

Poverty, Food Stamp Program Participation and Health:
Estimates from the NLSY97

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Introduction

In 1998, 19% of children under age 18 in the United States lived in poverty (U.S. Census Bureau, 1999). Previous research suggests that even in the United States, poor children are in worse health than nonpoor children. Through the provision of Food Stamps and nutrition information, the Food Stamp Program attempts to improve the health of low-income families. The primary purpose of the Food Stamp Program is to allow all Americans to afford a low-cost, well-balanced diet, named the Thrifty Food Plan (TFP), without spending more than thirty percent of household income on food. The Food Stamp Program provides benefits to make up the difference between thirty percent of household income and the cost of the TFP appropriate to the household size (Bradbard et al., 1997).

This paper examines the relationship between family income, Food Stamp Program participation, and the health of youths ages 12 to 18 using data from the National Longitudinal Survey of Youth 1997 (NLSY97).² This chapter tests two hypotheses. The first hypothesis is that poverty is negatively related to youth health. The second hypothesis is that participation in the Food Stamp Program is associated with better health for poor youths. The measures of youth health used in this chapter are indicators of whether the youth is underweight or obese, the youth's self-reported health status, and parent-reported incidence of chronic illness in the youth. The health of the youths in the NLSY97 is analyzed using cross-sectional logistic regression models that control for current family income, the poverty history of the youth's family, and Food Stamp Program participation, as well as other youth and family characteristics. The empirical analyses do not account for the potential endogeneity of youth health, family income, or Food Stamp receipt.

The research in this chapter provides some support for the hypothesis that poverty is negatively related to the health of youths. Youths from very poor families (families with income to needs ratio less than or equal to .5) are significantly more likely to be underweight than youths whose families are not poor. The poverty status of a youth's family is not significantly related to the likelihood that the youth is overweight. The current poverty of a youth's family is negatively, and in some models significantly, related to the likelihood that the youth reports that he or she is in good health. Also, long-term poverty is significantly and positively related to the likelihood that a youth has a chronic illness.

The research in this chapter suggests that there is not a consistently positive relationship between Food Stamp Program participation and youth health, but participation in the Food Stamp Program is negatively and significantly related to the likelihood that a youth is obese. Holding all else constant, Food Stamp Program participation is not significantly related to the likelihood that a youth is underweight or in good health. Participation in the Food Stamp Program is positively related to the likelihood that a youth has a chronic illness, but this relationship is no longer significant after the addition of controls for long-term poverty.

Previous Research

Three literatures provide a background for the research in this chapter. The first literature examines the relationship between family income and child health in developed

countries. The second literature examines the effect of Food Stamps on indirect measures of health. This literature has focused on the relationship between Food Stamp receipt and food expenditure or diet quality. The final literature examines the association between Food Stamp receipt and more direct measures of health such as weight-for-height, height-for-age and birthweight.

Effect of income on child health

This section summarizes the previous research on the relationship between income and health using data from developed countries.³ The child health outcomes that have been examined by previous research that are most relevant to the research in this chapter include indicators of nutritional status such as wasting (low weight-for-height) and stunting (low height-for-age), self-reported health status, and the prevalence of chronic illness.⁴

Studies that only control for current poverty status find that children who are poor in the year in which their health is measured are at higher risk for poor nutritional status (Miller et al., 1989; Jones et al., 1985).⁵ Miller et al (1989) measure nutritional status with stunting and height. Jones et al. (1985) measure nutritional status with height, weight, dietary intake variables, and a number of calculations of skinfold thickness. Korenman and Miller (1994) discuss studies with similar research designs from the 1970's; these studies also find that current poverty status is positively related to poor nutritional status of children.

Korenman and Miller (1994) examine the relationship between poverty and the likelihood that a child is wasted or stunted using data from the NLSY on children ages 0 to 7. Controlling for a number of youth and family characteristics, they find that the prevalence of wasting and stunting is higher among children in persistently poor families compared to those children in families that are not persistently poor. They find that the likelihood that a child is wasted or stunted is positively related to both current poverty status and long-term poverty status. Long-term poverty status is a larger and more significant predictor of the likelihood of wasting and stunting than current poverty status. Based on their findings, they conclude that estimates of the relationship between income and health will be biased unless models of child health include family poverty history as an explanatory variable.

According to estimates from the Center for Disease Control (1998), socioeconomic status is associated with the likelihood an adolescent is overweight. Overall, adolescents in higher income households are less likely to be overweight than those in poorer households. Using data from the National Health and Nutrition Examination Survey, 9% of adolescents in middle- or high-income households are overweight compared to 17% of adolescents in poor households. The relationship between income and the likelihood that a youth is overweight holds for non-Hispanic white adolescents, but not for Hispanic or black adolescents.

The National Health Interview Survey asks parents to report whether they consider their children's health to be excellent, very good, fair, or poor. Adams and Benson (1990) found that families with annual incomes less than \$10,000 reported a significantly smaller percentage of children in excellent health than families with annual incomes greater than \$35,000. Chronic conditions are also more prevalent among the

poor (Klerman, 1991). In particular, asthma appears to be associated with socioeconomic factors (Weitzman et al., 1989; Wissow et al., 1988).

Effect of Food Stamps on food expenditures and diet quality

One area of research on the effects of the Food Stamp Program has examined the relationship between participation in the Food Stamp Program and the level of food expenditures. Almost all of the empirical evidence suggests that participation in the Food Stamp Program increases expenditures on food (this literature is summarized in Levedahl, 1991; and Devaney and Fraker, 1989). These studies generally find that a dollar of Food Stamp income raises food expenditures by less than a dollar, but a dollar of Food Stamp income results in a larger increase in food expenditures than a dollar of non-Food Stamp income. In these studies there is considerable variation in the size of the estimates of the marginal propensity to consume food from Food Stamp income (Levedahl, 1991).

Another line of research investigates the relationship between Food Stamp Program participation and the nutrient content of an individual's diet or food expenditures. Considering studies that control for current family income and family characteristics in addition to participation in the Food Stamp Program, the general finding is that participation in the Food Stamp Program is associated with higher levels of nutrient consumption or nutrient content in food purchases (Basiotis et al., 1983; Basiotis et al., 1987; Rose et al., 1997; and Devaney and Moffitt, 1991). The one exception is Butler and Raymond (1996) who find that after controlling for self-selection into the Food Stamp Program, Food Stamp income and other income have a negative effect on nutrient intake for a sample of elderly participants in the Food Stamp Cashout Program. However, the level of nutrients does not decrease enough to cause individuals to fall below the Recommended Daily Allowances of these nutrients. These findings differ from Devaney and Moffitt (1991), who also control for self-selection into the Food Stamp Program.

