when the center serves more low-income children; and for-profit centers located in low-income neighborhoods are more likely to meet the criterion of serving at least 25% low-income children. Although within each type of area, poor children are more likely than non-poor children to receive CACFP, they are generally least likely to receive CACFP when they live in non-poor areas. At both two years and four years, when poor children attend for-profit centers, one-third or fewer participate in CACFP if they are located in a non-poor area ($\leq 10\%$ poor) in contrast to half to two-thirds in poor areas ($\geq 20\%$ poor). Many more four-year olds than two-year olds attend non-profit centers, and at four years a similar gradient is seen by area poverty: 48% are at participating centers when located in non-poor areas in comparison to three-quarters in poor areas. Thus, the chance that a poor child will receive CACFP in a center depends on the level of poverty in the local area.

In sum, our results indicate that the majority of children do not receive CACFP because many are cared for in settings such as maternal care or an unlicensed home that are either ineligible for or do not participate in CACFP. This is especially true for two year olds. The

majority of these children are poor. Licensed homes have high CACFP participation rates, but few children are in this type of care and participation is equally high among non-poor and poor children. Coverage of poor children is better in centers than licensed homes, and by four years of age the majority of children are cared for in centers. But, among centers, poor children are less likely to participate when they live in higher-income areas, especially those who attend for-profit centers.

Provider and Family Correlates of Participation in CACFP

Estimates from the regression models predicting CACFP participation are presented in Table 6. The results in Column 1 of Table 6 confirm our descriptive results; among low-income four-year olds who attend centers, CACFP participation is higher in higher-poverty areas. In addition, for-profit centers are 19 percentage points less likely to participate in CACFP than non-profit centers.⁷ Unlicensed centers and small licensed centers are less likely to participate than large licensed centers; predicted participation rates holding covariates at their means are 73%, 65%, and 52% for large, medium and small licensed centers, respectively, and 50% for unlicensed centers.

When we control for other characteristics of centers (column 2; only significant covariates are shown in Table 6; see Appendix C for all coefficients) significant effects of some determinants including local poverty are reduced, but remain substantial in size (about 10 to 20 percentage points). Of the new covariates, we see that centers with a referral relationship to Head Start are more likely to participate (16 percentage points), which likely reflects the presence of more poor children at the center or the influence of informational links to Head Start programs. School-based prekindergarten and other preschool programs, which are sometimes part-day programs and may serve fewer meals, are less likely to participate than community

centers, which are typically full-day programs. Accredited centers are more likely to participate (10 percentage points), which may indicate the selection of higher quality centers into the program, the ability of participating centers to invest in quality, or access to better informational networks. When the center director reports accepting subsidies the center is (unexpectedly) less likely to participate; this result may reflect the fact that the question asks whether subsidies would be accepted, rather than actually received.

As shown in Column 3 of Table 6, several child and family characteristics are significantly related to CACFP participation (see Appendix C for all coefficients). Children are more likely to attend a participating center if they are in care 30 or more hours per week (10 percentage points), if their mother is less educated (14 percentage point increase for high school graduate versus having some college or more),⁸ and if the mother reported that small care group size was very important to her child care decision (8 percentage points). In Column 4, two lagged child outcomes also predict attending a participating center (estimates in Column 4): families in which the child was food insecure at age two are 16 percentage points more likely to attend a participating center at age four; and children who drank more milk at age two are more likely to attend a participating center at age four (10 percentage points for those who drank milk at meals versus neither meals nor snacks). These associations remain significant when we restrict the analysis to those who had not been in care at two years old (Appendix D).

To summarize, our estimates suggest that provider, family and locational characteristics all affect participation in CACFP. Poor children who reside in low-income areas are more likely to participate than similar poor children in wealthier areas. These area differences likely reflect the fact that the benefits to participation are greater for centers that serve many poor children.

⁸ Interactions between profit-status and area poverty were not significant.

Provider characteristics also clearly matter. Large, licensed, accredited and non-profit centers are more likely to participate, as are those connected to Head Start through referrals. These patterns of participation by providers suggest the importance of both direct financial incentives (costs and benefits) as well as informational/organizational linkages. As expected, family characteristics also affect participation, even among low-income families. Not surprisingly, controlling for provider characteristics, participation is higher among parents of lower socioeconomic status and whose children are in care more hours.

What is the Association between CACFP Participation and Child Outcomes?

The coefficients of CACFP participation for each model and outcome are summarized in Table 7 (the full set of regression coefficients is available from the authors). Overall, estimates indicate that attending a CACFP-participating center is associated with increased consumption of milk, vegetables, and (to some extent) fruits, a lower probability of being underweight (versus healthy weight) and is not associated with overweight or food insecurity. In Column 1 of Table 7, the center's participation in CACFP is associated with an 8 percentage point increase in the chance that a child will drink two servings of milk per day and with a similar percentage point increase in the chance that a child will consume fruits and vegetables at least twice daily. The differentials for milk and vegetable consumption are generally robust to the addition of child, family, and provider controls (Table 7, Columns 2 and 3), and lagged outcomes (Column 4). The associations are also sizable, given that just about two-thirds of poor four year olds in centers, on average, drink two or more cups of milk and just over one-third, on average, eat two or more servings of fruits and vegetables daily. Predicted probabilities for the full models in Column 4, holding covariates constant at their means, indicate that about 62% of children who

⁸ Mothers with less than a high school education were also more likely to participate than those with some college or more in some models.

attend centers that do not participate in CACFP drink two or more cups of milk per day versus nearly 71% of those at participating centers. For fruits and vegetables, the increases are from 38% to 43% and from 33% to 42%, respectively.

In contrast, we find limited evidence that CACFP is associated with weight status or food insecurity (see again Table 7). There is some evidence that children at participating centers are more likely to be healthy weight than underweight; predicted probabilities indicate that about 8% are underweight at non-participating centers versus about 3% at participating centers, based on Column 4. Regarding overweight, about one-third of all poor four-year olds in centers are overweight (not shown in tables), and being healthy versus overweight is not significantly associated with CACFP participation (Table 7). Regarding food insecurity, on average, about 40% of all poor children who are in centers at four years have some household-level food insecurity and about 25% of these children are themselves food insecure (not shown in tables). The coefficient for CACFP-participation in Table 7 is small, never statistically significant and usually (unexpectedly) positive in sign for household and child food insecurity. However, the coefficient for child food insecurity reverses in sign to the expected negative direction in models with lagged outcomes (Column 4 of Table 7). Indeed, we saw in Table 6 that children who were food insecure at age two were more likely to attend a CACFP-participating center at age four.

Appendix E presents sensitivity analyses, re-estimating the models with minimal controls for children who were not in care at two years of age, who were in care 30 or more hours per week, and for children who were in community centers (as opposed to pre-kindergarten or preschool). The associations between CACFP participation and milk and vegetable consumption remained significantly positive and of similar magnitude in the models restricted to children who had not been in care at two years (Appendix E, Column 3). The coefficients of CACFP participation for children who are in care longer hours or in community centers are consistently

positive and sometimes larger than for the full sample, but significant only for milk consumption (Appendix E, Columns 1 and 2). Although we had expected the coefficients might be even larger for children with greater exposure to the care setting, it is also possible that children whose parents put them in longer hours of care and in community settings may be selectively different than children placed in care for fewer hours or in preschool.

In summary, among lower-income children, attending a CACFP-participating center is associated with greater consumption of milk, vegetables, and (to some extent) fruits at four years of age. In addition, poor children at CACFP participating centers are no more likely to be overweight and are less likely to be underweight than children at non-participating centers. Food insecurity does not differ between poor children attending CACFP-participating and non-participating centers.

□

Summary and Discussion

To our knowledge, this is the first study to provide a national portrait of the determinants of receiving CACFP benefits and the association of CACFP participation with children's nutrition-related outcomes. Our results reveal that the CACFP program misses many poor children, and a sizable fraction of non-poor children participate in the program. Coverage of poor children is particularly limited at age two because over 80% of two-year olds are cared for by parents at home or in an unlicensed child care home, and family poverty rates are relatively high for two-year old children who are cared for in these settings. The program reaches a higher fraction of poor four-year olds because many poor children spend time in Head Start centers, where CACFP participation rates are nearly 100%, or in other participating centers. Yet, poor children who are cared for in centers are much less likely to receive CACFP when they live in wealthier areas than when they live in poorer areas, especially if they attend a for-profit center.

Furthermore, even at four years, nearly 40% of children are cared for by parents at home or in an unlicensed child care home, and a relatively high proportion of children in these settings are poor. Licensed family day care is notable because few children are cared for in these settings at either two years or four years, and there is little variation in CACFP participation by family, provider, or area poverty.

We also found that provider, family, and locational characteristics all affect participation in CACFP. As noted, poor children who reside in low-income areas are more likely to participate in CACFP than poor children in wealthier areas. CACFP participation is higher among parents of lower socioeconomic status and whose children are in care more hours. Provider characteristics clearly matter. Large, licensed, accredited and non-profit centers are more likely to participate, as are those connected to Head Start through referrals (or who serve children who are also served by Head Start). These results are broadly consistent with the conclusion reached by Currie (2006b) that standard transaction costs (and benefits) as well as administrative burden importantly affect the take-up of social programs (though our results would also suggest a role for information networks).

