United States Department of Agriculture

Economic Research Service

E-FAN-04-014-1

December 2004

USDA

Nutrition and Health Characteristics of Low-Income Populations

Volume I, Food Stamp Program Participants and Nonparticipants

Mary Kay Fox
Nancy Cole

Food Assistance & Nutrition Research Program

Economic Research Service

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Electronic Publications from the Food Assistance & Nutrition Research Program

E-FAN-04-014-1

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Nutrition and Health Characteristics of Low-Income Populations

Volume I, Food Stamp Program Participants and Nonparticipants

By Mary Kay Fox and Nancy Cole, Abt Associates Inc.

ERS project representative: Biing-Hwan Lin, 202-694-5458, blin@ers.usda.gov

Abstract

Data from the Third National Health and Nutrition Examination Survey (NHANES-III), conducted in 1988-94, were used to compare the nutrition and health characteristics of participants and nonparticipants in the Food Stamp Program (FSP). FSP participants were compared with two groups of nonparticipants—those who were income-eligible for the FSP (income at or below 130 percent of poverty) and those with higher incomes (income above 130 percent of poverty). This research was designed to establish a baseline from which to monitor the nutritional and health characteristics of FSP participants and nonparticipants over time.

This report was prepared by Abt Associates Inc., under a research contract for the Economic Research Service. The views expressed are those of the authors and not necessarily those of ERS or USDA.

Acknowledgments

The authors wish to acknowledge the invaluable contributions of Ellie Lee, who completed all of the special programming required to estimate usual dietary intakes, and Nancy Burstein, who served as technical reviewer and offered many comments that improved the report. We also acknowledge Andrew McLaughlin, who diligently checked and proofed the report, and Linda Hatcher of the Economic Research Service, who completed the final copy edit. Thanks are also due to our project officer at the Economic Research Service, Biing-Hwan Lin, who along with colleagues Betsy Frazao, David Smallwood, Margaret Andrews, and Joanne Guthrie, generated the idea that resulted in this series of reports. Kevin Dodd at the National Cancer Institute and Alicia Carriquiry at the University of Iowa are also acknowledged for the consultation and advice they provided to staff at ERS and Abt Associates in conceptualizing and implementing the approach used to estimate usual dietary intakes. Finally, the report benefited from thoughtful review and critique by Biing-Hwan Lin, Betsy Frazao, and Margaret Andrews of the Economic Research Service and Steven Carlson of the Food and Nutrition Service.

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Executive Summary

This report describes the nutrition and health characteristics of participants and nonparticipants in the Food Stamp Program (FSP), using data from the Third National Health and Nutrition Examination Survey (NHANES-III).[1] The NHANES survey is the primary source of information used in monitoring the Nation's nutrition and health status. NHANES-III was completed between 1988 and 1994 and provides data for a large nationally representative sample of individuals.[2]

FSP participants are compared with two groups of nonparticipants: low-income individuals who were income-eligible for the FSP (household income at or below 130 percent of poverty) and higher-income individuals who were not income-eligible for the FSP (household income above 130 percent of poverty). These comparisons provide useful insights into policy-relevant questions, for example: are low-income individuals with the greatest nutritional and health needs receiving FSP services? Comparisons between FSP participants and higher-income nonparticipants are also of interest. These comparisons provide information on nutrition- and health-related disparities between FSP participants and individuals who are not constrained by low incomes. Both sets of comparisons also provide information on whether FSP participants do as well as other groups with respect to critical measures of nutrition and health status.

It should be noted that *this research was not designed to assess program impacts or in any way attribute differences observed between FSP participants and either group of nonparticipants to an effect of the program.* Rather, it was designed to establish a baseline from which to monitor the nutrition and health characteristics of FSP participants and nonparticipants over time and to generate questions and hypotheses for future research.

A broad array of measures is used to describe the nutrition and health characteristics of FSP participants and nonparticipants. These include dietary intake, body weight, selected nutritional biochemistries, bone density, health-related behaviors, measures of health status, conditions, and risks, and access to health care. All population estimates have been age-adjusted (based on year 2000 census data) to eliminate between-group differences that were due solely to differences in the age distribution of the groups.