Effect of Food Stamp Program participation on child health

Korenman and Miller (1992) is the only study I am aware of that explicitly examines the relationship between Food Stamp receipt and direct measures of child health.⁶ This study measures child health using the weight-for-height and height-for-age of children between the ages of 0 and 7 in the NLSY.⁷ They measure the health status of children in their sample using two dichotomous indicators: stunting and wasting. These indicators are based on standards developed by the National Center for Health Statistics and the World Health Organization. Children below the tenth percentile in height for children of the same age (in months) and sex are classified as "stunted". Children below the tenth percentile in weight for children of the same height and sex are classified as "wasted".

Korenman and Miller propose two pathways through which Food Stamp Program participation could reduce the likelihood that a child is wasted or stunted. They suggest that Food Stamp Program participation may decrease the likelihood that a child is wasted or stunted because it results in increased food expenditures or nutrient intake. An alternative route through which participation in the Food Stamp Program may decrease the likelihood that a child is wasted or stunted is that it may allow families to increase expenditures on non-food items that may affect the health of family members (medical

care for example). Direct measures of health status such as wasting and stunting might be able to pick up the latter beneficial effect of the Food Stamp Program, while solely measuring food expenditures and the nutrient composition of diets certainly would not.

Korenman and Miller estimate logistic regression models that examine the relationship between recent Food Stamp receipt and the likelihood that a child is wasted or stunted. They include controls for family income in order to prevent the Food Stamp variable from serving as a proxy for poverty status. Korenman and Miller argue that it is important to control not only for current family income, but also a family's history of poverty in order to filter out the effects of long-term poverty and Food Stamp receipt. Long-term poverty is measured using the average income-to-needs ratio of a child's mother over the child's lifetime. Their empirical specifications also include controls for the child's age at the time of his or her weight and height measurement, the child's race and birth order, the mother's age at her first birth, her educational attainment as of 1988, and the education of the mother's parents. Korenman and Miller note that their empirical models do not account for the possibility of unmeasured heterogeneity between poor Food Stamp recipients and poor nonrecipients (their data do not allow them to use fixed effects models or difference observations for the same individual over time). They also do not control for the potential simultaneity of child health and Food Stamp receipt because they feel there are no acceptable instruments available in the NLSY.

In models that include recent Food Stamp receipt and controls for long-term poverty, Korenman and Miller find that Food Stamp receipt is associated with an increase in the likelihood of stunting and a decrease in the likelihood of wasting, although neither effect is significant. In models that include a family's history of Food Stamp receipt and long-term poverty, Korenman and Miller find that Food Stamp receipt is positively and significantly associated with the prevalence of stunting for chronically poor children. Korenman and Miller suggest that the positive relationship between Food Stamp receipt and stunting is quite small and may reflect aspects of long-term economic deprivation that are not captured in their models. They also find that poor children who received Food Stamps for half but not all of their years in poverty were significantly less likely to be wasted than children with a comparable poverty history who never received Food Stamps.

Data and Sample

A sample of 7,920 youths from the NLSY97 is used in the empirical analyses in this chapter, narrowed down from the full NLSY97 sample of 9,022 youths. The parent questionnaire portion of the NLSY97 collected information on Food Stamp Program Participation, family income, and other family characteristics that might be expected to influence youth health. Due to nonresponse to the parent questionnaire, 1,056 observations were dropped from the full sample of the NLSY97. An additional 42 observations were dropped because they lacked data on Food Stamp Program participation.

The NLSY97 contains a sample weight that can be used to make comparisons between the full NLSY97 sample and the national population in the same age range. The sample used in this chapter is significantly smaller than the full sample. Therefore, weighting the sample from this chapter would not represent the entire population of the United States in the same age range, but would rather represent those whose parents

would have responded to the parent questionnaire and answered questions about Food Stamp Program participation. In the descriptive statistics and logit models estimated in this chapter, the data are not weighted. Instead, in the empirical analyses I include dummy variables for race and ethnicity. I also estimate separately the effect of income and Food Stamps on youth health by using sub-samples defined by race, ethnicity, and gender.⁸

Analyses of Youth Health

Outcome variables

Underweight and overweight— Low weight-for-height (underweight) and high weight-for-height (obesity) are used as indicators of poor nutritional status. Weight-for-height is measured using the Body Mass Index (BMI).⁹ BMI is calculated as weight in kilograms divided by height in meters squared.

In the United States, the official definition of underweight is a BMI less than 18.5 (U.S. National Institutes of Health, 1998). Youths are classified as underweight if their BMI is less than 18.5. Low weight-for-height is considered to be a risk factor for poor health in children and adults (Martorell and Ho, 1984; Miller, Fine, and Adams-Taylor, 1989). Korenman and Miller (1994) find that the likelihood that a child is wasted is positively and significantly related to current poverty and long-term poverty. Korenman and Miller (1992) find that the likelihood that a child is wasted is significantly and negatively related to long-term Food Stamp receipt. The data used in the Korenman and Miller studies were from significantly younger children than the sample used in this chapter, but it is still expected that a similar pattern between income, Food Stamp participation, and the likelihood that a youth is underweight will be found in the NLSY97.

In the United States, the official definition of obesity is a BMI greater than 30 (U.S. National Institutes of Health, 1998). Youths are classified as obese if their BMI exceeds 30. Obesity is a major risk factor for mortality (Allison et al., 1999). It is also a risk factor for heart disease, several forms of cancer, diabetes, and other health problems (Troiano et al., 1995).¹⁰ Given previous research, it is expected that poverty is positively related to the likelihood that a youth is obese. Since the Food Stamp Program provides food stamps as well as nutrition information, participation in the Food Stamp Program may be associated with a reduction in the likelihood that a youth is obese.

Health status— The youths in the NLSY97 were asked to rate their general health using one of the following categories: excellent, very good, good, fair, or poor. Youths who rate their health as “good” or better are classified as being in good health for the analyses in this chapter. Given previous research, it is expected that youths from poor families are less likely to report that they are in good health than youths from nonpoor families. Food Stamp Program participation is also expected to be associated with better health among youths.