Finally, we found evidence that CACFP is associated with increased milk, vegetable, and (to some extent) fruit consumption and lower prevalence of underweight among low-income four-year olds in centers. The associations with milk, vegetables, and healthy weight were robust to inclusion of detailed child, family and provider controls, including lagged milk consumption and lagged food insecurity. The findings for milk persisted when we restricted the sample to children in care full-time and to those not in care at age two. We found no evidence that CACFP increased the prevalence of overweight among this group of four-year olds, and we also found no evidence for an association with child or household food insecurity. Evidence that the program may benefit participating children underscores the importance of the finding that the

program fails to reach a substantial portion of poor children.

It is worth considering what the rationale might be for a nutrition redistribution program that does not reach all poor children, and that treats poor children differently depending on the characteristics of their child care provider. Considering how CACFP intersects with other nutritional and child care subsidy program is revealing in this regard. Consider first that consuming food away from home in child care (including when meals are paid for by the CACFP program) does not reduce eligibility for, or benefits from, other nutritional assistance programs (such as Food Stamps/SNAP or WIC). Whether this rule advances redistributive objectives depends in part on the goals of the CACFP program, the economic incidence of the subsidy, and the impact of the different food subsidy programs on food consumption. If CACFP is meant to subsidize meals consumed away from home by poor children, and Food Stamps and WIC benefit amounts are set optimally, then Food Stamp or WIC benefits would have to be adjusted downward if CACFP raises children's food consumption.⁹ On the other hand, if CACFP is meant to augment inadequate levels of Food Stamps and WIC benefits, then it would be more efficient to raise the benefit amounts in those programs to an adequate level, or, failing that, to make all low-income children eligible for CACFP, regardless of provider characteristics (including poor children cared for in their own homes). A third possibility is that CACFP is conditioned on care outside the home because it is intended to reward employment by offsetting costs to families associated with holding a job, the most important of which are child care costs

⁹ Anecdotal evidence suggests that most providers supply meals, rather than having parents send meals with children, and our data shows that 95 percent or more of providers report serving meals and snacks. Thus, Food Stamps and WIC benefits must cover fewer of the families' total food consumption when children are in child care. Providers might include meal costs in fees. But, families will not directly pay these fees if their care is covered by CCDF child care subsidies, thus they are effectively better off (in terms of total food subsidies) than comparable families whose children are not in care. And, if they do pay the fees directly, including the child's meal costs, then they are left with less fungible income than they would be if more food subsidies went directly to the provider (since Food Stamps and WIC must be spent on foods, and a limited bundle of foods at that).

and the implicit tax on earnings inherent in means-testing benefits. Nonetheless, if other means-tested nutritional assistance benefits are set optimally, it would be more efficient to use direct (cash) subsidies to child care to promote employment of the poor, rather than link eligibility to provider characteristics or characteristics of other children in the care setting.

It is also worth considering the rationale for more stringent eligibility requirements for for-profit than non-profit centers. One possibility is that these different payment schedules are intended as a crude quality-adjustment of the subsidy (see, e.g., Blau 2001) under the assumption that non-profit centers are of higher quality, on average, than for-profit centers (Cleveland and Krashinsky 2009). Policymakers might similarly have made eligibility criteria more stringent among for-profit centers out of concern that for-profit centers are more likely to use the subsidy to increase profit rather than to increase the quality of care. However, even if quality of non-profit centers is higher, on average, because there is substantial variation in quality within each sector, it would be more efficient to target quality directly with quality-adjusted subsidies than with a nutritional subsidy that is higher for care in the non-profit sector. States are increasingly adopting Quality Rating and Improvement Systems to provide such tiered reimbursement, although they have not been rigorously evaluated (National Child Care Information Center 2009).

Policymakers may similarly have excluded license-exempt homes from the national CACFP rules to assure some oversight or to assure of a lower bound on quality for settings that receive public subsidy. This practice would be in contrast to federal policy in the Child Care and Development Fund (CCDF) which provides general child care subsidies. In the 1980s and 1990s, the CCDF program moved increasingly toward reimbursing whatever type of care parents choose, including license-exempt care (Kahn and Kamerman 1987; U.S. Department of Health and Human Services 2009). Nationally, one-quarter of children who receive CCDF subsidies are

in license-exempt care; in some states as many as two-thirds are in such care (U.S. Department of Health and Human Services 2008). This inclusion of settings outside of the licensing system may reflect a combination of a preference for supporting parental choice, a need to rapidly increase the supply of care when the welfare reforms of the 1990s required parents to seek employment, and evidence that small home-based and unregulated settings are not inferior to licensed settings, at least according to some definitions of quality (such as the warmth and sensitivity of caregivers to infants and toddlers, NICHD 1996; and flexibility to parental needs, but not developmental quality, Li-Grining, and Coley 2006). Whatever the impetus, the two subsidies (food subsidy and general subsidy) for child care differ in this respect. It is also the case that if the general child care subsidy were set optimally, an additional child care food subsidy would be inefficient.¹⁰ If the general subsidy is too low, it would be more efficient to increase it than to have a separate food subsidy (unless perhaps the food subsidy's nutritional training and menu requirements are effective in increasing the nutritional quality of food, which our results suggest they may be).

State child care regulations often include nutritional standards that states use to attempt to improve nutrition in licensed settings. In a review of state regulations Sara E. Benjamin and colleagues (2009) found that 10 states' regulations for centers and 27 states' regulations for homes included none of the standards recommended by the National Health and Safety Performance Standards. A related review found that fewer than 10 states limited sugar sweetened beverages and foods of low nutritional value in child care licensing standards (Benjamin et al. 2008).

¹⁰ CCDF reimbursement rates are set by states. Federal guidelines require states to regularly conduct market rate surveys and recommend that reimbursement rates be 75th percentile of market rates. The most recent state plans indicate that half the states set their reimbursement rates below this benchmark, and rates range from the 10th to the 85th percentile (U.S. Department of Health and Human Services 2009).

In sum, the CACFP eligibility and benefit rules result in some undesirable efficiency and equity properties because equity criteria (especially poverty reduction) would require greater targeting of poor children and less reliance on provider characteristics, and because efficiency would be enhanced either by using direct, cash child care subsidies (possibly quality-adjusted), by increasing nutritional assistance through the Food Stamps or WIC programs, or by states increasing the nutritional requirements in child care licensing standards. Still, political support may be greater for a nutritional subsidy than a cash subsidy, or for a subsidy to child care rather than one that would also benefit poor families that care for children at home.

We are left with the conclusion that the structure of the CACFP program most likely reflects a compromise among multiple goals such as:

- provide nutritional assistance to poor children
- promote employment among low-income families
- support care providers who have low incomes or who serve low-income communities
- provide greater support to higher quality child care

Different individuals will attach different weights to each of these goals. More explicit consideration and agreement about any or a subset of these goals might lead to an assistance program that achieved distributional objectives more efficiently. The results for child food consumption and healthy weight that we present provide some evidence that the first (nutritional) goal may be met to some degree (although additional research is needed to replicate this result, ideally with a stronger causal design). The evidence on program coverage we present should help policymakers and analysts understand who is and is not being served by CACFP, and, therefore, to suggest the trade-offs in attempting to reach the full range of possible goals.

References

- American Heart Association. n.d. "Milk Products: AHA Recommendation." American Heart Association, Dallas, TX. <http://www.americanheart.org/presenter.jhtml?identifier=4684> (accessed May 10, 2010).
- Bethel, James, James L. Green, Graham Kalton, Christine Nord, Gail M. Mulligan, and Sandy Eyster. 2007. *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). Sampling Report for the 2-Year Data Collection*. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Benjamin, Sara E., Angie Cradock, Elizabeth M. Walker, Meghan M. Slining, and Matthew W. Gillman. 2008. "Obesity Prevention in Child Care: A Review of State Regulations." *BMI Public Health* 8 (188).
- Benjamin, Sara E., Kristen A. Copeland, Angie Cradock, Brian Neelon, Elizabeth Walker, Meghan M. Slining, and Matthew W. Gillman. 2009. "Menus in Child Care: A Comparison of State Regulations with National Standards." *Journal of the American Dietetic Association* 109 (1): 109-115.
- Besharov, Douglas J. 2003. "Growing Overweight and Obesity in America: The Potential Role of Federal Nutrition Programs." Testimony Prepared for the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate, April. <http://www.welfareacademy.org/pubs/foodassist/testimony-040303.pdf> (accessed November 18, 2010).
- Blau, David M. 2001. *The Child Care Problem*. New York: Russell Sage Foundation.
- Burstein, Nancy, Cristofer Price, Peter H. Rossi, and Mary Kay Fox. 2004. "Food Stamp Program." Pp. 30-90 in *Effects of Food Assistance and Nutrition Programs on Nutrition and Health (Volume 3, Literature Review)*, edited by Mary Kay Fox, William Hamilton, and Bing-Hwan Lin. Food Assistance and Nutrition Research Report Number 19-3. United States Department of Agriculture, Economic Research Service.
- Case, Anne and Christina Paxson. 2008. "Stature and Status: Height, Ability, and Labor Market Outcomes." *Journal of Political Economy* 116 (3): 499-532.
- Cleveland, Gordon and Michael Krashinsky. 2008. "The Nonprofit Advantage: Producing Quality in Thick and Thin Child Care Markets." *Journal of Policy Analysis and Management* 28: 440-462.
- Crepinsek, Mary K., Nancy R. Burstein, Ellen B. Lee, Stephen D. Kennedy, and William L. Hamilton. 2002. Meals Offered by Tier II CACFP Family Child Care Providers: Effects of Lower Meal Reimbursements. Food Assistance and Nutrition Research Program Report no. 02-006. Washington, DC: U.S. Department of Agriculture, Economic Research Service.
- Currie, Janet M. 2006a. *The Invisible Safety Net: Protecting the Nation's Poor Children and*

Families. Princeton, NJ: Princeton University Press.

