

Chapter 1

Introduction

The fraction of women in the United States who participate in the labor force has increased dramatically over the last few decades. According to the U.S. Bureau of Labor Statistics, employment among all women rose from 43 percent to 60 percent between 1970 and 2001. Currently as many as 78 percent of married women with school-age children (age 6 to 17), and 63 percent of married women with infants and preschoolers (under age 6), are employed outside the home (U.S. Census Bureau, 2002). Employment rates are even higher for single mothers. This high level of labor force participation raises questions about how households with working mothers cope with increased time constraints—in particular, changes they may make in the provision of food or supervision of children, how food and nutrition assistance programs figure in their lives, and the subsequent effects on children’s health and well-being.

This report presents findings from a study to explore issues pertaining to mothers’ employment and children’s nutrition. The study uses data from two extant sources to address the following research questions:

1. How do key nutrition outcomes differ among children whose mothers work full-time, part-time, and not at all?
2. How much of this difference remains when underlying differences among the groups of households are taken into account?
3. What role does the Child and Adult Care Food Program (CACFP) serve in meeting the nutritional needs of children in child care?
4. How do nutrition outcomes compare between children of working mothers in CACFP and children of non-working mothers who are not in care?

The conceptual framework for the research, data sources, and analysis approach are described below. A brief review of the empirical literature on the topic is also included in this chapter.

Conceptual Framework

Mothers’ employment status has potential implications for virtually all aspects of children’s growth and development, and nutrition outcomes are no exception. The quality of children’s diets and their subsequent physical health may depend significantly on whether and how much their mothers work outside the home. On the one hand, employed mothers may have less time available to supervise their children’s activities and to prepare their meals. On the other hand, the additional income they bring into the household may help to ensure a stable supply of high quality food. The net effects on children’s well being are likely to vary depending on the presence of other adults in the household, the household’s income net of the mother’s earnings, and the age of the child. Use of child care and participation in the U.S. Department of Agriculture’s (USDA) food assistance programs may mediate the effects of maternal employment on children’s health and nutrition.

The exploration of relationships between maternal employment and children's nutrition outcomes is based on time allocation theory. A vast literature exists on this topic, stemming from Gary Becker's seminal article (1965). The essence of the theory is that within a household, adult members allocate their time among market work, home production, and leisure (non-work time) so as to maximize household well-being. This well-being depends on the goods that can be obtained by combining the income from market work with the labor from home production, as well as on leisure. An implication is that, inasmuch as husbands typically have higher earning potential than their wives, couples in which both partners do not work full-time will usually choose to have the wife rather than the husband stay home with the children or work part-time, even if men's and women's personal preferences for market work *versus* home production are the same. "Household well-being" is clearly an abstraction from the well-being of the individuals, and more sophisticated models consider the balance of power within the household that determines the resources (including leisure) ultimately going to each member.³

A recent literature review by Olmstead and Weathers (2001) notes that individuals can respond to time constraints by four general strategies: domestic outsourcing (e.g., purchasing prepared meals, hiring a cleaning service); time-deepening (multi-tasking, speeding up non-market work); time-pooling (trading off tasks with other adults within or outside the household); and doing without (sleeping less, allowing the house to become untidy). Each of these strategies has clear advantages and drawbacks.

The availability of household services on the market has acquired central importance as a modification to the classic Becker model. Oppenheimer (1997) notes that specialization within a nuclear family is a risky strategy because of the possibility of job loss or illness. Each partner engaging in both household work and market employment offers flexible protection against these risks. Households can reach a higher material standard of living if both partners work and home production is largely outsourced.

In this study, the maternal employment decision is taken as given, rather than examining how it is determined by husbands' and wives' earnings potentials and preferences. The theory provides the insight that working mothers trade off the advantages of greater income against the disadvantages of less time for home production (including food purchasing, food preparation, and supervision of children's activities) and less free time. Although families may be presumed to have made the choices that best suit them overall (including perhaps the mother's desire to work outside the home), these choices may have positive or negative impacts on particular aspects of children's well-being.