Chronic illness— The NLSY97 parent questionnaire asked whether or not the youth suffered from a chronic illness.¹¹ The youths whose parents responded that they had a chronic condition are classified as having a chronic illness. Given previous research, it is expected that youths in poor families are more likely to have a chronic condition than

youths in nonpoor families. It is also expected that participation in the Food Stamp Program is associated with a lower incidence of chronic disease.

Control variables

Food Stamp Program participation— Participation in the Food Stamp Program is measured using a dummy variable for Food Stamp Program participation in 1996 (hereafter referred to as “current” Food Stamp Program participation). If the health outcomes examined in this chapter are affected by previous family circumstances, long-term Food Stamp receipt may be more strongly associated with health outcomes than current Food Stamp receipt. To examine this question, some of the models of health outcomes include controls for the long-term receipt of food aid.

The number of years between 1992 and 1996 that a youth’s family received food aid is used to measure the long-term receipt of food aid. The variable for the long-term receipt of food aid includes benefits from Food Stamps as well as food aid from other sources such as the Special Supplemental Food Program for Women, Infants and Children (WIC). Since the period over which the long-term receipt of food aid is measured overlaps with the variable that measures the receipt of Food Stamps in 1996, only one of these variables is used at a time in the empirical models.

Two dummy variables were created to indicate the youth’s family history of food aid receipt. One of the dummy variables is set equal to one if a youth’s family received food aid every year between 1992 and 1996. The other dummy variable is set equal to one if a youth’s family received food aid for one to four years between 1992 and 1996. The excluded category for food aid receipt is no food aid received between 1992 and 1996. The comparison group therefore includes families that were poor over that period and never received food aid.

Both recent Food Stamp receipt and the long-term receipt of food aid are correlated with income and long-term poverty status. Therefore, controls for income and long-term poverty status are included in the empirical analyses in order to determine the effect of Food Stamps on youth health independent of family income and poverty history.

Income— In the empirical analyses, the youth’s gross family income in 1996 is used to calculate the family’s income-to-needs ratio.¹² The income-to-needs ratio is calculated by dividing family income by the poverty line appropriate to the size of the family and its age composition. The gross family income variable does not include income from Food Stamps. The gross family income variable includes parent wages and payments received from interest, AFDC, SSI benefits, child support, and other sources of income (not including income from Food Stamps). Gross family income also includes wages for up to nine other family members in the household if the family member is older than fourteen (not including the youth). If there is information on the youth’s employment, the family income variable also includes the youth’s wages, interest income, dividend income, rental income, estate income, other income, unemployment insurance payments to the youth, AFDC benefits, SSI benefits, and other welfare (again not including Food Stamps).

Two dummy variables were created to indicate the poverty status of the youth’s family. If a youth’s family had an income to needs ratio less than or equal to .5, the youth is categorized as “very poor”. If a youth’s family had an income to needs ratio

greater than .5 and less than or equal to 1, the youth is categorized as “less poor”.¹³ The excluded income category is an income-to-needs ratio greater than one. The variables created from the gross family income variable are referred to as measures of “current” family income.

Poverty History— The NLSY97 will eventually be a panel data set, but at the time the research in this chapter was conducted, only the first year of data were available. The first year of data contain no direct measures of long-term family income or poverty status. The number of years between 1992 and 1996 in which a youth’s family received AFDC is used as an approximation of the long-term poverty status of the youth’s family.¹⁴ Of youths whose families were very poor, 60% of current Food Stamp recipients had received AFDC for all five years between 1992 and 1996. In comparison, only 2% of very poor nonrecipients had received AFDC for all five years between 1992 and 1996. The numbers tell a similar story for youths whose families were less poor. These tabulations suggest that empirical analyses that do not control for long-term poverty status may confound the estimates of the relationship between Food Stamp Program participation and health.

Two dummy variables have been created to indicate the youth’s family history of AFDC receipt. The first dummy variable is set equal to one if a youth’s family received AFDC every year between 1992 and 1996. The other dummy variable is set equal to one if a youth’s family received AFDC for one to four years between 1992 and 1996. The excluded category for AFDC receipt is no AFDC receipt between 1992 and 1996. The comparison group therefore includes families who were poor over that time period and never received AFDC.

Family Structure— In the health outcome models, controls are included for the number of children in the youth’s family and whether a single parent headed the family. A greater number of children or fewer adults in a household might result in a smaller amount of parental time and supervision devoted to the health of the youth (Klerman, 1991). Controlling for income, the number of children in the youth’s family is also an indication of the competition for family financial resources.

Health Insurance— Some research suggests that the availability and use of medical care is the primary influence on the health of children (Klerman, 1991). Whether or not the youth is covered by health insurance is included in the models of the likelihood that a youth is underweight, obese, and in good health.¹⁵ Health insurance coverage is not included in the chronic illness models because of the strong possibility of simultaneity between chronic illness and insurance.¹⁶ Eighty-six percent of the youths in the sample are covered by health insurance. Of those whose families are poor, 73% are covered by health insurance. Of those whose families are not poor, 90% are covered by health insurance.

Other Youth Traits— Other controls in the empirical models include youth characteristics such as age, gender, whether puberty has onset, race and ethnicity.¹⁷ Controls for the responding parent’s characteristics include education and parental BMI.¹⁸

Analytical Issues

There are two major analytical issues surrounding the empirical analyses in this chapter. The first is the possibility of omitted variable bias; the second is the possibility of the endogeneity of family income, Food Stamp Program participation, and youth health.

Food Stamp recipients may differ from nonrecipients even when individuals with the same measurable characteristics are compared. For example, unmeasured characteristics such as parent motivation may be related to the likelihood that a family receives Food Stamps as well as the health of children in the family. A major concern about cross-sectional modeling, mentioned in the literature review, is that measured characteristics may not adequately capture differences between poor recipients and poor nonrecipients. This discussion relates to Food Stamp Program participation, but a similar concern arises in relation to family income and youth health. If unobserved differences between youths are correlated with youth health and family income or Food Stamp receipt, the estimated effects of income and the Food Stamp Program on health will be biased.

If the unobserved characteristics of the youths do not vary over time, one solution to the omitted variable bias problem is a fixed effect model. Since the NLSY97 is a panel data set, once additional years of data become available it will be possible to use fixed effects models because of the availability of multiple observations for each youth in the sample.