□

-----, 2006b. "The Take-Up of Social Benefits." 80-148 in *Public Policy and the Income Distribution*, edited by Alan J. Auerbach, David E. Card and John M. Quigley. New York: Russell Sage Foundation.

□

Fleischhacker, Sheila, Katherine L. Cason, and Cheryl Achterberg. 2006. "You Had Peas Today?": A Pilot Study Comparing a Head Start Child-Care Center's Menu with the Actual Food Served. *Journal of the American Dietetic Association* 106 (2): 277-280.

□

Fogel, Robert William. 2004. *The Escape from Hunger and Premature Death, 1700-2100*. Cambridge, UK: Cambridge University Press.

□

Fox, Mary K., William Hamilton, and Christenson, Sharon. 2004. "Introduction." 1-12 in *Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 3, Literature Review*, edited by Mary K. Fox, William Hamilton, and Bing-Hwan Lin. Food Assistance and Nutrition Research Report no. FANRR 19-3. Washington, DC: U.S. Department of Agriculture, Economic Research Service.

□

Gibson-Davis, Christina and E. Michael Foster. 2006. "A Cautionary Tale: Using Propensity Scores to Estimate the Effect of Food Stamps on Food Insecurity." *Social Service Review*, 80, 93-126.

□

Glantz, Frederic B. 2004. "Child and Adult Care Food Program." 236-249 in *Effects of Food Assistance and Nutrition Programs on Nutrition and Health: Volume 3, Literature Review*, edited by Mary K. Fox, William Hamilton, and Bing-Hwan Lin. Food Assistance and Nutrition Research Report no. FANRR 19-3. Washington, DC: U.S. Department of Agriculture, Economic Research Service.

□

Gordon, Erika, Francine Barrington, Pedro J. Saavedra, and JoAnn Kuchak. 2008. *Child and Adult Care Food Program (CACFP) Assessment of Sponsor Tiering Determinations 2006*. Special Nutrition Programs Report no. CN-07-ID. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service.

□

Hofferth, Sandra L. and Sally Curtin. 2005. "Poverty, Food Programs, and Childhood Obesity." *Journal of Policy Analysis and Management* 24 (4): 703-726.

□

Iruka, Iheoma U. and Pricilla R. Carver. 2006. *Initial Results from the 2005 NHES Early Childhood Program Participation Survey*. National Center for Education Statistics no. 2006-075. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

□

Kahn, Alfred J. and Sheila B. Kamerman. 1987. *Child Care: Facing the Hard Choices*. Dover, MA: Auburn House Publishing Company.

□

Kuratko, Connye N., Ruth E. Martin, William Y. Lan, James A. Chappell, and Mahassen Ahmad. 2000. "Menu Planning, Food Consumption, and Sanitary Practices in Day Care

- Facilities." *Family and Consumer Sciences Research Journal* 29 (1): 81-91.
- Li-Grining, Christine P. and Rebekah L. Coley. 2006. "Child Care Experiences in Low-Income Communities: Developmental Quality and Maternal Views." *Early Childhood Research Quarterly* 21 (2): 125-141.
- National Child Care Information Center and the National Association for Regulatory Administration. 2009. *The 2007 Child Care Licensing Study*. Lexington, KY: National Association for Regulatory Administration. http://www.naralicensing.org/associations/4734/files/2007%20Licensing%20Study_full_report.pdf (accessed October 12, 2009).
- National Child Care Information Center. 2009. "QRIS Definition and Statewide Systems." National Child Care Information Center, Fairfax, VA. <http://nccic.acf.hhs.gov/pubs/qrs-defsystems.html> (accessed November 12, 2009).
- NICHD. Early Child Care Research Network. 1996. "Characteristics of Infant Child Care: Factors Contributing to Positive Caregiving." *Early Childhood Research Quarterly* 11: 269-306.
- Nord, Mark, Margaret Andrews, and Steven Carlson. 2009. *Household Food Security in the United States, 2008*. Economic Research Report no. 83. Washington, DC: U.S. Department of Agriculture, Economic Research Service.
- Oakley, Charlotte B., Anne K. Bomba, Kathy B. Knight, and Sylvia H. Byrd. 1995. "Evaluation of Menus Planned in Mississippi Child-Care Centers Participating in the Child and Adult Care Food Program." *Journal of the American Dietetic Association* 95 (1): 165-168.
- Oliveira, Victor. 2009. *The Food Assistance Landscape: FY 2008 Annual Report*. Economic Information Bulletin no. 6-6. Washington, DC: U.S. Department of Agriculture, Economic Research Service.
- Snow, Kyle, Lisa Thalji, Azucena Derecho, Sara Wheelless, Jean Lennon, Susan Kinsey, James Rogers, Melissa Raspa, and Jennifer Park. 2007. *Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Preschool Year Data File User's Manual (2005-06)*. National Center for Education Statistics no. 2008-024. Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics.
- Tanner, Emily M. and Matia Finn-Stevenson. 2002. "Nutrition and Brain Development: Social Policy Implications." *American Journal of Orthopsychiatry* 72 (2): 182-93.
- U.S. Census Bureau. 2009. "Poverty Thresholds: 2005." U.S. Census Bureau, Washington, DC. <http://www.census.gov/hhes/www/poverty/threshld/thresh05.html> (accessed May 15, 2009).
- U.S. Department of Agriculture, Food and Nutrition Service. n.d. "CACFP Reimbursement Rates for Meals Served in Homes and Centers." U.S. Department of Agriculture, Alexandria, VA. <http://www.fns.usda.gov/CND/Care/ProgramBasics>

[/Rates/2005HomesContig.htm](#) and <http://www.fns.usda.gov/CND/Care/ProgramBasics/Rates/2005CentersContig.htm> (accessed September 2, 2009).

□

U.S. Department of Agriculture, Food and Nutrition Service. 2009. "Meal Patterns." U.S. Department of Agriculture, Alexandria, VA. http://www.fns.usda.gov/CND/Care/ProgramBasics/Meals/Meal_Patterns.htm (accessed October 9, 2009).

□

U.S. Department of Agriculture, Food and Nutrition Service. 2008. *Final Rule: For-Profit Center Participation in the CACFP*. Federal Register 7 CFR Part 226. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service.

□

U.S. Department of Agriculture, Economic Research Service. 2002. *Effects of CACFP Meal Reimbursement Tiering: Major Findings of the Family Child Care Homes Legislative Changes Study*. Food Assistance and Nutrition Research Program Report no. 24. Washington, DC: U.S. Department of Agriculture, Economic Research Service.

□

U.S. Department of Health and Human Services, Administration for Children and Families. 2008. "Child Care and Development Fund Average Monthly Percentages of Children Served in Regulated Settings vs. Settings Legally Operating Without Regulation (FFY 2006)." U.S. Department of Health and Human Services, Administration for Children and Families, Washington, DC. http://www.acf.hhs.gov/programs/ccbf/data/ccdf_data/06acf800/table4.htm (accessed November 18, 2009).

□

U.S. Department of Health and Human Services, Administration for Children and Families. 2009. "Child Care and Development Fund: Report of State and Territory Plans, FY 2008-2009." U.S. Department of Health and Human Services, Administration for Children and Families, Washington, DC. <http://nccic.acf.hhs.gov/pubs/stateplan2008-09/part3.pdf> (accessed November 18, 2009).

□

Ziegler, Paula, Ronette Briefel, Michael Ponza, Timothy Novak, and Kristy Hendricks. 2006. "Nutrient Intakes and Food Patterns of Toddlers' Lunches and Snacks: Influence of Location." *Journal of the American Dietetic Association* 106 (1): S124-S134.

□

Zotov, Natasha, Shao-hsen Keng, and William Hamilton. 2002. *Family Child Care Providers in the CACFP: Operational Effects of Reimbursement Tiering*. Electronic Publication from the Food Assistance & Nutrition Research Program no. 02-004. Washington, DC: U.S. Department of Agriculture, Economic Research Service.

Table 1. Examples of CACFP monthly reimbursement levels for homes and centers.

HOMES			
	All Tier II	All Tier I	Ratio of Tier I to Tier II
Small (3 children)	117	244	2:1
Mid-size (6 children)	235	487	2:1
Large (12 children)	469	974	2:1

CENTERS					
	Paid	Reduced	Full	Ratio of Reduced to Paid	Ratio of Full to Paid
Small (50 children)	564	3,531	4,692	6:1	8:1
Mid-size (100 children)	1,127	7,061	9,384	6:1	8:1
Large (150 children)	1,691	10,592	14,076	6:1	8:1

NOTE: Author calculations based on reimbursement rates effective July 1, 2004 to June 30, 2005 (U.S. Department of Agriculture n.d.) for a breakfast, a lunch and one snack (the most typical configuration of meals and snacks; Crepinsek et al. 2002) for care occurring 23 days per month. CACFP=Child and Adult Care Food Program.

1

Table 2. Two year olds' child care arrangements, CACFP participation rate, and family poverty (overall and within CACFP participation status).