Direct measures of children's nutritional status (e.g., food and nutrient intake), as well as other nutrition-related outcomes (e.g., food assistance program participation, risk of overweight, food

³ Another variation on the model is to distinguish between maintenance activities (eating, sleeping) and leisure *per se*. Although this distinction focuses attention on the valid point that a minimum of non-work time is required for survival, it does not add further to our understanding of time pressures, because adults are typically free to allocate their free time between these two areas without implications for other family members. Reducing market or non-market work time, in contrast, may require intrafamilial negotiation.

sufficiency) are included in the analysis of the relationship of mothers' work with child nutrition outcomes.⁴ For some child nutrition outcomes, hypotheses about the causal effects of maternal employment are unambiguous, other things equal. For other outcomes, the loss of home production time and the gain in income work in opposite directions, with the net effect unknown. These hypotheses are discussed below.

Expected Negative Effects of Maternal Employment

On the assumption that no caretaker would be more motivated than the child's mother to supervise the child's **activities**, we anticipate that children in non-parental care or self-care might snack more, perhaps on less healthful foods, watch more television, and be less physically active than their counterparts, other things equal. The income/time trade-off made by working mothers would be expected to lead to increased reliance on **prepared foods** (e.g., frozen entrées) and **carry-out** items, which are typically higher in fat and sodium, and possibly lower in fiber, than meals cooked at home. In addition, the means-tested Food and Nutrition Assistance Programs (FNAPs) dampen the effects of maternal earnings on nutrition outcomes, both because households may lose eligibility (or may be eligible for reduced benefits), and because participation may be less convenient for working mothers. Thus, to the extent that participation in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and the Food Stamp Program (FSP) improve children's nutrition, the advantages will be less available to children of working mothers.⁵

Expected Positive Effects of Maternal Employment

The higher income of families with working mothers should lead to increased **food expenditures** and a higher-quality diet in those dimensions that might be constrained by lack of income. **Food security** can also be expected to improve. Furthermore, participation in CACFP may dampen any negative effects of maternal employment on children's food intake in the mother's absence. In addition, maternal employment might increase children's participation in the School Breakfast Program (SBP) and the National School Lunch Program (NSLP)⁶—not for the advantage of free or reduced-price meals, but for the convenience. If the meals offered are of high nutritional quality, then like CACFP these programs may also dampen some negative effects of maternal employment on child nutrition.

Unclear Effects of Maternal Employment

The overall effect of maternal employment on children's **dietary patterns and diet quality** is hard to predict. Although some aspects of diet quality related to income might be improved (e.g., more fresh fruits and vegetables), other aspects related to the caregiver's time availability might be worsened (greater use of prepared foods and carry-out). Diet patterns such as skipping meals and frequency of

⁴ It should be noted that the nutritional implications of mother's employment do not end with children's food intake, energy balance, and food sufficiency. More distal outcomes include dental caries, biochemical indicators of nutritional status, cognitive development, and physical growth. Outcomes like these are not discussed in this report because they were not measured in the available data sets.

⁵ An additional domain in which maternal employment is likely to have negative consequences is breastfeeding initiation and duration. This study does not include breastfeeding among the child nutrition outcomes examined, because a vast literature already exists on the topic.

⁶ Data necessary to examine the relationship between maternal employment and participation in the Summer Food Service Program (SFSP) were not available for this project.

meals and snacks could also be either improved or worsened, because of increased financial resources on the one hand and reduced supervision on the other. Risk of **overweight** likewise might be affected either way. Although higher quality food and stable household food supplies could help control children's weight, lack of maternal supervision of meals and snacks and of physical activities, combined with more convenience foods and carry-out, might make overweight and obesity more likely.

Review of Literature

Although considerable research has been done on the relationship between maternal employment and breastfeeding, only a small number of studies have explored the effects of maternal employment on other child nutrition outcomes. These studies have primarily examined children's nutrient intake. Overweight and maternal attitudes toward child nutrition have been studied as well. A literature review conducted by Johnson *et al.* in 1993 concluded that although the study of the field is limited, maternal employment does not have negative consequences for preschool children's dietary intakes. Recent work by Anderson and colleagues (2002), however, suggests that mothers who worked full-time since their children's birth are more likely to have overweight children. The findings of studies published within the last decade or so are summarized below and in Exhibit 1.1.