There is another possible source of bias that is not dealt with by the empirical analyses in this chapter. This bias results from the potentially simultaneous determination of child health, Food Stamp receipt and family income.¹⁹ The logistic regression models estimated in this chapter do not control for the potential endogeneity of Food Stamp receipt, and income. Models that included fixed effects would still be subject to this potential source of bias. A common way of dealing with endogeneity is to use instrumental variables. It is difficult to come up with an appropriate instrument for Food Stamp receipt (Korenman and Miller, 1992).²⁰ Thus, the estimates in this chapter should be regarded as descriptive of the relationship between income, Food Stamp use, and youth health rather than as causal.

Sample characteristics

In the sample used in the empirical analyses in this chapter, 13% of the youths were very poor, 12% of the youths were less poor, and 75% of the youths were not poor. The NLSY97 over-samples black and Hispanic youth. The high poverty rate in the sample may be partially explained by the fact that the poverty rate among blacks and Hispanics in the United States is higher than the poverty rate among non-Hispanic, non-black individuals.²¹ Fourteen percent of the sample received Food Stamps in 1996.

On average, youths whose families are current Food Stamp recipients are in worse health than are youths whose families are not current Food Stamp recipients. Of the youth's whose families received Food Stamps in 1996, 25% were underweight, 5% were obese, 91% were in good health, 13% had a chronic condition, and 10% had asthma. Of the youths whose families did not receive Food Stamps in 1996, 23% were underweight, 4% were obese, 96% were in good health, 10% had a chronic condition, and 10% had asthma.

Table 1 categorizes youths by the poverty status of their families in 1996 and whether their family received Food Stamps in 1996. This table reveals how, controlling for current poverty status, the youths whose families currently receive Food Stamps differ from those youths whose families do not currently receive Food Stamps.

Current Food Stamp receipt is expected to reduce the likelihood that a youth is underweight, obese, in bad health, or inflicted with a chronic disease. Table 1 indicates that, in general, youths whose families are current Food Stamp Program participants are in worse health than youths whose families are similarly poor but are not currently participating in the Food Stamp Program. Current Food Stamp Program participants are more likely to be in poor health and have a chronic illness than are poor nonparticipants. Of the very poor youths, Food Stamp Program participants are more likely to be obese and overweight than are nonparticipants. Of the less poor youths, Food Stamp Program participants are more likely to be underweight than are nonparticipants.

Table 1 shows that youths whose families currently receive Food Stamps differ significantly in terms of government program participation from youths whose families do not currently receive Food Stamps, even after grouping youths into categories by family income. Looking at the percentages of each group in long-term AFDC receipt and long-term food aid categories demonstrates this fact. Among youths whose families are currently poor, those youths whose families are current Food Stamp recipients are much more likely to be long-term AFDC and food aid recipients than those youths whose families are not currently receiving Food Stamps. This is especially pronounced among youths whose families are currently very poor (income-to-needs ratio less than .5). Seventy-three percent of very poor current Food Stamp Program participants received AFDC for at least one year between 1992 and 1996. In contrast, only 7.5% of very poor nonparticipants received AFDC at least one year between 1992 and 1996.

On this basis it appears reasonable to conclude that families that are current Food Stamp Program participants suffer from more persistent poverty than do those families that are poor but are not current participants in the Food Stamp Program.²² This finding illustrates that it is important to control for poverty history as well as current income when trying to determine the relationship between Food Stamp Program participation and health.

Logit models

Current Food Stamp receipt— The first set of models examines the relationship between current Food Stamp receipt, current income, and the likelihood that a youth is underweight, obese, in good health, or inflicted with a chronic illness. The model for the likelihood that a youth is underweight is:

$$(1) \quad \text{Underweight} = f_1(\text{Very Poor, Less Poor, Food Stamp Receipt in 1996, additional controls})$$

Similar models are estimated for the other youth health outcomes. Column (1) in Tables 2 – 5 presents odds ratios from logistic regression models of each health outcome. In this set of models, current poverty is associated with an increase in the likelihood that a youth is underweight, obese, or in poor health. Current poverty is associated with a decrease (although not significant) in the likelihood that a youth has a chronic illness.

Only the odds ratio of underweight for extreme poverty is significant ($p < .099$). The odds ratios of good health for extreme poverty and less poverty are close to significant at the 10% level ($p < .198$ and $p < .117$ respectively).

In models in which the only income controls are current family income, participation in the Food Stamp Program is associated with a significant decrease in the likelihood that a youth is obese and a significant increase in the likelihood that a youth has a chronic illness. Another outcome of interest is that single-parent household status is adversely and significantly related to all of the health outcomes except underweight (but it is nearly significant in the model of underweight).

Including Poverty History— In order to reduce the possibility of biased odds ratios for the current income and Food Stamp variables, a second set of models is estimated in which controls are added for long-term poverty. The model for the likelihood that a youth is underweight is:

$$(2) \quad \text{Underweight} = f_2(\text{Very Poor, Less Poor, Food Stamp Receipt in 1996, AFDC receipt for one to four years between 1992 and 1996, AFDC receipt every year between 1992 and 1996, additional controls})$$

Similar models are estimated for the other youth health outcomes. Column (2) of Tables 2 – 5 presents odds ratios from logistic regression models of each health outcome. The introduction of long-term controls for poverty into the models of youth health outcomes does not sizably change the estimates or significance of the relationship between current poverty and the likelihood that a youth is underweight, obese, or in good health. The significance of the odds ratio of underweight for extreme poverty slips under the 10% significance level ($p < .12$). Without the controls for long-term poverty, current poverty status is associated with a decrease in the likelihood of chronic illness. Once the controls for long-term poverty are added, the odds ratios become significant.

Long-term poverty is significantly and positively related to the likelihood that a youth has a chronic illness. This finding is expected given that chronic illness by its definition continues over an extended period of time. Long-term poverty is not significantly related to any of the other youth health outcomes. The fact that long-term poverty is not significantly related to the likelihood that a youth is underweight contradicts past research that suggests that youth weight-for-height is associated with long-term poverty. There were no firm expectations about the relationship between obesity and long-term poverty. The survey question about youth health asks youths to describe their current health status. The fact that long-term poverty is not significantly related to self-reported health status suggests that current conditions are driving the youths' responses to this question.