Type of Care	Percentage Distribution of Study Children			Percentage of Study Children Who Are Poor		
	All	If in Care	Percentage Receiving CACFP	By CACFP Status		
				All	Not CACFP	1 CACFP
Exclusive maternal care	61	--	--	55	--	--
Unlicensed (child's home or relative caregiver)	16	41		46		
Unlicensed (nonrelative not in child's home)	4	10	5	37	36	46
Licensed homes	5	13	66	28	28	28
Non-Profit centers (Not Head Start)	7	17	44	36	25	49
For-Profit centers (Not Head Start)	7	19	31	32	22	56
Head Start	--	--	--	--	--	--

NOTE: $n = 7,450$ (unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement). Statistics are weighted by the Parent Analysis Weight (W2R0). Child-level eligibility for CACFP based on income less than 185% of federal poverty level, family is on TANF, or family receiving Food Stamps. CACFP=Child and Adult Care Food Program.

-- not applicable (Children in exclusive maternal care are not eligible for CACFP. In the ECLS-B, providers were not asked the CACFP question if they cared for the child in the child's home or (at two years) if they were related to the child. No two year olds participated in Head Start.)

Table 3. Four year olds' child care arrangements, CACFP participation rate, and family poverty (overall and within CACFP participation status).

Type of Care	Percentage Distribution of Study Children			Percentage of Study Children Who Are Poor		
	All	If in Care	Percentage Receiving CACFP	By CACFP Status		
				All	Not CACFP	CACFP
Exclusive maternal care	24	--	--	66	--	--
Unlicensed (child's home or relative caregiver)	13	17	--	54	--	--
Unlicensed (nonrelative not in child's home)	3	4	4	37	37	^a
Licensed homes	4	5	66	29	34	27
Non-Profit centers (Not Head Start)	34	45	39	37	21	63
For-Profit centers (Not Head Start)	14	18	23	25	18	47
Head Start	9	12	94	88	80	88

NOTE: $n = 6,900$ (unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement). Statistics are weighted by the Parent Analysis Weight (W3R0). Child-level eligibility for CACFP based on income less than 185% of federal poverty level, family is on TANF, or family receiving Food Stamps. CACFP=Child and Adult Care Food Program.

-- not applicable (Children in exclusive maternal care are not eligible for CACFP. In the ECLS-B, providers were not asked the CACFP question if they cared for the child in the child's home or (at two years) if they were related to the child.)

^a Percentage not presented because cell size less than 10.

Table 4. Among children cared for in licensed homes, percentage enrolled in a CACFP: participating child care setting and provider low-income status, by family- and area-level poverty and child age.

Family and Area Poverty	Child Age							
	Two Years				Four Years			
	Percentage Receiving CACFP	Percentage of Providers Who Are Low-Income by CACFP Status			Percentage Receiving CACFP	Percentage of Providers Who Are Low-Income by CACFP Status		
		Not CACFP	CACFP			Not CACFP	CACFP	
Family: Poor								
No Poor Schools	74	a	50	60	a	56		
Some Poor Schools	69	27	46	82	a	21		
All Poor Schools	67	73	81	53	a	a		
Family: Not Poor								
No Poor Schools	70	21	18	67	31	49		
Some Poor Schools	68	20	35	72	40	19		
All Poor Schools	72	a	56	84	a	34		
Unweighted sample size (rounded to nearest 50)								
	300	100	150	200	50	100		

NOTE: CACFP=Child and Adult Care Food Program. Family-level poverty based on income less than 185% of federal poverty level or income already verified for enrollment in another program (TANF, Food Stamps). Area-level poverty based on the number of elementary schools in the child's ZIP code in which 50% or more of children are free- or reduced-lunch eligible. Provider low-income defined as below \$40,000 (approximately 185 percent of the poverty threshold for family of four in 2005). Percentages weighted by Parent Analysis Weight (two years: W2R0; four years: W3R0).

^a Percentage not presented because cell size less than 10.

Table 5. Among children cared for in non-profit and for-profit centers, percentage enrolled in a CACFP-participating child care setting, by family- and area-level poverty and child age.

Family and Area Poverty	Child Age			
	Two Years		Four Years	
	Non-profit centers	For-profit centers	Non-profit centers	For-profit centers
Family: Poor				
ZIP Young Child Poverty <10%	74	33	48	28
ZIP Young Child Poverty 10-19%	53	43	60	46
ZIP Young Child Poverty ≥20%	62	67	75	50
Family: Not Poor				
ZIP Young Child Poverty <10%	27	11	17	12
ZIP Young Child Poverty 10-19%	31	30	27	19
ZIP Young Child Poverty ≥20%	59	43	39	31
Unweighted sample size				
(rounded to nearest 50)				
	500	500	2,400	950

NOTE: CACFP=Child and Adult Care Food Program. Family-level poverty based on income less than 185% of federal poverty level or income already verified for enrollment in another program (TANF, Food Stamps). Area-level poverty based on the percentage of young children who are poor in ZIP code. Percentages weighted by Parent Analysis Weight (two years: W2R0; four years: W3R0).

Table 6. Summary of coefficients from OLS linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child, and Family Covariates (3)	Add Lagged Child Outcomes (4)
Key Determinants of Benefits				
Area young child poverty (Ref: <10%)				
10-19%	0.128*	0.108*	0.082	0.094*
	(0.052)	(0.050)	(0.050)	(0.051)
20% or more	0.213*	0.164*	0.124*	0.125*
	(0.045)	(0.043)	(0.049)	(0.049)
Center for-profit				
	-0.187*	-0.100*	-0.107*	-0.099*
	(0.042)	(0.046)	(0.047)	(0.046)
Center license status and size (Ref: Licensed for more than 100 children)				
Not licensed	-0.224*	-0.188*	-0.166*	-0.164*
	(0.047)	(0.046)	(0.048)	(0.048)
Licensed for 50 children and below	-0.211*	-0.201*	-0.188*	-0.197*
	(0.043)	(0.043)	(0.044)	(0.044)
Licensed for 51 to 100 children	-0.077*	-0.048	-0.042	-0.055
	(0.046)	(0.043)	(0.045)	(0.045)
Center Covariates				
Center type and location (Ref: Community center)				
School-based prekindergarten		-0.122*	-0.111*	-0.099*
		(0.051)	(0.053)	(0.052)
Other preschool		-0.217*	-0.190*	-0.182*
		(0.054)	(0.054)	(0.054)
Something else		-0.207*	-0.212*	-0.218*
		(0.099)	(0.103)	(0.107)
Center accredited		0.101*	0.113*	0.114*
		(0.035)	(0.036)	(0.036)
Center refers to/from Head Start/		0.155*	0.125*	0.125*
Early Head Start		(0.034)	(0.034)	(0.034)
Center accepts CCDF child care subsidies		-0.102*	-0.104*	-0.099*
		(0.040)	(0.040)	(0.040)
Child and Family Covariates^a				
Child in care 30 or more hours				
			0.095*	0.099*
			(0.035)	(0.035)
Mother education (Ref: Some college or college graduate)				
Less than high school			0.064	0.067*
			(0.041)	(0.041)
High school graduate			0.144*	0.143*
			(0.041)	(0.041)
			(0.043)	(0.043)
Small care group size very important				
to mother's child care decision			0.081*	0.081*
			(0.034)	(0.034)

Table 6. Summary of coefficients from OLS linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child, and Family Covariates (3)	Add Lagged Child Outcomes (4)
Lagged Child Outcomes				
Household and child food insecurity at two years (Ref: No food insecurity)				
Household and child food insecure				0.164 [±]
				(0.048)
Household food insecure				0.048
				(0.048)
Child milk consumption at two years (Ref: Milk at neither meals nor snack)				
With meals				0.100 [±]
				(0.044)
With snack				0.051
				(0.042)
With snack and meals				0.035
				(0.045)
Constant	0.673 [±]	0.676 [±]	0.153	0.044
	(0.088)	(0.104)	(0.385)	(0.390)

NOTE: $n = 850$ (unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement). Minimal controls in Column 1 are the parent sampling weight (W3R0) and dummies for child age and for geographic state or region. Results for additional center, child and family characteristics shown in Appendix C. Robust standard errors in parentheses, which adjust for clustering within ZIP codes. CACFP=Child and Adult Care Food Program. CCDF=Child Care and Development Fund.

^a 95% of respondents are the biological mother.

[±] $p < .10$, * $p < .05$

Table 7. Summary of coefficients from OLS linear probability models regressing child nutritional outcomes on CACFP participation status for low-income four-year olds in non-Head Start centers.