Nutrient Adequacy and Over-Consumption

Johnson and colleagues (1992a) looked at measures of nutrient adequacy and nutrient over-consumption in a sample of 2- to 5-year-old children from the 1985 Continuing Survey of Food Intakes of Individuals (CSFII). Using both bivariate and multivariate analysis techniques, they found that maternal employment status was not correlated with any of the diet quality measures examined. The authors conclude that maternal employment has no detrimental effect on young children's diets. They also note several limitations of the study, including non-response, attrition, and lack of employment data at all but the initial point of dietary data collection.

Addressing the same issues using the 1987 to 1988 Nationwide Food Consumption Survey (NFCS), Johnson *et al.* (1992b) similarly found that maternal employment did not affect the diet quality of 2- to 5-year-old children. Further, this study found no evidence of relationships between maternal employment and diet quality for different levels/values of mothers' education, age, presence of male head of household, race, number of children under 5 years old, age of child, or number of meals eaten away from home. This study did find that children of full-time and part-time working mothers ate more meals at schools and child care centers than children whose mothers were not employed. Non-response was substantial for the NFCS.

Horton and Campbell (1991) used data from the 1984 Family Food Expenditure Survey (urban households in Canada) to find that maternal employment is associated with higher rates of restaurant-food consumption and higher costs per calorie of home-prepared food. The authors also find that full-time maternal employment is negatively associated with household nutrient availability (which combines expenditure and nutrient variables), with no evidence showing that increased income from maternal employment was being related to increased expenditures on basic needs. The authors concede, however, the limitations of their use of food expenditures rather than complete information on specific foods eaten.

Exhibit 1.1**Summary of Studies of Maternal Employment and Child Nutrition Outcomes**

Study	Measures	Sample	Data Collection Method
Godwin and McIntosh (1997)	<ul style="list-style-type: none"> • Children's body fat percentages • Intake of vitamin B₁₂ 	Pilot study of Texas 14-15 year-olds (<i>n</i> =54)	Venipuncture, step test, anthropometrics, 24-hour diet and activity recalls, two-day diet and activity records
Johnson/JADA (1992a)	<ul style="list-style-type: none"> • Nutrient adequacy • Nutrient over-consumption 	1985 Continuing Survey of Food Intakes of Individuals (<i>n</i> =216)	Four nonconsecutive days of 24-hour diet recalls during a one-year period
Johnson/Pediatrics (1992b)	<ul style="list-style-type: none"> • Nutrient adequacy • Nutrient over-consumption 	1987-88 National Food Consumption Survey (<i>n</i> =442)	Three-day average of one 24-hour recall and two days of food records
Horton and Campbell (1991)	<ul style="list-style-type: none"> • Nutrient availability • Costs per calorie 	1984 Family Food Expenditure Surveys (urban households in Canada) (<i>n</i> =5,188)	Household survey of two weeks of family eating habits
Gillespie and Achterburg (1989)	<ul style="list-style-type: none"> • Mothers' attitudes about the importance of nutrition 	Families in upstate New York (<i>n</i> =520)	Mail questionnaire (returned by 74%)
Anderson, Butcher and Levine (2002)	<ul style="list-style-type: none"> • Children's body mass index (BMI) • Television viewing • Food energy, nutrient, and food consumption 	National Longitudinal Survey of Youth, 1986 to 1996 (<i>n</i> =6,894), supplemented with 1988 to 1994 (NHANES III) (<i>n</i> =4,073) and 1994 to 96, 1998 CSFII (<i>n</i> =7,388)	Height and weight measurements, and 24-hour diet recalls

Other Outcomes

A recent study by Anderson, Butcher, and Levine (2002) examined the relationship between maternal employment and childhood overweight. Mother-child data from three sources were used: the National Longitudinal Survey of Youth, the Third National Health and Nutrition Examination Survey (NHANES III), and the 1994 to 1996 and 1998 CSFII. Descriptive findings indicate that fast food consumption is higher among children whose mothers work, but no differences were seen in energy intake, TV viewing, or levels of overweight. Based on econometric models, the authors report a positive relationship between the intensity of maternal employment and child overweight. The effect was most notable for white children in more economically advantaged families.