With the addition of controls for long-term poverty, the odds ratio of obesity for Food Stamp receipt is still less than one but no longer significant ($p < .177$). In the estimates of Model (2), participation in the Food Stamp Program is no longer significantly and positively related to the likelihood that a youth has a chronic illness. Participation in the Food Stamp Program is not significantly related to either the likelihood that a youth is underweight or in good health.

Long-term receipt of food aid— Holding all else constant, youths from families that receive food aid for a longer period of time might be expected to be in better health. A third set of models is estimated in which controls are added for the long-term receipt of food aid. The model for the likelihood that a youth is underweight is:

- (3) Underweight = f_3 (Very Poor, Less Poor, Food Aid receipt for one to four years between 1992 and 1996, Food Aid receipt every year between 1992 and 1996, AFDC receipt for one to four years between 1992 and 1996, AFDC receipt every year between 1992 and 1996, additional controls)

A similar model is estimated for all of the other health outcomes. Column (3) in Tables 2 – 5 presents odds ratios from the logistic regression models of each health outcome. The inclusion of controls for long-term food aid receipt in the models of youth health does not have a sizeable impact on the size or significance of any of the odds ratios for current or long-term poverty. The receipt of long-term food aid is not significantly related to any of the youth health outcomes.

Gender, race, and ethnicity

To determine if the relationship between poverty, Food Stamp Program participation, and health differs by gender or race and ethnicity, Model (2) was estimated separately for females, males, blacks, Hispanics, and non-black, non-Hispanics. The key variables of interest are current income, poverty history, and Food Stamp Program participation. The estimates of the odds ratios for each sub-sample are not discussed in this section unless they are significant.

In the logistic regression models of underweight, extreme poverty is positively and significantly related to the likelihood that a youth is underweight in the female and black sub-samples (the estimates of the odds ratios are 1.44 and 1.40 respectively). Recall that the significance of the odds ratio for extreme poverty had fallen below $p < .10$ in Model (2) using the full sample. In the models of obesity, current Food Stamp receipt is negatively and significantly related to the likelihood that a youth is obese in the male and black sub-samples (the estimates of the odds ratios are .469 and .374 respectively). The estimate from Model (2) of the odds ratio for Food Stamp receipt using the full sample was not significant (although it was in Model (1)). The self-reported health of youth was significantly and negatively related to current poverty status for youths in the male sub-sample (the odds ratio for less poor equals -.49 and the odds ratio for very poor equals -.48). The estimates from Model (2) of the odds ratios for extreme poverty and less poverty were not significant using the full sample. In all of the sub-samples, the odds ratios of chronic illness for long-term poverty were significant and greater than one.

Conclusions

This paper set out to test the hypotheses that current poverty and persistent poverty are negatively related to youth health and that Food Stamp Program participation is positively related to youth health. The estimates here indicate that when poverty, poverty history, or Food Stamp Program participation is significantly related to youth health

outcomes, the relationship is almost always in the expected direction. It is interesting to note that all four of the health outcomes examined in this chapter are significantly related to at least one of the primary explanatory variables of interest, but no health outcome is significantly related to all of them.

A youth is significantly more likely to be underweight if his or her family is currently in extreme poverty. This relationship is especially pronounced in the female and black sub-samples. The likelihood that a youth is underweight is not significantly related to either long-term poverty history or current Food Stamp Program participation.

The likelihood that a youth is obese is reduced if his or her family participates in the Food Stamp Program. This association is more pronounced in the male and black sub-samples. Obesity is the only health outcome examined in this chapter for which participation in the Food Stamp Program is associated with an improvement in youth health. Obesity is not significantly related to either current or persistent poverty.

The likelihood that a youth reports that he or she is in good health declines if the youth's family is currently poor. This relationship is strongly significant in the male sub-sample. Poverty history and current Food Stamp Program participation is not significantly related to the likelihood that a youth is in good health.

Finally, the likelihood that a youth has a chronic illness significantly increases if the youth's family has a history of long-term AFDC receipt. This relationship holds across all of the sub-samples. In the one estimate that runs counter to expectations, current poverty is associated with a significant decrease in the likelihood that a youth has a chronic illness. Food Stamp Program participation is not significantly related to the prevalence of chronic illness.

There are a number of empirical issues that may be addressed with future years of data from the NLSY97 or the geo-coded data. In future years it will be possible to actually determine a family's poverty history rather than using the number of years between 1992 and 1996 that a family received AFDC as a proxy. The empirical analyses in this paper are unlikely to capture all of differences between poor Food Stamp recipients and poor non-recipients. Future waves of NLSY97 data will allow the use of fixed effects analysis to deal with omitted variable bias. Additionally, the empirical analyses do not deal with the potential endogeneity of Food Stamp receipt and family income. The geo-coded NLSY97 data may provide opportunities to use variables that depend on locational variation to serve as instruments for Food Stamp receipt and family income.

Table 1: Characteristics of Youth by Family Poverty Status and Food Stamp Receipt in 1996
(Values equal the percentage of the sub-sample in each category unless otherwise noted)

Variables	Income to Needs Ratio $\leq .5$		Income to Needs Ratio $>.5$ & ≤ 1		Income to Needs Ratio > 1
	Received Food Stamps	Did Not Receive Food Stamps	Received Food Stamps	Did Not Receive Food Stamps	
<i>Health:</i>					
Underweight	25.9	27.9	23.7	19.9	23.1
Overweight	20.8	14.6	20.9	21.4	15.8
Obese	5.5	4.6	5.6	6.8	4.3
Good Health	89.7	94.2	91.6	92.2	96.0
Chronic Illness	12.6	5.8	14.6	8.4	11.1
Asthma	9.9	3.5	11.0	6.9	8.8
<i>Income in 1996:</i>					
Gross Family Income (mean \$)	4773	3199	12745	14266	58692
Food Stamp Income (mean \$)	2899	0	2294	0	85.2
Income to Needs Ratio (mean ratio)	0.25	0.18	0.72	0.78	3.61
<i>AFDC receipt 1992 – 1996:</i>					
Never	27.3	92.5	37.5	80.3	93.7
1-4 years	29.7	4.0	30.3	14.4	5.0
All 5 years	43.0	3.5	32.2	5.3	1.2
<i>Food Aid receipt 1992 – 1996:</i>					
Never	15.4	85.8	13.1	72.6	88.7
1-4 years	25.0	11.8	34.2	23.5	9.4
All 5 years	59.5	2.3	52.7	3.8	1.8