Child Outcomes	Minimal Controls (1)	Add Child and Family Covariates (2)	Add Center Covariates (3)	Add Lagged Outcomes (4)
Two or more cups per day of:				
Milk	0.083* (0.034)	0.080* (0.037)	0.089* (0.039)	0.091* (0.038)
100% fruit juice	0.016 (0.035)	0.005 (0.038)	-0.004 (0.040)	-0.001 (0.041)
Soda or fruit-flavored drinks	0.016 (0.025)	-0.024 (0.027)	-0.033 (0.028)	-0.034 (0.029)
Two or more servings per day of:				
Vegetables (excluding French fries)	0.089* (0.035)	0.102* (0.037)	0.104* (0.041)	0.092* (0.041)
Fruits	0.074* (0.033)	0.062 (0.038)	0.060 (0.041)	0.055 (0.041)
Fast food	0.004 (0.012)	-0.009 (0.014)	-0.014 (0.014)	-0.016 (0.014)
Sweet snacks	-0.004 (0.026)	-0.023 (0.028)	-0.033 (0.030)	-0.028 (0.030)
Salty snacks	0.007 (0.022)	-0.006 (0.023)	-0.006 (0.025)	-0.011 (0.025)
Child CDC Growth Chart Status				
Healthy weight versus overweight/at risk of overweight	-0.023 (0.035)	0.001 (0.038)	0.003 (0.039)	0.008 (0.038)
Healthy weight versus underweight	0.033* (0.019)	0.049* (0.023)	0.052* (0.023)	0.049* (0.023)
Any food insecurity				
Household	0.060 (0.036)	0.027 (0.038)	0.007 (0.041)	-0.017 (0.040)
Child	0.043 (0.030)	0.017 (0.032)	0.013 (0.035)	-0.003 (0.035)

NOTE: $n = 850$ for all outcomes except “healthy weight versus overweight/at risk of overweight” where it is 800 due to the exclusion of underweight children and “healthy weight versus underweight” where it is 550 due to the exclusion of children at risk of overweight or overweight (unweighted sample size rounded to nearest 50 as per ECLS-B data sharing agreement). Minimal controls are: parent sampling weight and dummies for child age, geographic region/state, and whether parent respondent is mother. Additional child/family (Column 2), center (Column 3), and lagged outcome (Column 4) variables listed in Appendix A were controlled. Robust standard errors, adjusted for clustering within ZIP codes, in parentheses. CACFP=Child and Adult Care Food Program. CDC=Centers for Disease Control and Prevention. + $p < .10$, * $p < .05$

Appendix A: Measures in the ECLS-B and Descriptive Statistics

CACFP participation.—At the two year follow up, center directors and home-based providers were asked: *Do you receive commodities or cash reimbursement from the Child and Adult Care Food Program or the Child Care Food Program for the meals and snacks you serve?* The question was skipped when care was provided by a relative or when the care took place in the child's home. At the four year follow up, center directors were asked: *Do you currently receive reimbursement from the United States Department of Agriculture (USDA) for meals or snacks served to children in your {center/program}?* And home-based providers were asked: *Do you participate in the Child and Adult Care Food Program (CACFP), or the Child Care Food Program for the meals and snacks you serve?* At the four year follow up, the question was skipped only for providers of care in the child's home (relatives in another home answered the question). At both waves, we coded the small fraction (5% or less) of centers and homes that did not serve meals or snacks as non-participants. At neither wave were participating home providers asked if they received Tier I or Tier II reimbursement.

CACFP reimbursement levels.—We use information about the family, provider, and ZIP code poverty to approximate eligibility rules and reimbursement levels. Of the several criteria that can be used to demonstrate eligibility for Tier I reimbursement levels (see Figure 1), prior research has found that nearly three-quarters of Tier I providers are determined eligible based on local school data (Gordon et al. 2008). We merged National Center for Education Statistics data about elementary schools in the family's ZIP code and classified ZIP codes according to whether in none, some, or all of these schools were at least 50% of pupils eligible for free or reduced-price lunch. The next most commonly used criterion for Tier I homes is provider income (Gordon et al. 2008). Although we lacked complete information about the provider's household

size, we approximated provider eligibility based on whether the provider's income was above or below \$40,000 (approximately 185% of the poverty threshold for a family of four in 2005). The least common criterion to determine homes' eligibility for Tier I reimbursement is local census data (Gordon et al. 2008); however, local poverty may better approximate the benefits to centers of participating. Thus, we also merged data from the U.S. Decennial Census of Population and classified ZIP codes to determine whether fewer than 10%, 10 to 19%, or 20% or more of young children (under age 5) in the ZIP code had family incomes below 100% of the federal poverty level. The two measures of local area poverty (school lunch program eligibility and ZIP code poverty rates) are highly correlated (see Appendix B).

The ECLS-B study child's eligibility for the highest reimbursement levels in Tier II homes and in centers was based on whether their household income fell below 185% of the federal poverty line (FPL) for a household of their size (Snow et al. 2007: 405-411) and whether the family participated in TANF or Food Stamps. When we refer to *poor* or *low-income* children we mean those who meet any of these individual eligibility criteria (less than or equal to 185% FPL or receiving TANF or Food Stamps).

Type of child care provider.—We classified children according to whether the child was: (1) not in care, (2) in unlicensed care, either in their own home or by a relative in another home, (3) in unlicensed care by a non-relative in another home, (4) in licensed family day care, (5) in a for-profit non-Head Start center (referred to as *for-profit center* for simplicity), (6) in a non-profit non-Head Start center (referred to as *non-profit center*), or (7) in a Head Start center (referred to as *Head Start*). The parent reported whether or not the child was in care, and provider interviews determined the type of care. Children who were in multiple types of arrangements were classified based on the setting where they spent the most hours.

Approximately 19% of children were in more than one care arrangement and, on average, these children spent 65% of their time in care in their primary setting.

Child and family covariates—Child and family covariates were chosen because they might predict whether the child attended a participating center and/or the child's food consumption, weight, and food security; they included: child gender and race-ethnicity (Hispanic, Non-Hispanic black, or Non-Hispanic other versus Non-Hispanic white), whether the home language is not English or the mother was born outside of the U.S., whether the family's income is below 100% of the federal poverty line (versus 100 to 185% of poverty), the mother's education level (less than high school or high school graduate versus more than high school), the mother's employment status (full-time or part-time versus not employed), whether the family had rules about food the child could eat, whether the mother reported that a small group size in child care was important to her child care selection, whether she had difficulty finding child care, whether she was married, her age (less than 25, 25 to 29, 35 to 39, or 40 or more versus 30 to 34), whether the family had received WIC (for the study child) or Food Stamps since the last interview, whether the child was born low birth weight, whether the child was lactose intolerant, the number of child's well-child doctor visits since the last interview (zero or one, or two, versus three or more), whether the child was ever breast fed, whether the mother's health was excellent or very good, whether the child was in multiple care arrangements, whether the child spent 30 or more hours in care, and the percentage of residents of the family's ZIP code who were Hispanic and non-Hispanic black. We also adjust in regression models, but do not show: dummy variables for the child's age (in months) at the four year follow up interview, whether the parent respondent was the child's mother, the parent's sampling weight from the four year follow up, and dummy indicators of the state or region where the child lived. Ten states with 25 or more

study children had their own dummy variable; other states were indicated by their region (Northeast, Midwest, West, South).

Center covariates.— Our regression analyses are restricted to four-year-old children in center care. We include in these models characteristics of centers that may influence their CACFP participation decision and affect outcomes of children in their care. These controls include the center's location (community-based center, preschool, school-based pre-kindergarten, or something else), accreditation status, employee turnover rate, and the director's years of experience at the center. Although the survey information is not precise enough to determine eligibility among for-profit centers, we do know whether the center accepts children from or refers children to Head Start, and whether the center reports a willingness to accept subsidies. To approximate total benefit levels, we use license status and licensed capacity (not licensed versus licensed for 50 or fewer, 51 to 100, or more than 100 children).¹¹

Child nutritional outcomes.— At the four year follow-up, the mother reported the frequency with which the child drank milk, juice, and soda and consumed fruits, vegetables, fast food, sweet snacks, and salty snacks over the seven days prior to the interview. We created dummy variables to distinguish between children who drank two or more cups of drinks or had two or more servings per day of foods, versus those who consumed less. We used the cutoff of two based roughly on the CACFP meal guidelines and other nutritional guidelines (American Heart Association n.d.). The mother was explicitly instructed to think about all the meals and snacks the child had from the time she got up until the time she went to bed. She was further

¹¹ We define the variable in this way because unlicensed centers were not asked their size in the main interview. A subset of directors who were selected for their center to be observed reported the center size on a self-administered questionnaire. Based on this report, although a similar proportion of unlicensed and licensed centers were large in size (had more than 100 children, 43 percent of unlicensed and 40 percent of licensed) a higher percentage of unlicensed centers were small (less than 50 children, 37 percent versus 28 percent) than mid-size (51 to 100 children, 20 percent versus 32 percent).

asked to “Be sure to include food {CHILD} ate at home, preschool, restaurants, play dates, anywhere else, and over the weekend.” For juice, mothers were told to include 100% fruit juice, and to not include “punch, Sunny Delight, Kool-Aid, sport drinks or other fruit-flavored drinks.” Instead, mothers were asked to include these fruit-flavored drinks with their reports about the child drinking soda. For vegetables, the mother was asked to exclude French fries and other fried potatoes, but to “include vegetables like those served in a stir-fry, soup, or stew.”

Children’s height and weight were measured by interviewers with a stadiometer ruler and digital bathroom scale. Two measurements were taken for both the child’s height and weight and the measurements were averaged. Based on measured height and weight, we computed the child’s body mass index (BMI) then defined the child as *underweight* (less than the 5th percentile), *healthy weight* (5th percentile to less than the 85th percentile), *at risk of overweight* (85th to less than the 95th percentile) and *overweight* (equal to or great than the 95th percentile) based on CDC Growth Charts appropriate for the child’s age.

Parents reported food insecurity for the family as a whole and specific to the child using the 18 item Current Population Survey-Food Security Scale (CPS-FSS; Nord et al. 2009). The standard continuously scored measure was highly skewed because few sample members endorsed the items. Thus, we created a dichotomous indicator of whether the mother endorsed any item about the children in the household (of eight items such as whether children’s meals were reduced in size, children skipped a meal or went hungry, or did not eat a balanced meal) or the entire household (which was based on the eight child items as well as 10 additional items such as whether the adults cut the size of meals or skipped meals and whether the mother currently worried food would run out or the household couldn’t afford to eat balanced meals).