Dietary Intake

Dietary intake was assessed using data from a single 24-hour recall. In addition to energy intake, the analysis examined intakes of nine key nutrients and dietary components: vitamin C, iron, zinc, calcium, total fat, saturated fat, cholesterol, sodium, and fiber. Estimates of usual intake were generated using the personal computer version of the Software for Intake Distribution Estimation.[3] Healthy Eating Index (HEI) scores (Kennedy et al., 1995) were also examined.

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[1] Similar reports have been prepared for participants and nonparticipants in the WIC program (Cole and Fox, 2004a), for school-age children (Fox and Cole, 2004), and for older adults (Cole and Fox, 2004b).

[2] Beginning in 1999, NHANES became a continuing survey, without breaks between data collection cycles. Similar sampling and data collection procedures are used, although at least two years of data are necessary to have adequate sample sizes for subgroup analyses (Flegal et al., 2002). Data for the first two continuous years of the ongoing NHANES (1999-2000) have been released since the time the tabulations presented in this report were prepared. Data for subsequent years are expected in mid-2005.

[3] Because NHANES-III included a very small sample of second dietary recalls, which are needed to estimate intraindividual variation in intake, variance components were derived from the Continuing Survey of Food Intake of Individuals (CSFII), 1994-96 (see appendix C).

- **Meal consumption.** Overall, 35 percent of individuals 1 year of age and older consumed fewer than three meals in the preceding 24 hours. FSP participants were significantly more likely than higher-income nonparticipants to have consumed fewer than three meals in the preceding 24 hours (44% vs. 33%).

- **Energy.** On average, FSP participants consumed more food energy than income-eligible nonparticipants (95% of the 1989 Recommended Energy Allowance vs. 91%). FSP participants also consumed more food energy than higher-income nonparticipants, but this difference (95% vs. 93%) was not statistically significant.

- **Vitamin C.** Among males, FSP participants were significantly *more* likely than income-eligible nonparticipants to have an adequate usual intake of vitamin C (76% vs. 68%). Among females, FSP participants were significantly *less* likely than either group of nonparticipants to consume an adequate amount of vitamin C (75% vs. 79-80%).

- **Iron.** FSP participants were significantly less likely than higher-income nonparticipants to consume adequate amounts of iron (91% vs. 95%). Among menstruating females, who are at greater risk of consuming inadequate amounts of iron than other subgroups, differences between FSP females and higher-income females differed by age. Among 14-18-year-olds, FSP females were *more* likely than higher-income females to have an adequate iron intake (90% vs. 77%). Among females 19-50 years of age, the trend was reversed, with FSP females being *less* likely than their higher-income counterparts to consume adequate amounts of iron (77-80% vs. 84-86%).

- **Zinc.** FSP participants were significantly less likely than either group of nonparticipants to have an adequate zinc intake (80% vs. 83% and 88%). The oldest adults (71 years and older) were at the greatest risk of inadequate zinc intake and the risk was significantly greater for FSP participants than for higher-income nonparticipants (49% vs. 71% had adequate intake).

- **Calcium.** It was not possible to assess the prevalence of adequate calcium intakes among older adults because the required dietary standard—the EAR—has not been established for calcium. Mean usual calcium intakes were compared to established Adequate Intake (AI) levels. On average, FSP participants consumed a significantly smaller percentage of the AI for calcium than either income-eligible nonparticipants or higher-income nonparticipants (73% vs. 79% and 83%).

- **Percent of Energy from Fat.** On average, persons 2 years and older obtained about 34 percent of their food energy from fat.[4] This level of fat intake exceeded the *Dietary Guidelines for Americans* recommendation of no more than 30 percent of total energy (U.S. Departments of Agriculture and Health (USDA) and Human Services (DHHS), 2000) but fell within more recently defined Acceptable Macronutrient Distribution Ranges (AMDRs) for fat intake (Institute of Medicine (IOM), 2002b).[5] FSP participants had a significantly lower usual fat intake than

[4] Assessment of fat, saturated fat, cholesterol, sodium, and fiber intake was limited to persons 2 years and older because the reference standards used for most of these dietary components (the *Dietary Guidelines for Americans*) are not designed for younger children.