Table Continues on Next Page

Table 1 - Continued: Characteristics of Youth by Family Poverty Status and Food Stamp Receipt in 1996
(Values equal the percentage of the sub-sample in each category unless otherwise noted)

Variables	Income to Needs Ratio $\leq .5$		Income to Needs Ratio $>.5$ & ≤ 1		Income to Needs Ratio > 1
	Received Food Stamps	Did Not Receive Food Stamps	Received Food Stamps	Did Not Receive Food Stamps	
<i>Other Youth</i>					
<i>Traits:</i>					
Age	14.7	14.6	14.6	14.8	14.8
Female	51.8	43.9	47.6	53.6	48.1
Hispanic	30.8	35.9	30.2	41.7	15.4
Black	56.2	35.4	45.1	29.7	19.9
Parent's Education	10.7	11.5	11.0	10.9	13.9
Reached Puberty	76.3	78.7	79.7	83.1	84.7
Health Insurance	83.1	63.7	83.2	55.6	90.3
Single-Parent Family	76.6	49.6	65.0	42.2	23.5
Family Size	5.2	4.5	4.7	4.9	4.3
Number of Children in Family	3.5	2.5	3.0	2.9	2.2
Number of Cases	621	346	489	438	5821

Notes:

Underweight = 1 if BMI ≤ 18.5 ; = 0 if BMI >18.5

Overweight = 1 if BMI ≥ 25 ; = 0 if BMI <30

Obese = 1 if BMI ≥ 30 ; = 0 if BMI <30

Good Health Status = 1 if the youth reported that his or her health was "good", "very good" or "excellent"
= 0 if the youth reported that his or her health was "fair" or "poor"

Chronic Illness = 1 if the responding parent of the youth reported that the youth has a chronic illness
= 0 if the responding parent of the youth reported that the youth does not have a chronic illness

Asthma = 1 if the responding parent of the youth reported that the youth has asthma
= 0 if the responding parent of the youth reported that the youth does not have asthma

Table 2: Odds Ratios and 95% Confidence Intervals (CI) of Underweight by Income, Food Stamp Participation and Youth Characteristics

	(1)		(2)		(3)	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
<i>Income in 1996:</i>						
Income to Needs Ratio <.5	1.22	.96-1.54	1.21	.95-1.54	1.20	.95-1.52
Income to Needs Ratio > .5 & <= 1	.97	.76-1.23	.94	.74-1.20	.93	.73-1.18
<i>Food Stamp Program Participation:</i>						
In 1996	1.09	.87-1.35	1.01	.79-1.29	-	-
<i>Food Aid receipt 1992 – 1996:</i>						
1-4 years	-	-	-	-	1.15	.92-1.44
All 5 years	-	-	-	-	.99	.71-1.38
<i>AFDC receipt 1992 – 1996:</i>						
1-4 years	-	-	1.19	.93-1.52	1.10	.85-1.44
All 5 years	-	-	1.16	.84-1.60	1.20	.83-1.73
<i>Other Youth Traits:</i>						
Age	3.20	1.27-8.07	3.20	1.27-8.08	3.22	1.28-8.13
Age Squared	.95	.92-.98	.95	.92-.98	.95	.92-.98
Female	.70	.62-.79	.70	.62-.79	.70	.62-.79
Black	1.22	1.04-1.44	1.21	1.03-1.43	1.22	1.03-1.44
Hispanic	.87	.72-1.04	.87	.72-1.05	.88	.73-1.06
Parent’s Education	1.01	.98-1.03	1.01	.99-1.03	1.01	.99-1.04
Reached Puberty	.58	.49-.68	.58	.49-.68	.57	.49-.67
Chronic Illness	1.10	.91-1.34	1.09	.90-1.33	1.09	.90-1.33
Health Insurance	.97	.79-1.18	.96	.79-1.18	.98	.80-1.20
Single-Parent Family	.88	.76-1.03	.88	.75-1.02	.87	.75-1.02
Number of Children in Family	1.03	.97-1.08	1.02	.97-1.08	1.02	.97-1.08
Pseudo R-Squared	.079		.080		.080	
Number of Observations	6184		6176		6180	

Notes:

Underweight = 1 if BMI <= 18.5; = 0 if BMI >18.5

The excluded income category is an income-to-needs ratio greater than 1.

The excluded long-term food aid receipt category is no food aid received between 1992 and 1996.

The excluded long-term AFDC receipt category is no AFDC received between 1992 and 1996.

The excluded race/ethnicity category is non-Hispanic, non-black.

The models also include a set of controls for the BMI of the responding parent interacted with the gender of the responding parent and whether or not the responding parent was biologically related to the youth.

Table 3: Odds Ratios and 95% Confidence Intervals (CI) of Obesity by Income, Food Stamp Participation and Youth Characteristics

	(1)		(2)		(3)	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
<i>Income in 1996:</i>						
Income to Needs Ratio <.5	1.14	.72-1.79	1.14	.72-1.81	.98	.62-1.55
Income to Needs Ratio > .5 & <= 1	1.04	.67-1.61	1.06	.68-1.65	.94	.60-1.46
<i>Food Stamp Program Participation:</i>						
In 1996	.69	.46-1.04	.73	.46-1.16	-	-
<i>Food Aid receipt 1992 – 1996:</i>						
1-4 years	-	-	-	-	.97	.63-1.50
All 5 years	-	-	-	-	1.29	.74-2.26
<i>AFDC receipt 1992 – 1996:</i>						
1-4 years	-	-	.73	.44-1.22	.66	.38-1.13
All 5 years	-	-	1.00	.56-1.79	1.29	.39-1.13
<i>Other Youth Traits:</i>						
Age	.39	.06-2.47	.39	.06-2.48	.41	.06-2.57
Age Squared	1.04	.98-1.11	1.04	.98-1.11	1.04	.98-1.11
Female	1.26	.98-1.61	1.25	.98-1.61	1.25	.97-1.60
Black	1.16	.84-1.59	1.17	.85-1.60	1.13	.83-1.56
Hispanic	1.50	1.06-2.13	1.50	1.06-2.13	1.49	1.05-2.11
Parent’s Education	.99	.94-1.03	.99	.94-1.03	.99	.94-1.03
Reached Puberty	1.13	.73-1.75	1.12	.72-1.73	1.13	.73-1.74
Chronic Illness	1.17	.73-1.75	1.18	.81-1.71	1.18	.81-1.72
Health Insurance	.96	.67-1.38	.95	.66-1.37	.93	.65-1.35
Single-Parent Family	1.48	1.12-1.97	1.49	1.12-1.98	1.44	1.08-1.91
Number of Children in Family	.90	.81-1.00	.90	.81-1.01	.89	.79-.99
Pseudo R-Squared	.11		.109		.108	
Number of Observations	6184		6176		6180	

Notes:

Obese = 1 if BMI ≥ 30 ; = 0 if BMI < 30

The excluded income category is an income-to-needs ratio greater than 1.