We also include lagged child outcomes from the two year follow up in some models. We

dummy coded whether the mother reported that the two-year-old child drank milk at both meals and snacks, meals only, snacks only, or neither. We used the child's measured height and weight to calculate the child's Body Mass Index (BMI) at age two.¹² We also include lagged measures of household and child food insecurity when the child was two-years-old, based on the same scale as used at the four year follow up, with two dummies: any food insecurity for both household and child and any food insecurity for the household but not the child, versus the reference category of no food insecurity.

¹² Due to missing data on two year old BMI, we included a dummy indicator of not missing two year old BMI in regression models and assigned missing two year old BMI values to zero.

□

Appendix A. Descriptive statistics for low-income four-year old children in non-Head Start centers.

	Mean				
	Not	Participating	Participating in	Standard	
	Participating	in CACFP	CACFP	Deviation	Min Max
Key Determinants of Benefits					
□					
Area Young Child Poverty (Ref: <10%)					
10-19%	0.27	0.24	0.43	0	1
20% or more	0.43	0.63	0.50	0	1
Center For-Profit					
	0.30	0.17	0.42	0	1
Center license status and size (Ref: Licensed for more than 100 children)					
Not licensed	0.28	0.18	0.41	0	1
Licensed for 50 children and below	0.32	0.27	0.45	0	1
Licensed for 51 to 100 children	0.22	0.18	0.40	0	1
Center Covariates					
□					
Center type and location (Ref: Community centers)					
School-based prekindergarten	0.44	0.54	0.50	0	1
Other preschool	0.36	0.25	0.46	0	1
Something else	0.06	0.03	0.20	0	1
Center accredited					
	0.43	0.58	0.50	0	1
Center refers to/from head start/early head start	0.36	0.61	0.50	0	1
Center accepts CCDF child care subsidies	0.56	0.37	0.50	0	1
Center employee turnover rate/10	1.74	1.62	2.23	0	10
Director experience at center/10	0.74	0.72	0.71	.01	4.6
Child Covariates					
□					
Child is female	0.51	0.49	0.50	0	1
Child race-ethnicity (Ref: Non-Hispanic white)					
Non-Hispanic black	0.18	0.27	0.42	0	1
Non-Hispanic other	0.06	0.05	0.23	0	1
Hispanic	0.25	0.37	0.47	0	1
Child in ≥1 care arrangement					
	0.21	0.14	0.38	0	1
Child in care 30 or more hours	0.33	0.52	0.50	0	1
Child low birth weight	0.07	0.09	0.28	0	1
Mother ever breast fed child	0.65	0.64	0.48	0	1
Child height at 4 years (centimeters)	104.35	104.65	5.57	85	120
Child lactose intolerant	0.05	0.04	0.20	0	1
Child number of well-child visits (Ref: Three or more)					
Zero or One	0.18	0.18	0.39	0	1
Two	0.64	0.63	0.48	0	1

Appendix A. Descriptive statistics for low-income four-year old children in non-Head Start centers.

	Mean				
	Not Participating in CACFP	Participating in CACFP	Standard Deviation	Min	Max
Since last interview, child received WIC	0.47	0.64	0.49	0	1

Appendix A. Descriptive statistics for low-income four-year old children in non-Head Start centers.

	Mean				
	Not Participating in CACFP	Participating in CACFP	Standard Deviation	Min	Max

Family Covariates

Family Household Income <100% of FPL	0.41	0.49	0.50	0	1
Mother married	0.51	0.43	0.50	0	1
Number of children in household (Ref: One)					
Two	0.38	0.39	0.49	0	1
Three	0.29	0.29	0.45	0	1
Four or more	0.14	0.14	0.35	0	1
Mother education (Ref: Some college or college graduate)					
Less than high school	0.34	0.39	0.48	0	1
High school graduate	0.19	0.27	0.42	0	1
Mother's age (Ref: 30 to 34)					
Less than 25	0.19	0.24	0.41	0	1
25 to 29	0.32	0.32	0.47	0	1
35 to 39	0.15	0.12	0.34	0	1
40 or More	0.10	0.09	0.29	0	1
Mother Employment status (Ref: Not employed)					
Full time	0.40	0.40	0.49	0	1
Part time	0.20	0.18	0.39	0	1
Mother health excellent or very good	0.57	0.53	0.50	0	1
Since last interview, family used Food Stamps	0.43	0.51	0.50	0	1
No English at home or mother not born in U.S.	0.21	0.31	0.45	0	1
Household has rules about food	0.75	0.69	0.45	0	1
Small care group size very important to mother's childcare decision	0.63	0.66	0.48	0	1
Mother had no difficulty finding care	0.62	0.63	0.49	0	1
Percentage Non-Hispanic black in ZIP code (Ref: 55 or more)					
<25	0.77	0.75	0.43	0	1
25-54	0.13	0.16	0.36	0	1
Percentage Hispanic in ZIP code (Ref: 55 or more)					
<25	0.81	0.67	0.45	0	1
25-54	0.14	0.16	0.36	0	1

Appendix A. Descriptive statistics for low-income four-year old children in non-Head Start centers.

	Mean				
	Not Participating in CACFP	Participating in CACFP	Standard Deviation	Min	Max
Lagged Child Outcomes					
Household and child food insecurity at two years (Ref: No food insecurity)					
Household and child food insecure	0.10	0.15	0.34	0	1
Household food insecure	0.11	0.12	0.32	0	1
Child milk consumption at two years (Ref: Milk at neither meals nor snack)					
With meals	0.25	0.22	0.42	0	1
With snack	0.23	0.26	0.43	0	1
With snack and meals	0.24	0.26	0.43	0	1
Child BMI	14.60	15.58	6.47	0	30.7
Not Missing BMI	0.84	0.88	0.34	0	1
Child Outcomes at 4 Years					
Child drank 2 or more cups of milk per day	0.63	0.74	0.46	0	1
Child drank 2 or more cups of juice per day	0.47	0.49	0.50	0	1
Child drank 2 or more cups of soda per day	0.15	0.16	0.36	0	1
Child ate 2 or more servings of vegetables per day	0.36	0.43	0.49	0	1
Child ate 2 or more servings of fruit per day	0.39	0.47	0.50	0	1
Child ate 2 or more servings of fast food per day	0.03	0.03	0.17	0	1
Child Ate 2 or more servings of sweets per day	0.15	0.12	0.34	0	1
Child ate 2 or more servings of salty snacks per day	0.09	0.08	0.27	0	1
Healthy weight vs. at risk/overweight	0.62	0.62	0.49	0	1
Healthy weight vs. under weight	0.96	0.97	0.18	0	1
Household food insecure	0.34	0.43	0.49	0	1
Child food insecure	0.18	0.28	0.43	0	1
Observations	350	500		850	
(unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement)					

NOTE: Statistics weighted by Parent Analysis Weight (W2R0; W3R0). CCDF=Child Care and Development Fund. FPL=Federal poverty level. WIC= Special Supplemental Nutrition Program for Women, Infants, and Children. BMI=Body mass index.

Appendix B. Cell percentages from cross-tabulation of area-poverty categories based on: (1) eligibility for free/reduced lunch at elementary schools and (2) percentage in poverty among children under five years old.

Area Categories Defined By ZIP Code Poverty Rates Among Young Children (<5)			
Area Categories Defined By School			
Free/Reduced Lunch	< 10%	10% to 19%	>=20%
Wave 2			
No Schools in ZIP code Meet Criteria	26	6	2
Some Schools in ZIP code Meet Criteria	9	14	14
All Schools in ZIP code Meet Criteria	1	5	24
Wave 3			
No Schools in ZIP code Meet Criteria	28	6	2
Some Schools in ZIP code Meet Criteria	9	13	13
All Schools in ZIP code Meet Criteria	1	6	22

NOTE: $N = 7,700$ for Wave 2; $N = 7,200$ for Wave 3 (unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement; includes children in care and children not in care). Area-level eligibility based on the number of schools in the child's ZIP code in which 50% or more of children are free- or reduced-lunch eligible. Percentages weighted by Parent Analysis Weight (W2R0; W3R0).