[5] AMDRs for fat intake have been defined for three different age groups: children 1 to 3 years (30-40% of energy); children 4 to 18 years (25-35%); and all those 19 years and older (20-35%).

higher-income nonparticipants (33.1% of total energy vs. 33.6%).

Distributions of usual fat intake suggest that, in several subgroups (4-8-years, 14-18-years, 31-50-years, and 71 years and older), FSP participants were more likely than one or both groups of nonparticipants to have usual fat intakes that fell within the relevant AMDR. A different pattern was observed for 1-3-year-olds. Although, few children in this age group had usual fat intakes that exceeded the upper end of the AMDR, the distributions suggest that this was more likely to occur for FSP participants that for either group of nonparticipants (usual intakes at the 95th percentile were 41.7% vs. 39.4% and 39.0%, compared with an AMDR of 30-40%). At the opposite end of the distribution, 1-3-year-old FSP participants were *less* likely than income-eligible nonparticipants and *more* likely than higher-income nonparticipants to have usual fat intakes that fell within the lower bound of the AMDR (usual intakes at the 15th percentile were 29.2% vs. 31.2% and 27.6%).

- **Percent of Energy from Saturated Fat.** The mean usual saturated fat intake of persons 2 and older exceeded the *Dietary Guidelines* recommendation that saturated fat provide less than 10 percent of total energy (USDA and U.S. DHHS, 2000). There were no significant between-group differences in the mean usual intake of saturated fat; in all three participant/nonparticipant groups, saturated fat contributed roughly 11 percent of usual energy intake. FSP participants were significantly less likely than income-eligible nonparticipants to meet the *Dietary Guidelines* recommendation for saturated fat (23% vs. 27%).

- **Cholesterol.** The mean usual cholesterol intake of persons 2 and older (271 mg.) was consistent with the *Dietary Guidelines* recommended maximum of 300 mg. (USDA and U.S. DHHS, 2000). The mean usual cholesterol intake of FSP participants was significantly greater than the mean usual intake of higher-income nonparticipants (291 mg. vs. 267 mg.). In addition, FSP participants were significantly less likely than higher-income nonparticipants to have usual cholesterol intakes that were consistent with the *Dietary Guidelines* recommendation (61% vs. 68%).

  Sodium. The mean usual sodium intakes of persons 2 and older (3,463 mg.) exceeded the *Dietary Guidelines* recommended maximum of 2,400 mg. (USDA and U.S. DHHS, 2000) as well as the more recently defined Tolerable Upper Intake Levels (UL) (IOM, 2004).[6] Overall, FSP participants had a significantly lower usual sodium intake than higher-income nonparticipants (3,339 mg. vs. 3,518 mg.). Nonetheless, distributions of usual sodium intake suggest that FSP participants aged 2-3-years, 4-8-years, and 14-18-years were significantly *less* likely than comparably aged higher-income nonparticipants to have usual sodium intakes consistent with the UL. The trend was reversed for older age groups. For all subgroups of adults 19 and older, FSP participants were significantly more likely than higher-income nonparticipants to have usual sodium intakes that were consistent with the UL.

[6] ULs for sodium are lower than the *Dietary Guidelines* recommendation, especially for the youngest age groups. The ULs are 1,500 mg. for 2-3-year-olds, 1,900 mg. for 4-8-yearolds, 2,200 mg. for 9-13-year-olds, and 2,300 mg. for all those 14 years and older.

Health Eating Index Scores

- For all persons 2 years and older, the mean HEI score was 64.0 out of a possible 100. On average, FSP participants scored lower on the HEI than either income-eligible or higher-income nonparticipants (60.2 vs. 61.8 and 64.8). The HEI is a composite score constructed from 10 individual scores: five food-based scores that assess intake of grains, vegetables, fruits, dairy, and meat, four nutrient-based scores, and a variety score.[7]

- FSP participants were *more* likely than higher-income nonparticipants to consume poor diets (24% vs. 15%) and *less* likely to consume "good" diets (6% vs. 12%).