The excluded long-term food aid receipt category is no food aid received between 1992 and 1996.

The excluded long-term AFDC receipt category is no AFDC received between 1992 and 1996.

The excluded race/ethnicity category is non-Hispanic, non-black.

The models also include a set of controls for the BMI of the responding parent interacted with the gender of the responding parent and whether or not the responding parent was biologically related to the youth.

Table 4: Odds Ratios and 95% Confidence Intervals (CI) of Good Health Status by Income, Food Stamp Participation and Youth Characteristics

	(1)		(2)		(3)	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
<i>Income in 1996:</i>						
Income to Needs Ratio <.5	.78	.53-1.14	.77	.52-1.14	.74	.51-1.08
Income to Needs Ratio > .5 & <= 1	.74	.51-1.08	.75	.52-1.08	.74	.52-1.06
<i>Food Stamp Program Participation:</i>						
In 1996	.77	.55-1.08	.78	.54-1.14	-	-
<i>Food Aid receipt 1992 – 1996:</i>						
1-4 years	-	-	-	-	.70	.49-1.00
All 5 years	-	-	-	-	.78	.49-1.25
<i>AFDC receipt 1992 – 1996:</i>						
1-4 years	-	-	.89	.61-1.30	.99	.67-1.48
All 5 years	-	-	1.04	.66-1.64	1.02	.62-1.69
<i>Other Youth Traits:</i>						
Underweight	1.27	.95-1.72	1.27	.94-1.71	1.27	.94-1.71
Obese	.46	.31-.68	.46	.31-.68	.46	.31-.68
Chronic Illness	.42	.32-.56	.42	.32-.56	.42	.32-.56
Age	1.76	.35-8.74	1.76	.35-8.75	1.80	.36-8.92
Age Squared	.98	.93-1.04	.98	.93-1.04	.98	.93-1.03
Female	.81	.64-1.01	.81	.64-1.01	.81	.65-1.02
Black	.68	.51-.90	.68	.51-.90	.68	.51-.90
Hispanic	.91	.65-1.28	.92	.65-1.29	.91	.65-1.28
Parent’s Education	1.04	1.00-1.09	1.04	1.00-1.09	1.04	1.00-1.09
Health Insurance	1.42	1.04-1.93	1.40	1.03-1.91	1.32	.97-1.81
Single-Parent Family	.68	.53-.89	.69	.53-.90	.69	.53-.90
Number of Children in Family	.93	.85-1.02	.93	.85-1.02	.93	.86-1.02
Pseudo R-Squared	.060		.060		.061	
Number of Observations	6741		6731		6738	

Notes:

Good Health Status = 1 if the youth reported that his or her health was “good”, “very good” or “excellent”
= 0 if the youth reported that his or her health was “fair” or “poor”

The excluded income category is an income-to-needs ratio greater than 1.

The excluded long-term food aid receipt category is no food aid received between 1992 and 1996.

The excluded long-term AFDC receipt category is no AFDC received between 1992 and 1996.

The excluded race/ethnicity category is non-Hispanic, non-black.

Table 5: Odds Ratios and 95% Confidence Intervals (CI) of Chronic Illness by Income, Food Stamp Participation and Youth Characteristics

	(1)		(2)		(3)	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
<i>Income in 1996:</i>						
Income to Needs Ratio <.5	.82	.62-1.10	.77	.57-1.03	.80	.60-1.07
Income to Needs Ratio > .5 & <= 1	.82	.61-1.08	.75	.57-1.01	.80	.60-1.05
<i>Food Stamp Program Participation:</i>						
In 1996	1.52	1.19-1.94	1.12	.84-1.48	-	-
<i>Food Aid receipt 1992 – 1996:</i>						
1-4 years	-	-	-	-	1.10	.84-1.43
All 5 years	-	-	-	-	.82	.55-1.22
<i>AFDC receipt 1992 – 1996:</i>						
1-4 years	-	-	1.83	1.39-2.40	1.83	1.35-2.48
All 5 years	-	-	1.98	1.39-2.84	2.47	1.63-3.73
<i>Other Youth Traits:</i>						
Age	.90	.32-2.56	.88	.32-2.51	.86	.30-2.46
Age Squared	1.00	.97-1.04	1.01	.97-1.04	1.01	.97-1.04
Female	.86	.74-.99	.85	.73-.99	.85	.73-.99
Black	.88	.73-1.07	.87	.72-1.06	.88	.72-1.07
Hispanic	.72	.58-.91	.73	.58-.91	.71	.57-.90
Parent’s Education	1.01	.98-1.04	1.01	.99-1.04	1.02	.99-1.04
Single-Parent Family	1.23	1.04-1.47	1.17	.98-1.40	1.18	.99-1.41
Number of Children in Family	.93	.87-1.00	.92	.86-.99	.93	.87-.99
Pseudo R-Squared	.008		.013		.013	
Number of Observations	7188		7177		7186	

Notes:

Chronic Illness = 1 if the responding parent of the youth reported that the youth has a chronic illness
= 0 if the responding parent of the youth reported that the youth does not have a chronic illness

The excluded income category is an income-to-needs ratio greater than 1.

The excluded long-term food aid receipt category is no food aid received between 1992 and 1996.

The excluded long-term AFDC receipt category is no AFDC received between 1992 and 1996.

The excluded race/ethnicity category is non-Hispanic, non-black.

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NOTES

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² The youths in the NLSY97 were ages 12-16 as of December 31, 1996, but were ages 12-18 at the time of their first NLSY97 interview.

³ Research on the relationship between income and child health in developing countries may not be applicable to the United States. This is primarily because differences exist between developed and developing countries in the severity and duration of nutritional deprivation, disease patterns and the quality and availability of health care (Korenman and Miller, 1994).