Godwin and McIntosh (1997) relate parental employment to adolescents' various physical and nutritional outcomes using data from a pilot study in Texas. The authors found that daughters' body fat percentages and intake of vitamin B₁₂ was predicted by both the work history and the "work preoccupation" of mothers. Specifically, mothers who showed greater desire to work weekends or bring work home were more likely to have daughters with high body fat and low intake of vitamin B₁₂. The studies also showed sons' food energy, carbohydrate, and fat—particularly saturated fat—intake, to be predicted by their mothers' "work schedule irregularity and commitment."

Gillespie and Achterburg (1989) examined how maternal employment related to parental attitudes about the importance of nutrition. Using responses to a questionnaire mailed to families in upstate New York, the authors found that families in which the mother was employed part-time placed the higher importance on nutrition than those in which the mother was employed full-time or not at all.

Data Sources

The main sources of data for this study were two national surveys conducted in the mid-1990s: (1) the Continuing Survey of Food Intakes by Individuals, including the Diet and Health Knowledge Survey, and (2) the Early Childhood and Child Care Study. Each of these data sets is described below.

Continuing Survey of Food Intakes by Individuals

The CSFII and the Diet and Health Knowledge Survey (DHKS) are conducted by the Agricultural Research Service (ARS) of USDA. The CSFII was conducted over three years (1994 to 1996) and again in 1998. During 1994 to 1996, all household members were eligible for selection as a sample person. In 1998, sample persons were restricted to household members aged 0 to 9 (the CSFII Supplemental Children's Survey). Low-income individuals (income at or below 130 percent of the federal poverty guideline) were oversampled in all survey years.

CSFII data provide summary information for the household, demographic information for each household member (collected from the reference person), employment information, and detailed dietary intake information for sample persons (a random sample of household members). Two nonconsecutive days of dietary intake data were collected for almost all sample persons using in-person 24-hour recalls.⁷ Thus, information is available on a variety of aspects of children's nutrition, including eating

⁷ For infants and children under 6 years of age, a parent or knowledgeable caregiver is asked to provide the information, and for children 6 to 12 years, the child is interviewed with adult assistance.

patterns, food and nutrient intake, and diet quality. Other related variables available from the CSFII include measures of:

- Physical activity level
- Overweight and obesity⁸
- Participation in food assistance programs
- Responsibility for meal planning, food purchasing, and food preparation
- Food expenditures
- Food sufficiency.

The CSFII includes individual participation in WIC, the NSLP, and the SBP as well as household participation in the FSP.

The DHKS was administered, primarily by telephone, to a random subsample of sample persons aged 20 years or older who completed the CSFII (only one person per household was selected). The survey (42 questions and 140 potential variables) asked about the respondents' nutrition knowledge, attitudes, and behaviors. A main focus was concepts related to the *Dietary Guidelines for Americans* (USDA/DHHS, 1995) and USDA's Food Guide Pyramid (USDA, 1992). Information was also captured on awareness and beliefs in the relationship between diet and health, self-assessment of diet quality, use of food labels, and food-related behaviors (e.g., whether skin is removed from chicken).

Early Childhood and Child Care Study

The Early Childhood and Child Care Study (ECCCS) was a study of the CACFP sponsored by the Food and Nutrition Service of USDA (Glantz *et al.*, 1997; Fox *et al.*, 1997). It described the institutions and children that participate in CACFP. The study was also designed to:

- Examine the nutrient content of meals **offered** to children while in care;
- Examine the nutrient content of meals **consumed** by children while in care; and
- Assess the **contribution to the total diet** of foods consumed while in care.

Information was collected from nationally representative samples of sponsoring agencies, participating child care sites (child care centers; Head Start centers; and family child care homes), and children and their parents. The data were collected between January and June 1995, a time period roughly comparable to the 1994 to 1996 CSFII. At that time, the USDA Food and Nutrition Service (FNS) elected not to analyze the information on out-of-care consumption due to the low, 41-percent response rate on this portion of the study. FNS recommends that analyses of these data should not be considered as representative of the population of CACFP participants or of the impact of the program. It appears to us, however, that this information could make a significant contribution to our understanding of the role of the CACFP—one source of food eaten away from home upon which working mothers rely. An analysis of non-response was conducted as part of this study and results are presented in Appendix D.