Appendix C. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child and Family Covariates (3)	Add Lagged Child Outcomes (4)	All Coefficients With Minimal Controls (5)
Key Determinants of Benefits					
Area Young Child Poverty (Ref: <10%)					
10-19%	0.128*	0.108*	0.082	0.094*	0.136*
	(0.052)	(0.050)	(0.050)	(0.051)	(0.054)
20% or more	0.213*	0.164*	0.124*	0.125*	0.231*
	(0.045)	(0.043)	(0.049)	(0.049)	(0.046)
Center For-Profit					
	-0.187*	-0.100*	-0.107*	-0.099*	-0.184*
	(0.042)	(0.046)	(0.047)	(0.046)	(0.042)
Center license status and size (Ref: Licensed for more than 100 children)					
Not licensed	-0.224*	-0.188*	-0.166*	-0.164*	-0.100*
	(0.047)	(0.046)	(0.048)	(0.048)	(0.043)
Licensed for 50 children and below	-0.211*	-0.201*	-0.188*	-0.197*	-0.136*
	(0.043)	(0.043)	(0.044)	(0.044)	(0.041)
Licensed for 51 to 100 children	-0.077*	-0.048	-0.042	-0.055	-0.020
	(0.046)	(0.043)	(0.045)	(0.045)	(0.045)
Center Covariates					
Center type and location (Ref: Community center)					
School-based prekindergarten		-0.122*	-0.111*	-0.099*	0.002
		(0.051)	(0.053)	(0.052)	(0.051)
Other preschool		-0.217*	-0.190*	-0.182*	-0.178*
		(0.054)	(0.054)	(0.054)	(0.056)
Something else		-0.207*	-0.212*	-0.218*	-0.095*
		(0.099)	(0.103)	(0.107)	(0.089)
Center accredited		0.101	0.113*	0.114*	0.187*
		(0.035)	(0.036)	(0.036)	(0.035)
Center refers to/from head start/ early head start		0.155*	0.125*	0.125*	0.222*
		(0.034)	(0.034)	(0.034)	(0.034)
Center accepts CCDF child care subsidies		-0.102*	-0.104*	-0.099*	-0.151*
		(0.040)	(0.040)	(0.040)	(0.036)
Center employee turnover rate/10		0.003	0.002	0.001	0.002
		(0.009)	(0.008)	(0.008)	(0.009)
Director experience at center/10		-0.021	-0.017	-0.018	-0.038
		(0.022)	(0.023)	(0.022)	(0.026)
Child Covariates					
Child is female			-0.025	-0.020	-0.018
			(0.033)	(0.032)	(0.035)
Child race-ethnicity (Ref: Non-Hispanic white)					
Non-Hispanic black			0.103*	0.112*	0.185*
			(0.054)	(0.054)	(0.049)

Appendix C. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child and Family Covariates (3)	Add Lagged Child Outcomes (4)	All Coefficients With Minimal Controls (5)
Non-Hispanic other			0.040 (0.056)	0.035 (0.057)	0.087 (0.055)
Hispanic			0.012 (0.054)	0.004 (0.056)	0.158* (0.052)
Child in >1 care arrangement			-0.013 (0.040)	-0.005 (0.041)	-0.017 (0.045)
Child in care 30 or more hours			0.095* (0.035)	0.099* (0.035)	0.166* (0.036)
Child low birth weight			-0.033 (0.046)	-0.028 (0.045)	0.035 (0.044)
Mother ever breast fed child			-0.003 (0.037)	0.004 (0.037)	-0.060* (0.036)
Child height at 4 years (centimeters)			0.002 (0.003)	0.001 (0.003)	0.003 (0.003)
Child lactose intolerant			0.011 (0.087)	0.051 (0.088)	-0.027 (0.088)
Child number of well-child visits (Ref: Three or more)					
Zero or one			0.065 (0.053)	0.070 (0.053)	0.063 (0.058)
Two			0.048 (0.041)	0.048 (0.040)	0.027 (0.045)
Since last interview, child received WIC			0.027 (0.034)	0.023 (0.034)	0.106* (0.034)
Family Covariates^a					
Family household income <100% FPL			-0.050 (0.037)	-0.057 (0.037)	0.086* (0.033)
Mother married			-0.046 (0.038)	-0.046 (0.037)	-0.107* (0.033)
Number of children in household (Ref: One)					
Two			0.089* (0.045)	0.082* (0.045)	0.045 (0.048)
Three			0.070 (0.050)	0.060 (0.049)	0.021 (0.050)
Four or more			0.070 (0.060)	0.071 (0.059)	0.031 (0.058)
Mother education (Ref: some college or college graduate)					
Less than high school			0.064 (0.041)	0.067* (0.041)	0.148* (0.039)
High school graduate			0.144* (0.041)	0.143* (0.041)	0.215* (0.042)
Mother's age (Ref: 30 to 34)					
Less than 25			0.047 (0.051)	0.059 (0.050)	0.116* (0.049)

Appendix C. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child and Family Covariates (3)	Add Lagged Child Outcomes (4)	All Coefficients With Minimal Controls (5)
25 to 29			0.066 (0.045)	0.071 (0.045)	0.106 ⁺ (0.046)
35 to 39			-0.001 (0.055)	-0.011 (0.055)	-0.003 (0.060)
40 or more			0.009 (0.059)	-0.006 (0.060)	0.011 (0.067)
Mother employment status (Ref: Not employed)					
Full time			0.072 ⁺ (0.038)	0.071 ⁺ (0.038)	0.044 (0.038)
Part time			0.056 (0.043)	0.060 (0.043)	0.009 (0.047)
Mother health excellent or very good			-0.041 (0.033)	-0.037 (0.033)	-0.068 ⁺ (0.034)
Since last interview, family used Food Stamps			0.026 (0.039)	0.009 (0.039)	0.081 ⁺ (0.036)
No English at home or mother not born in U.S.			0.068 (0.050)	0.085 ⁺ (0.050)	0.056 (0.045)
Household has rules about food			-0.003 (0.036)	0.006 (0.035)	-0.092 ⁺ (0.037)
Small care group size very important to mother's child care decision			0.081 ⁺ (0.034)	0.081 ⁺ (0.034)	0.052 (0.036)
Mother had no difficulty finding care			-0.017 (0.034)	0.001 (0.034)	0.013 (0.035)
Percentage Non-Hispanic black in ZIP code (Ref: 55 or more)					
<25			0.097 (0.068)	0.087 (0.068)	0.001 (0.061)
25-54			0.013 (0.065)	0.011 (0.065)	0.041 (0.069)
Percentage Hispanic in ZIP code (Ref: 55 or more)					
<25			-0.102 (0.066)	-0.125 ⁺ (0.067)	-0.306 ⁺ (0.065)
25-54			-0.071 (0.068)	-0.091 (0.068)	-0.187 ⁺ (0.069)
Lagged Child Outcomes					
Household and child food insecurity at two years (Ref: No food insecurity)					
Household and child food insecure				0.164 ⁺ (0.048)	0.157 ⁺ (0.049)
Household food insecure				0.048 (0.048)	0.072 (0.053)
Child milk consumption at two years (Ref: Milk at neither meals nor snack)					
With meals				0.100 ⁺ (0.044)	0.029 (0.048)
With snack				0.051 (0.042)	0.047 (0.047)

Appendix C. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers.

	Key				
	Variables		Add	Add	All
	With		Child and	Lagged Child	Coefficients
	Minimal	Add Center	Family	Outcomes	With Minimal
	Controls	Covariates	Covariates		Controls
	(1)	(2)	(3)	(4)	(5)
With snack and meals				0.035	-0.003
				(0.045)	(0.049)
Child BMI at two years				0.011	0.015 ⁺
				(0.008)	(0.008)
Constant	0.673 ⁺	0.676 ⁺	0.153	0.044	
	(0.088)	(0.104)	(0.385)	(0.390)	

NOTE: $n = 850$ (unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement). Minimal controls, not shown, are: (1) the parent sampling weight (W3R0) and dummies for child age and for geographic state or region in all columns, and (2) whether the parent respondent is the mother in columns 3, 4, and 5, and (3) not missing BMI at two years in columns 4 and 5. Robust standard errors in parentheses, which adjust for clustering within ZIP codes. CACFP=Child and Adult Care Food Program. CCDF=Child Care and Development Fund. FPL=Federal poverty level. WIC= Special Supplemental Nutrition Program for Women, Infants, and Children. BMI=Body mass index.

^a 95% of respondents are the biological mother.

⁺ $p < .10$, * $p < .05$

□
□

Appendix D. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers, restricted to subsample of children not in care at two years.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child and Family Covariates (3)	Add Lagged Child Outcomes (4)	All Coefficients With Minimal Controls (5)
Key Determinants of Benefits					
Area Young Child Poverty (Ref: <10%)					
10-19%	0.148 ⁺ (0.072)	0.115 (0.071)	0.074 (0.075)	0.084 (0.075)	0.164 ⁺ (0.072)
20% or more	0.249 ⁺ (0.064)	0.194 ⁺ (0.061)	0.162 ⁺ (0.071)	0.160 ⁺ (0.069)	0.275 ⁺ (0.065)
Center For-Profit	-0.235 ⁺ (0.063)	-0.120 ⁺ (0.069)	-0.181 ⁺ (0.073)	-0.176 ⁺ (0.073)	-0.235 ⁺ (0.063)
Center license status and size (Ref: Licensed for more than 100 children)					
Not licensed	-0.154 ⁺ (0.064)	-0.125 ⁺ (0.063)	-0.125 ⁺ (0.068)	-0.134 ⁺ (0.069)	-0.077 (0.055)
Licensed for 50 children and below	-0.115 ⁺ (0.064)	-0.095 (0.064)	-0.097 (0.064)	-0.129 ⁺ (0.067)	-0.064 (0.055)
Licensed for 51 to 100 children	-0.019 (0.075)	0.003 (0.071)	-0.018 (0.072)	-0.037 (0.073)	0.016 (0.073)
Center Covariates					
Center type and location (Ref: Community center)					
School-based prekindergarten		-0.178 ⁺ (0.093)	-0.227 ⁺ (0.092)	-0.184 ⁺ (0.090)	-0.016 (0.089)
Other preschool		-0.256 ⁺ (0.100)	-0.285 ⁺ (0.096)	-0.242 ⁺ (0.096)	-0.186 ⁺ (0.096)
Something else		-0.193 (0.153)	-0.235 (0.154)	-0.233 (0.159)	-0.034 (0.132)
Center accredited		0.131 ⁺ (0.049)	0.126 ⁺ (0.050)	0.121 ⁺ (0.050)	0.212 ⁺ (0.049)
Center refers to/from head start/ early head start		0.166 ⁺ (0.049)	0.115 ⁺ (0.050)	0.117 ⁺ (0.051)	0.247 ⁺ (0.049)
Center accepts CCDF child care subsidies		-0.122 ⁺ (0.054)	-0.121 ⁺ (0.053)	-0.112 ⁺ (0.054)	-0.210 ⁺ (0.053)
Center employee turnover rate/10		-0.010 (0.011)	-0.010 (0.011)	-0.010 (0.011)	-0.009 (0.012)
Director experience at center/10		-0.025 (0.030)	-0.024 (0.033)	-0.023 (0.032)	-0.056 ⁺ (0.033)
Child Covariates					
Child is female			-0.058 (0.046)	-0.050 (0.045)	-0.024 (0.048)
Child race-ethnicity (Ref: Non-Hispanic white)					

Appendix D. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers, restricted to subsample of children not in care at two years.