- FSP males had significantly lower mean scores than income-eligible males for both the grain (6.3 vs. 6.9) and variety (6.6 vs. 7.2) components of the HEI. For both of these components, significantly fewer FSP males than income-eligible males satisfied the HEI standard (23% vs. 28% for the grain component and 42% vs. 48% for the variety component). Differences between FSP males and higher-income males were more widespread. FSP males had significantly lower mean scores than higher-income males on all of the food-based HEI components except meat. The same pattern was true for the percentage of males meeting HEI standards for the food-based components.

- Mean scores for female FSP participants and income-eligible females were significantly different for three of the six food-based HEI components: fruit, meat, and variety. For the fruit and variety components, FSP females had significantly lower mean scores than income-eligible females (3.1 vs. 3.9 for the fruit component and 6.5 vs. 6.9 for the variety component). For both of these components, significantly fewer FSP females than income-eligible females satisfied the HEI standard (13% vs. 22% for the fruit component and 39% vs. 45% for the variety component). FSP females were also less likely than income-eligible females to meet the HEI standard for vegetables (19% vs. 24%). For the meat component, the difference between FSP females and income-eligible females ran in the opposite direction. In comparison with income-eligible females, FSP females scored *higher*, on average, on the meat component (6.6 vs. 6.2) and were *more* likely to consume the recommended number of meat servings per day (30% vs. 25%).

- Mean HEI scores for FSP females and higher-income females were significantly different for all food-based components except grains. The same pattern was true for the percentage of females meeting HEI standards for food-based components. With the exception of the meat component, mean scores were significantly lower for FSP females than for higher-income females, and FSP females were significantly less likely than higher-income females to satisfy HEI standards. As noted in the comparison of FSP females and income-eligible females, the between-group difference for the meat component ran in the opposite direction.

- There were no significant differences between FSP participants and income-eligible nonparticipants on any of the nutrient-based components of the HEI. Significant differences were observed between FSP participants and higher-income nonparticipants for the cholesterol and

[7] The nutrient-based components compare intakes of total fat, saturated fat, cholesterol, and sodium to recommended maximums.

sodium components. FSP participants had a significantly *lower* mean score for cholesterol (7.3 vs. 7.9) and a significantly *higher* mean score for sodium (6.4 v. 6.0).

Body Weight

Body weight was assessed on the basis of body mass index (BMI), a measure of the relationship between height and weight that is the commonly accepted index for classifying adiposity (or fatness) in adults (CDC, 2003).[8] For adults (20 and older), a healthy weight is defined as a BMI that is at least 18.5 but less than 25. Overweight is defined as a BMI of 25.0 to 29.9, and obesity is defined as a BMI of 30 or more. A BMI below 18.5 indicates underweight.

For children, BMIs were compared to a BMI-for-age growth chart developed by the CDC (Kuczmarski et al., 2002). Because this growth chart is designed for ages 2 and over, children less than 2 years were excluded from the analysis. In assessing children's weight status, use of the word "obesity" is avoided because of potential negative connotations (CDC, 2003). Instead, assessment of weight status focuses on the prevalence of overweight (defined as BMI-for-age at or above the 95th percentile), the prevalence of being at risk of overweight (defined as BMI-for-age between the 85th and 95th percentiles), and the prevalence of underweight (defined as BMI-for-age below the 5th percentile). The prevalence of retarded linear growth (height-for-age below the 5th percentile) was also assessed.

Adults (20 and Older)

- Adult FSP participants had a significantly greater mean BMI than either income-eligible nonparticipants or higher-income nonparticipants (28.3 vs. 26.9 and 26.4). The differences between groups were entirely attributable to differences among females (29.3 vs. 27.4 and 26.1).