⁸ Although obesity is a topic of much concern, parent-reported heights and weights for children younger than 12 are notably unreliable, with height too often reported at 6-inch intervals, such as 18, 24, 30, and 36 inches. With the analysis aiming to include all children 0 to 17 years old, obesity was not among the nutrition outcomes we could measure for all children. Results for children age 12 to 17 are provided in volume II of this report.

In the ECCCS, each participating child care provider was assigned a target week during the field period. Three interrelated data collection activities took place during the target week: (1) a menu survey, (2) meal observations, and (3) dietary recall interviews. The menu survey, completed by providers for the target week, collected detailed information on the foods **offered** to children while in care. To gather information on what the children consumed in the child care setting, meal observations were conducted on two nonconsecutive days by trained data collectors.⁹ To obtain information on food consumed by children outside of the child care setting (on the observation days), dietary recalls were conducted with parents by telephone. A household interview was also conducted with the parents of participating children at this or a later time.

Two days of complete dietary recall data are available for just under one half of respondent children; the remaining children's parents completed only the first recall. The information collected is similar to that provided in the CSFII, although meal times were not captured making it difficult to define eating occasions consistently across the data sets. Nutrients and the availability of USDA food codes allow for the construction of a number of diet quality variables, including Food Guide Pyramid servings and Healthy Eating Index (HEI) scores. Information on mothers' employment is also available, allowing the distinction to be made between homemakers and mothers' who are employed or in school.

Analytic Approach

Research Question #1: How do nutrition outcomes differ among children whose mothers work full-time, part-time, and not at all?

Children of working mothers may have better or worse nutrition outcomes than their counterparts either because their mothers work, or because working mothers differ in other ways from non-working mothers (e.g., they may tend to have more formal education, may be more likely to be single parents, or may have varying nutrition knowledge or attitudes). The analysis sample for addressing this research question comprises children living in households that participated in the CSFII whose mothers (or mother-equivalents) were either employed or homemakers. A child is a household member aged 0 to 17 years, excluding reference persons (heads of household), their spouses, and their partners. A mother/mother equivalent, or "maternal female", is a female member of the child's household, aged 15 to 59 years and at least five years older than the child, who has the closest familial relationship to the child. In the great majority of cases, this person is the child's biological mother. In some cases she may, however, be the child's stepmother, foster mother, older sister, aunt, or grandmother, or the unmarried partner of the child's father.¹⁰ Although the term "mother" is used for brevity, this should be understood as synonymous with the more precise term "maternal female."

⁹ Prior to each meal and snack, observers weighed or measured reference portions of each food to be offered. During meal time, observers recorded the amount of food each child received and the amount of food left on the child's plate. Food consumed was then calculated as the difference.

¹⁰ It is not always possible to tell the exact relationship between the child and the "mother", because the CSFII reports only household members' relationship to the reference person (RP), not their relationships to each other. Thus if the RP is male, a child of the RP may either be the biological child or stepchild of the RP's spouse. Appendix A details the procedures used to determine child-maternal female dyads in the CSFII.

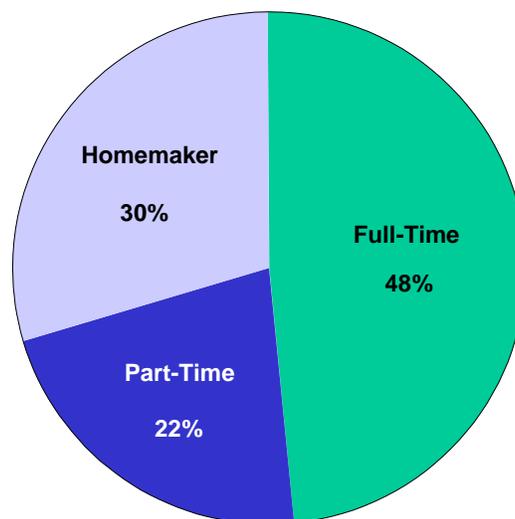
The final sample comprises 15,344 child-maternal female dyads in 7,190 households. In these dyads:

- 10,116 children were randomly selected as CSFII sample persons for collection of dietary intake data (including children only up to age 9 in the Supplemental Children’s Survey); and
- 1,517 children’s mothers were randomly selected to participate in the DHKS.