⁴ Nutritional status is usually defined in terms of either “input” or “output” type indicators. Input indicators are mainly measures of food and nutrient intake. Even if perfectly measured, nutrient intake can not be equated with nutritional status because individuals differ in the efficiency of nutrient utilization. Nutritional status can alternatively be defined in terms of output measures, including clinical signs of malnutrition, biochemical indicators, physical activity and anthropometry. An advantage of using anthropometry to measure nutritional status is that growth consequences are often apparent even at low levels of malnutrition. In contrast, biochemical and clinical indicators may only indicate a problem at extreme levels of malnutrition. A difficulty with anthropometric data is that they can indicate whether a problem exists, but they reveal very little about its causes (Martorell and Ho, 1984).

⁵ Children who are poor at the time their health is measured are also at higher risk of child mortality (Mare, 1982; Children’s Defense Fund, 1989) and low birthweight (Children’s Defense Fund, 1989; Institute of Medicine, 1985; Gould, 1988; Starfield et al., 1991; Currie and Cole, 1993). Only Starfield et al. include long-term poverty measures in their analysis. They find that low birthweight is significantly related to long-term poverty.

⁶ Kafatos and Zee (1997) examine the effect of a supplementary food program on child weight and height. This program included the provision of Food Stamps, supplementary foods, day care and an infant feeding program. Kafatos and Zee measured the weight and height of a cross-sectional sample of low-income preschool children in Memphis before the introduction of the supplementary food program. They compared the means from this sample to the means from a different cross-sectional sample of children taken three years after the introduction of the supplementary food program. They found a significant increase in the mean weight and height of children after the introduction of the program. Since the supplementary food program contained a number of different components, it is not possible to separate out the effect of the Food Stamp Program on the health of low-income preschool children. Other studies have used local data to examine the effect of WIC on birth weight or pregnancy outcomes (Devaney et al., 1991; Kennedy and Kotelchuck, 1984; Stockbauer, 1987; Kotelchuck et al., 1984; and Rush et al., 1984). Currie and Cole (1993) use data from the NLSY to examine the relationship between a mother’s participation in AFDC during pregnancy and the birth weight of her child.

⁷ Korenman and Miller also examine the relationship between Food Stamp receipt during pregnancy and the health of the infant and mother. They are concerned that cross-sectional models do not capture adequately the difference between impoverished recipients and non-recipients. Their solution is to use fixed-effects estimates that are obtained by comparing outcomes across a woman’s births or pregnancies. Their sample is restricted to women who had both first and second births during the survey window (1979 through 1988). Their sample is approximately 2500 children. Mothers who switch between use and non-use of Food Stamps between their first and second births identify the effect of Food Stamp use. They find

that Food Stamp use during pregnancy appears to be associated with higher birth weight, but the coefficients on these estimates were often not significant. The fixed-effects estimates suggest an effect of about 2.5 ounces on birth weight.

⁸ The NLSY97 User's Guide suggests that "if particular groups follow significantly different regression specifications, the preferred method of analysis is to estimate a separate regression for each group or to use dummy variables to specify group membership."

⁹ The BMI measures used in this paper correct for measurement error in the youth height and weight reports. John Cawley from the University of Michigan provided these corrections. Cawley (in this volume) provides a description of the techniques used to correct these data.

¹⁰ Also see Cawley (in this volume) for an analysis of the relationship between body weight and its correlation with dietary and social behaviors.

¹¹ Specifically the parent questionnaire asked whether the youth suffered from asthma, a heart condition, anemia, diabetes, cancer, epilepsy or an infectious disease. Asthma was the most common condition; 79% of the 868 youths with a chronic condition had asthma.

¹² The income variable used in this chapter was provided by Yoonae Jo, Carolyn Hill and Robert Michael from the Harris Graduate School of Public Policy Studies at the University of Chicago.

¹³ If a youth's family income to needs ratio is less than or equal to .5, this is also referred to as "extreme poverty". If a youth's family income to needs ratio is greater than .5 and less than or equal to one, this is also referred to as "less poverty".

¹⁴ Since AFDC receipt is likely to be highly correlated with family structure, the models of youth health include a control for whether or not the youth's family is headed by a single-parent. This issue is discussed further in the section of the chapter that describes the characteristics of the sample.

¹⁵ The health outcome models were also run without the insurance variable. Its removal had very little impact on the size or the significance of other variables in the models.

¹⁶ When insurance was included in the chronic illness models, the coefficient on insurance was positive and significant. This suggests that simultaneity is a problem, as it indicates that those youths with chronic illnesses are more likely to have insurance.

¹⁷ Dummy variables for Hispanic and non-Hispanic Black (hereafter referred to as black) are used to indicate race and ethnicity. Controls for puberty status are only used in the models of underweight and obesity.

¹⁸ The models for underweight and obesity include a set of dummy variables for the BMI of the responding parent interacted with the gender of the responding parent and whether or not the responding parent was biologically related to the youth.

¹⁹ An illustration of the potential simultaneity problem with respect to Food Stamps is that on the one hand Food Stamp receipt may directly improve child health. On the other hand, if an impoverished child has poor health it may cause the parents of the child to enroll in the Food Stamp Program.

²⁰ Korenman and Miller (1992) argue that there are no valid instruments for Food Stamp receipt in the NLSY. They feel that all potential instruments either belong in the first stage of the model or are too weak to be of use. I have done preliminary work to find an instrument for Food Stamp receipt in the NLSY97, but none have proved successful. I attempted to use grandfather's highest grade completed and

grandmother's highest grade completed as instruments. Neither were highly correlated with Food Stamp receipt after conditioning on the other variables included in the first stage of the model.

²¹ In 1998, the poverty rate for blacks was 26.1% and the poverty rate for Hispanics was 25.6%. The poverty rate for non-Hispanic whites was 8.2% (U.S. Census Bureau, 1999).

²² The difference in poverty history suggested by these numbers may be overstated because a higher percentage of poor non-participants are two-parent families compared to poor participants (50% of very poor non-participant families are single-parent families compared to 77% of the very poor participants). Poor two-parent families are very rarely eligible for AFDC (Blank, 1997). When a family signs up for AFDC, they are automatically eligible for the Food Stamp Program. Two-parent families who are not eligible for AFDC, but eligible for Food Stamps may be less likely to know about or apply for Food Stamp benefits. The empirical models of child health try to take this into account by including a control for single-parent family status.

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