- Female FSP participants were significantly *less* likely than either income-eligible females or higher-income females to be at a healthy weight (28% vs. 36% and 49%) and significantly *more* likely to be obese (42% vs. 30% and 22%).

- There were no statistically significant differences between FSP males and income-eligible males in the distribution of body weight. In comparison with higher-income males, however, FSP males were *more* likely to be at a healthy weight (44% vs. 37%) and *less* likely to overweight (29% vs. 42%).

Children 2-19 Years

- In comparison with higher-income children, FSP children had a significantly greater mean BMI (19.8 vs. 19.2) and were significantly more likely to be overweight (12% vs. 9%). These differences were concentrated among 12-19-year-old females. FSP females in this age group had a significantly greater mean BMI than comparably aged higher-income females (23.7 vs. 21.8). In addition, they were almost twice as likely to be overweight (13% vs. 7%) and almost twice as likely to be at risk of overweight (22% vs. 12%).

[8] BMI is equal to [weight in kilograms] ÷ [height in meters]^2.

- FSP children were significantly *less* likely than higher-income children to be underweight (3% vs. 4%). This difference was concentrated among 3-5-year-old males. In this subgroup, the prevalence of underweight among FSP participants was less than half that of higher-income nonparticipants (3% vs. 7%).

- FSP children were twice as likely as higher-income nonparticipant children to have retarded linear growth (6% vs. 3%).

Nutritional Biochemistries

- **Iron Deficiency.** FSP participants were twice as likely as higher-income nonparticipants to be iron deficient (10% vs. 5%). This difference was concentrated among females of childbearing age, particularly 20-29-year-olds (14% vs. 6%) and 30-39-year-olds (20% vs. 9%).

- **Iron-deficiency Anemia.** FSP participants were twice as likely as higher-income nonparticipants to have iron-deficiency anemia (4% vs. 2%). Differences between the two groups were concentrated among 1-2-year-olds (5% vs. 1%) and among females (5% vs. 3%).

- **Anemia.** Overall, the prevalence of anemia (defined on the basis of low hemoglobin) among FSP participants was double that of higher-income nonparticipants (14% vs. 7%). Among 1-2-year-olds, 3-5-year-olds, 20-29-year-olds, and adults 70 and older, FSP participants were significantly more likely than either income-eligible nonparticipants or higher-income nonparticipants to have anemia.

- **Low Red Blood Cell (RBC) Folate.** FSP participants were significantly more likely than higher-income nonparticipants to have low RBC folate (11% vs. 6%).

- **Low Serum Vitamin B_{12}.** FSP participants were significantly less likely than higher-income nonparticipants to have low levels of serum vitamin B_{12} (2% vs. 3%).

- **High and Borderline-high Total Cholesterol.** FSP participants were significantly less likely than income-eligible nonparticipants to have a high total cholesterol (16% vs. 19%). This difference was concentrated among females, with FSP participants significantly less likely than either group of nonparticipants to have a high cholesterol (16% vs. 20% and 19%). There were no significant differences between FSP participants and either group of nonparticipants in the prevalence of borderline-high cholesterol levels.

Bone Density

- Among those most at risk of osteoporosis—adults 80 and over—FSP participants were significantly more likely than higher-income nonparticipants to have severely reduced bone density (42% vs. 24%).
- A notably different pattern was observed among younger adult males. FSP males were significantly *less* likely than income-eligible males (20-29 years and 40-49 years) and higher-income males (20-29 years through 40-49 years) to have reduced or severely reduced bone density.

Health-Related Behaviors

Initiation and Duration of Breastfeeding

- Among women who had given birth within the preceding 2 years, FSP participants were significantly less likely than either income-eligible nonparticipants or higher-income nonparticipants to have breastfed their infant(s) (45% vs. 59% and 63%). Similarly, FSP infants and children under the age of 6 were significantly less likely to have ever been breastfed than either income-eligible or higher-income nonparticipant infants and children (33% vs. 48% and 63%).

- Among infants and children who had been breastfed, FSP infants and children were significantly less likely than either group of nonparticipants to have been breastfed for at least 6 months (36% vs. 43-44%).