Within the dyads, mothers were classified as full-time employed, part-time employed, or homemaker. The distinction between the first two categories is determined based on reported hours per week “usually” worked, or if necessary, by hours worked last week: 1 to 34 (part-time) *versus* 35 or more (full-time). Women who did not work because they were keeping house are considered homemakers. Because the focus of this analysis is comparing the nutrition outcomes of children of working *versus* nonworking mothers, children whose mothers were unemployed or in school were dropped from the sample. Nearly half (48 percent) of the sample children’s mothers worked full time, over a quarter (30 percent) were homemakers, and the remainder (22 percent) worked part time (Exhibit 1.2).

Exhibit 1.2

Employment Status of Sample Children’s Mothers



Child nutrition outcomes such as food and nutrient intake were analyzed for mother-child dyads in which children were sample persons in the CSFII. **Household nutrition outcomes** (including FSP participation and food sufficiency) were analyzed (in volume II) for all dyads, regardless of sample person status. **Maternal nutrition knowledge and attitudes** were analyzed for those dyads in which the mother was a sample person and was administered the DHKS.

Outcomes for children of mothers who work full-time and part-time were compared with outcomes for children of nonworking mothers (homemakers), and the differences were tested for statistical significance. In addition to comparisons for the entire analysis sample, comparisons were also performed for subgroups, as appropriate for the particular outcomes, based on the following characteristics:

- Age of child
- Household income relative to federal poverty level
- Presence of another adult in the household.

Because younger children's mothers are less likely to work, all tabulations were age-weighted. Thus, when comparing outcomes among maternal employment categories, the distribution of children's age is held constant.

Research Question #2: How do dietary outcomes differ among children whose mothers work full-time, part-time, and not at all, after taking account of underlying differences in the populations?

Further analysis is conducted of the relationship between maternal employment and selected nutrition outcomes, namely, direct measures of children's dietary intake. These measures include the HEI and its components, food energy, intake of iron, zinc, and dietary fiber, and several foods of special interest (soda, added sugar, fried potatoes). Although it is not possible to establish causation,¹¹ it is at least possible to use multivariate analysis (logistic and least squares regression) to determine the relationship net of the influences of some basic characteristics that may vary with maternal employment, namely:

- mother's age
- mother's race/ethnicity
- mother's education
- household size/composition
- mother's nutritional knowledge
- mother's nutritional attitudes
- other adult household members' earnings
- region of country
- urban *versus* rural residence

Maternal nutrition knowledge and attitudes are included on the above list because they are particularly interesting as potential determinants of children's dietary outcomes. They are assumed neither to cause nor to be caused by maternal employment. They may however be correlated with maternal employment because of common antecedents—some of which (education, race/ethnicity) are included in the analysis, and others of which (general attitudes, temperament) are not. A design feature of the CSFII is that information was collected on maternal nutrition knowledge and attitudes for only a small fraction of children for whom dietary data are available (around 15 percent). In

¹¹ Causal inferences cannot be drawn because there may be unmeasured characteristics that affect both maternal employment and children's nutrition outcomes, such as the mother's attitudes toward women's appropriate roles.

Appendix C, a few key models on the restricted sample have been estimated with and without these variables.

Earnings of other adult household members are not measured directly in the CSFII. Information is available, however, on the usual hours of employment and occupation of each household member. This information was used to construct a rough index of “basic household income” (earnings of adults other than the mother), using median weekly full-time earnings by occupation and sex in 1996 as determined by the Current Population Survey (CPS) (U.S. Census Bureau, 1997).¹²

Several intervening factors may also affect dietary outcomes, such as participation in the FSP and WIC. These are not included in the models because they are not causally prior to maternal employment. Whether the mother works affects household income, and therefore affects eligibility for these programs. Program participation thus cannot be “held constant” while maternal employment status varies.