	Key Variables With Minimal Controls (1)	Add Center Covariates (2)	Add Child and Family Covariates (3)	Add Lagged Child Outcomes (4)	All Coefficients With Minimal Controls (5)
Non-Hispanic black			0.102 (0.083)	0.098 (0.084)	0.198 ⁺ (0.073)
Non-Hispanic other			0.087 (0.081)	0.083 (0.082)	0.119 ⁺ (0.076)
Hispanic			-0.004 (0.076)	-0.018 (0.079)	0.162 ⁺ (0.072)
Child in >1 care arrangement			0.016 (0.065)	0.017 (0.066)	0.068 (0.068)
Child in care 30 or more hours			0.109 ⁺ (0.055)	0.103 ⁺ (0.053)	0.200 ⁺ (0.054)
Child low birth weight			-0.051 (0.067)	-0.038 (0.069)	0.036 (0.061)
Mother ever breast fed child			0.049 (0.055)	0.061 (0.054)	-0.034 (0.051)
Child height at 4 years (centimeters)			0.001 (0.004)	0.000 (0.004)	0.002 (0.004)
Child lactose intolerant			0.006 (0.118)	0.036 (0.124)	-0.057 (0.125)
Child number of well-child visits (Ref: Three or more)					
Zero or one			0.067 (0.079)	0.076 (0.078)	0.089 (0.085)
Two			0.003 (0.064)	0.013 (0.063)	0.059 (0.067)
Since last interview, child received WIC			0.074 (0.051)	0.077 (0.051)	0.154 ⁺ (0.049)
Family Covariates^a					
Family household income <100% FPL			-0.039 (0.054)	-0.050 (0.055)	0.117 ⁺ (0.049)
Mother married			-0.121 ⁺ (0.053)	-0.122 ⁺ (0.053)	-0.154 ⁺ (0.048)
Number of children in household (Ref: One)					
Two			-0.003 (0.074)	0.006 (0.074)	0.021 (0.079)
Three			0.021 (0.080)	0.025 (0.078)	0.021 (0.081)
Four or more			0.033 (0.086)	0.061 (0.086)	0.054 (0.086)
Mother education (Ref: some college or college graduate)					
Less than high school			0.115 ⁺ (0.065)	0.118 ⁺ (0.064)	0.229 ⁺ (0.056)
High school graduate			0.261 ⁺ (0.060)	0.255 ⁺ (0.059)	0.342 ⁺ (0.058)

Appendix D. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers, restricted to subsample of children not in care at two years.

Key Variables				All Coefficients
With Minimal Controls	Add Center Covariates	Add Child and Family Covariates	Add Lagged Child Outcomes	With Minimal Controls
(1)	(2)	(3)	(4)	(5)
Mother's age (Ref: 30 to 34)				
Less than 25		0.022	0.016	0.115
		(0.072)	(0.073)	(0.071)
25 to 29		0.086	0.059	0.131*
		(0.062)	(0.064)	(0.068)
35 to 39		-0.078	-0.108	-0.064
		(0.073)	(0.074)	(0.080)
40 or more		0.015	-0.034	0.056
		(0.081)	(0.080)	(0.088)
Mother Employment status (Ref: Not employed)				
Full time		0.066	0.052	0.078
		(0.062)	(0.062)	(0.058)
Part time		0.028	0.014	-0.015
		(0.061)	(0.062)	(0.064)
Mother health excellent or very good				
		-0.057	-0.046	-0.064
		(0.046)	(0.046)	(0.048)
Since last interview, family used Food Stamps		-0.069	-0.072	0.042
		(0.055)	(0.055)	(0.051)
No English at home or mother not born in U.S.		0.032	0.043	0.078
		(0.074)	(0.074)	(0.061)
Household has rules about food				
		0.017	0.025	-0.081
		(0.052)	(0.053)	(0.054)
Small care group size very important to mother's child care decision		0.121*	0.112*	0.070
		(0.049)	(0.048)	(0.050)
Mother had no difficulty finding care				
		-0.038	-0.026	0.015
		(0.049)	(0.049)	(0.052)
Percentage Non-Hispanic black in ZIP code (Ref: 55 or more)				
<25		0.061	0.051	-0.078
		(0.101)	(0.097)	(0.087)
25-54		-0.028	-0.024	-0.089
		(0.105)	(0.103)	(0.107)
Percentage Hispanic in ZIP code (Ref: 55 or more)				
<25		0.009	-0.016	-0.235*
		(0.093)	(0.095)	(0.088)
25-54		0.014	0.005	-0.032
		(0.098)	(0.100)	(0.097)
Lagged Child Outcomes				
Household and child food insecurity at two years (Ref: No food insecurity)				
Household and child food insecure			0.157*	0.169*
			(0.070)	(0.069)
Household food insecure			-0.042	-0.072
			(0.074)	(0.078)
Child milk consumption at two years (Ref: Milk at neither meals nor snack)				

Appendix D. OLS Linear probability models predicting CACFP participation among low-income four-year old children in non-Head Start centers, restricted to subsample of children not in care at two years.

	Key Variables				All Coefficients
	With Minimal Controls	Add Center Covariates	Add Child and Family Covariates	Add Lagged Child Outcomes	With Minimal Controls
	(1)	(2)	(3)	(4)	(5)
With meals				0.113 [†]	0.075
				(0.064)	(0.071)
With snack				0.070	0.093
				(0.064)	(0.068)
With snack and meals				-0.003	-0.031
				(0.065)	(0.069)
Child BMI at two years				0.004	0.013
				(0.012)	(0.011)
Constant	0.540 [*]	0.599 [*]	0.233	0.067	
	(0.127)	(0.160)	(0.524)	(0.530)	

NOTE: $n = 450$ (unweighted sample size rounded to nearest 50 as per the ECLS-B data sharing agreement). Minimal controls, not shown, are: (1) the parent sampling weight (W3R0) and dummies for child age and geographic state or region in all columns, and (2) whether the parent respondent is the mother in columns 3, 4, and 5, and (3) not missing BMI at two years in columns 4 and 5. Robust standard errors in parentheses, which adjust for clustering within ZIP codes. CACFP=Child and Adult Care Food Program. CCDF=Child Care and Development Fund. FPL=Federal poverty level. WIC=Special Supplemental Nutrition Program for Women, Infants, and Children. BMI=Body mass index.

[†] 95% of respondents are the biological mother.

† $p < .10$, * $p < .05$

□

Appendix E. Summary of coefficients from OLS linear probability models regressing child nutritional outcomes on CACFP participation status for low-income four-year olds in center care (Subsample models, with minimal controls).

	Subsample: Currently ≥ 30 Hours (n = 400)	Subsample: In Community Centers (n = 150)	Subsample: Not in Care at Two Years (n = 450)
Child Outcomes	(1)	(2)	(3)
Two or more cups per day of:			
Milk	0.153* (0.059)	0.238* (0.099)	0.113* (0.049)
100% fruit juice	0.052 (0.058)	-0.006 (0.103)	0.032 (0.051)
Soda or fruit-flavored drinks	0.026 (0.044)	-0.018 (0.075)	0.031 (0.036)
Two or more servings per day of:			
Vegetables (excluding French fries)	0.067 (0.056)	0.151 (0.101)	0.099* (0.050)
Fruits	0.082 (0.057)	0.123 (0.102)	0.067 (0.050)
Fast food	-0.002 (0.022)	-0.000 (0.058)	0.004 (0.012)
Sweet snacks	0.002 (0.046)	-0.077 (0.084)	-0.009 (0.039)
Salty snacks	0.033 (0.035)	0.026 (0.073)	0.003 (0.030)
Child CDC Growth Chart Status			
Healthy weight versus overweight/at risk of overweight	-0.077 (0.055)	-0.024 (0.095)	-0.010 (0.048)
Healthy weight versus underweight	0.063 (0.041)	-0.033 (0.054)	0.025 (0.019)
Any food insecurity			
Household	0.041 (0.060)	0.126 (0.104)	0.056 (0.050)
Child	0.019 (0.053)	0.128 (0.097)	0.038 (0.042)

NOTE: The sample sizes are as listed at the top of each column, except for “healthy weight versus underweight” where the sample sizes are 250, 100, and 300 respectively (unweighted sample size rounded to the nearest 50 as per the ECLS-B data sharing agreement). **Minimal controls are:** parent sampling weight and dummies for child age, geographic region/state, and whether parent respondent is mother. Robust standard errors shown, which adjust for clustering within ZIP codes, are in parentheses. CACFP=Child and Adult Care Food Program. CDC=Centers for Disease Control and Prevention. + p<.10, * p<.05