- Among the youngest breastfed infants (2-6-month-olds and 7-11-month-olds), FSP participants were significantly more likely than either of the nonparticipant groups to have received supplemental infant formula. In addition, among infants and 2-year-olds, breastfed FSP participants were first fed formula on a daily basis at a significantly earlier age than breastfed higher-income nonparticipants.

Other Infant Feeding Practices

- It is recommended that infants be fed beverages from cups rather than bottles as soon as they are able to sit erectly on their own. At about a year of age, there was a noteworthy decline in use of baby bottles. However, in comparison with higher-income children, the rate of decline was significantly slower for FSP children. Among 1-4-year-olds, the percentage using a baby bottle was significantly greater for FSP participants than for higher-income nonparticipants at each year of age. Among 4-year-olds, the difference between FSP participants and income-eligible nonparticipants was also statistically significant.

- Recommended infant feeding practices suggest that infants not receive solid foods until they are at least 4 months old. Parents of FSP infants and children were more likely to adhere to this guideline than parents of either income-eligible nonparticipants or higher-income nonparticipants (20% vs. 24% for both groups of nonparticipants).

Physical Activity and Television Viewing Among Children

- In comparison with higher-income nonparticipant children, FSP children were less likely to engage in vigorous physical activity (mean time per week: 4.4 times vs. 4.8 times and percent engaging in vigorous physical activity at least three times per week: 74% vs. 81%) and less likely to be involved in team sports or other organized exercise programs (50% vs. 68%).

- Among children 5-16 years, FSP participants watched significantly more television, on average, than higher-income children. Higher-income males spent about 18 minutes less per day in front of the television than their FSP participant counterparts. Higher-income females spent about 35 fewer minutes per day watching television than FSP females. FSP children were less likely than

higher-income children to meet the *Healthy People 2010* goal (U.S. DHHS, 2000a) of limiting television viewing to no more than 2 hours per day (55% vs. 68%).

Physical Activity Among Adults

- Among adults (17 years and older) FSP participants were significantly *more* likely than either group of nonparticipants to engage in no physical activities (33% vs. 24% and 13%) and significantly *less* likely to engage in three or more physical activities (19% vs. 30% and 45%).

- In addition, FSP adults were less likely than adults in either of the nonparticipant groups to have walked a mile or more without stopping at least once during the past month (42% vs. 46% and 51%) and to have been physically active three or more times per week (37% vs. 51% and 60%) or five or more times per week (28% vs. 40% and 46%).

Alcohol Consumption

- Among persons 12 years and older, FSP participants were significantly less likely than higher-income nonparticipants to have consumed 12 or more alcoholic beverages—both over a lifetime (74% vs. 82%) and within the past year (37% vs. 52%). When drinking, however, FSP participants consumed more alcoholic beverages, on average, than higher-income nonparticipants (5 drinks vs. 3 drinks).

Tobacco Consumption

- FSP participants were significantly more likely than either income-eligible nonparticipants or higher-income nonparticipants to have ever smoked (defined as having smoked at least 100 cigarettes in a lifetime) (57% vs. 51% and 48%). Current use of cigarettes (defined as having smoked cigarettes in the last 5 days, regardless of whether 100 or more cigarettes had been smoked over a lifetime) was also significantly more common among FSP participants than either income-eligible or higher-income nonparticipants (44% vs. 35% and 25%).

- FSP participants started smoking at a younger age than either group of nonparticipants (16.3 years vs.17.0 years and 17.2 years).

- Nonsmoking FSP participants were more likely than nonsmokers in either group of nonparticipants to be exposed to second-hand smoke produced by other household members (34% vs. 26% and 18%). The exposure of infants and young children to second-hand smoke is of special concern. FSP infants under a year of age were more likely than infants in either of the nonparticipant groups to be exposed to second-hand smoke (53% vs. 42% and 27%). In addition, FSP children between the ages of 1 and 5 were more likely to be exposed to second-hand smoke than comparably aged children in the higher-income nonparticipant group.