One regression model was estimated for each outcome, with the effects of full-time and part-time maternal employment allowed to vary by age of child. The form of the model (shown for a continuous variable) is:

$$y_i = \sum_g b_{1g} \times age_{ig} + \sum_g b_{2g} FT_i \times age_{ig} + \sum_g b_{3g} PT_i \times age_{ig} + \sum_k b_{4k} \times Z_{ik} + \varepsilon_i$$

Here y_i is the outcome for child i ; FT_i and PT_i are indicators that the child’s mother works full-time and part-time, respectively; age_{ig} is an indicator that child i is in age group g (1 to 2 years, 3 to 4 years, 5 to 8 years, etc.), Z_{ik} is the value of characteristic k for child i , and ε_i is the residual.¹³ The components of the b_2 vector represent the estimated effects of mothers’ full-time employment on the outcome for children in each age group relative to children of non-working mothers in the same age group, and similarly the components of the b_3 vector represent the estimated effects of mothers’ part-time employment on children by age group, relative to children of nonworking mothers.

¹² The great majority (over 90 percent) of “other adults” in these households who were working, reported working full-time, i.e., 35 hours a week or more. The remaining adults were assigned a fraction of the appropriate weekly earnings based on their usual hours divided by 40. For individuals with missing hours, the hours values were filled in using a randomly selected “donor” observation in the same occupation. For individuals with missing or “other” occupations, full-time earnings values were filled in using a randomly selected “donor” observation with the same hours status (full-time or part-time).

Clearly this measure is only a rough proxy for the desired measure. The median earnings figures used are not exactly appropriate for this population because they are based on all employed adults—not just those in households with dependent children. In addition, earnings within an occupation vary by education, region, age, and many other factors. Still, this variable gives some information about differences in household resources net of the mother’s potential earnings that are associated with having no other adults present, or no other working adults, *versus* having a father in the house who is a full-time professional or a full-time service worker.

¹³ The 16 variables are included in this set of indicators: the child’s mother is under 30, age 40 or older, non-Hispanic black, Hispanic, of other non-white race/ethnicity, lacking a high school diploma/GED, with post-secondary education, and with unknown level of education; the numbers of adults and children in the household; an index of other adults’ earnings; indicators for Midwest, Northeast, and West regions (South is excluded); and indicators for central city and other urban areas (rural is excluded).

Research Question #3: What role does the CACFP appear to serve in meeting the nutritional needs of children in child care?

Not all children of working mothers are in child care, and not all children in child care have working mothers. Nonetheless, the correlation is strong. According to the 1997 National Survey of America's Families (NSAF), among children aged 0 to 5 whose "responding parent" (the person most knowledgeable about the child) was employed, 78 percent of those in lower income households and 85 percent in higher income households are in non-parental care. The corresponding proportions for children whose responding parent was not employed are 44 and 57 percent (Tout *et al.*, 2001).¹⁴ The child component of CACFP, which subsidizes qualifying meals and snacks for children in child care, is thus the nutrition assistance program most directly focused on children of working mothers.

Two major studies funded by USDA, the ECCCS and, more recently, the Family Child Care Homes Legislative Changes Study, have assessed the dietary quality of CACFP meals and snacks. Although no quantitative nutrition standards exist for the CACFP, both studies compared meals offered by CACFP providers to benchmarks established for the school meal programs. The earlier study also did the same comparisons for meals and snacks actually consumed by children in CACFP care. Findings from these and other studies of the CACFP raise the possibility that CACFP meals contribute more than their share of fat, saturated fat, and sodium and a less-than-adequate proportion of total carbohydrate relative to food energy intake (Crepinsek *et al.*, 2002a; Fox *et al.*, 1997; Briley *et al.*, 1993). On the other hand, they offer a substantial proportion of children's Recommended Daily Allowance (RDA) for food energy and key vitamins and minerals (Fox *et al.*, 1997, Crepinsek *et al.*, 2002a).

No national studies to date have evaluated the impact of the CACFP on children's dietary intake over a full 24-hour period (Glantz, 2003). Using hitherto unexamined data from the ECCCS, this study assesses the food energy and nutrient intake by children in CACFP settings in the context of their consumption during the rest of the day. Because the focus of this research question is CACFP as a whole, all child participants are included, regardless of maternal employment.

To examine the role the CACFP plays in meeting the nutritional needs of children in child care, ECCCS meal observation data for meals consumed in CACFP care were linked with dietary recall interview data on non-CACFP care intake for the same days. The analysis sample was CACFP children age 1 to 10 for whom information was available on meals consumed in both contexts. Tabulations place the food energy and nutrient intake from CACFP meals in the context of intake for the whole day. Although meal requirements for children are the same regardless of type of CACFP care setting, demographic characteristics differ. Findings are therefore presented separately for children in family child care homes, Head Start centers, and other types of child care centers.

Research Question #4: How do nutrition outcomes compare between CACFP-participating children of working mothers and not-in-care children of non-working mothers?

The CACFP may be deemed successful if it feeds children who need to be in care at least as well as children who do not need to be in care are fed by their own mothers. Diet quality, therefore, was

¹⁴ Lower income families are those under 200 percent of the federal poverty guideline.

compared between children in CACFP care whose mothers are working or in school and not-in-care children whose mothers are full-time homemakers.¹⁵

The sample of children in CACFP was drawn from the ECCCS. The comparison group was children not in child care in the 1994 to 1996 CSFII data set whose mothers did not work (referred to from here on as 'not-in-care children of nonworking mothers'). The samples of children for this analysis were limited to children 1 to 5 years of age, the group for which CACFP and maternal employment were expected to have the most impact. For the CSFII sample, only data collected on weekdays were included (76 percent of the 1994 to 1996 interviews) to enhance comparability with the ECCCS. Diet quality measures were tabulated for CACFP participants by hours per day in child care, and for both the CACFP and CSFII samples by subgroups based on income and number of adults in the household. Differences in outcomes for participants with working mothers and not-in-care children of nonworking mothers were tested for statistical significance.

Differences between groups are reported in the text as statistically significant if they have a less than 5 percent probability of arising by chance. Some disciplines conventionally consider differences to be significant if their probability of arising by chance is less than 10 percent. Accordingly, differences that would be significant at the 10 percent level but not the 5 percent level are noted, but indicated as $p < 0.10$. Differences that are significant at the 5 percent level or better are simply reported as “statistically significant”.

Overview of Report

The next two chapters of this report address Research Questions 1 and 2. Chapter 2 describes the simple relationships between mothers' work status and direct measures of children's nutrition (HEI scores and food and nutrient intake). Results of further analyses of the relationship between maternal employment and children's nutrition using multivariate techniques are discussed in Chapter 3.

Chapter 4 presents findings from analyses of the contribution of CACFP to children's diets (Research Question 3). It begins with a descriptive analysis of children's food energy and nutrient intake from CACFP meals and snacks in the context of total intake over 24 hours. This is followed by results of comparisons of selected measures of diet quality between CACFP participants with working mothers and not-in-care children of nonworking mothers (Research Question 4).

Appendices A through C include information on the identification of maternal-child dyads in the CSFII, sampling weights, and detailed findings on the association of sample characteristics (including maternal nutrition knowledge and attitudes) with maternal employment status. A nonresponse analysis for the ECCCS 24-hour recalls is described in Appendix D, and Appendix E provides standard errors for selected analyses of these data.

¹⁵ For these analyses, children in CACFP care were excluded when their mothers were not working or in school. The reason for doing so is that CACFP care is not substituting for mothers' care for these children; mothers' care is in fact available. Conversely, excluded from the comparison group were children whose mothers worked or were in school, even if the children were not in care. Although mothers of school-aged children can forego nonparental care if they work or go to school part time, they are clearly under more time pressure than stay-at-home mothers. The most appropriate comparison appears to be between children who need to be in nonparental care and are served by CACFP with children who do not need to be (and are not) in nonparental care.

Volume II of this report presents results of additional analyses of the relationships between mothers' work status and children's other nutrition-related outcomes. That volume's four chapters examine children's eating patterns, household food acquisition and food sufficiency, participation in food assistance programs, and children's physical activity and weight status.