- The percentage of nonsmoking FSP participants with high serum cotinine levels was significantly greater than the percentage of nonsmokers in either the income-eligible or higher-income nonparticipant groups (75% vs. 70% and 62%). Cotinine is a breakdown product of nicotine, and is used as a biological marker for tobacco use and exposure to environmental tobacco smoke. The

prevalence of abnormal serum cotinine levels in children was exceptionally high for FSP participants.

Health Status

- FSP participants were *less* likely than either group of nonparticipants to rate their health status as being very good or excellent (33% vs. 40% and 63%) and *more* likely to rate their health status as fair or poor (32% vs. 24% and 10%).

- Physician assessments of general health status were consistently more positive than self-assessments, but the general trends were largely consistent with those observed in the self-reported data. Physicians found that FSP participants were *less* likely to be in excellent or very good health than either group of nonparticipants (61% vs. 66% and 76%) and *more* likely to be in fair or poor health (13% vs. 11% and 5%).

Chronic Health Conditions Among Adults

- FSP participants were more likely than either income-eligible or higher-income nonparticipants to report having diabetes (10% vs. 7% and 5%) and emphysema or congestive heart failure (9% vs. 6% and 4%).[9] FSP participants were also more likely than higher-income nonparticipants to report having had a heart attack (5% vs. 3%) or a stroke (4% vs. 2%) and to actually have high blood pressure (based on physician assessment) (23% vs. 18%).

- Both FSP males and FSP females had significantly greater 10-year risks of coronary heart disease than their counterparts in the higher-income nonparticipant group. In addition, FSP males were significantly more likely than higher-income nonparticipant males to have a 10-year-risk that exceeded 10 percent (35% vs. 30%).

Pregnancy and Childbirth History

- FSP females were significantly more likely than either income-eligible or higher-income females to have been pregnant one or more times (93% vs. 84% and 78%). Among females who had ever been pregnant, FSP participants had significantly more pregnancies (4.4 vs. 3.5 and 2.9) and more live births (3.4 vs. 2.8 and 2.1) than either group of nonparticipants.

- Female FSP participants were significantly younger at the time of their first live birth than either income-eligible nonparticipant females or higher-income nonparticipant females (19.8 years vs. 21.0 years and 22.4 years). In addition, FSP females were significantly more likely than either group of nonparticipant females to have been teenagers at the time of their first live birth (59% vs. 47% and 30%).

[9] Congestive heart failure and emphysema were combined for this analysis because the prevalence of each condition was so low that most point estimates in the individual tabulations were statistically unreliable.

Birth Characteristics of Infants and Children

- Among infants and children under 12 years of age, FSP participants were born to younger mothers, on average, than either group of nonparticipants (23.7 years vs. 24.7 years and 27.0 years). FSP infants and children were also more likely than infants and children in either of the nonparticipant groups to have been born to a teen mother (26% vs. 17% and 8%). FSP infants and children were less likely than higher-income nonparticipant infants and children to have been born to mothers over the age of 35 (4% vs. 6%).

- Infants and children participating in the FSP were more likely than either income-eligible or higher-income infants and children to have been born to women who smoked during the pregnancy (31% vs. 23% and 21%).

- Based on self-reported data, infants and children participating in the FSP had a significantly lower mean birthweight than either income-eligible nonparticipants or higher-income nonparticipants. Infants and children in FSP households were also more likely than infants and children in either of the two nonparticipant groups to have been low birthweight (less than 2,500 gm. or 5.5 pounds) (13% vs. 8% and 5%).

Measures of Childhood Health

- Among infants and 3-5-year-olds, the percentage of FSP participants who had been hospitalized at least once since birth was significantly greater than the percentage of either income-eligible or higher-income nonparticipants.

- Infants and children (up to the age of 16) participating in the FSP were significantly less likely than higher-income nonparticipant infants and children to have had an accident, injury, or poisoning that required medical attention (9% vs. 16%).

- Compared with higher-income nonparticipants, FSP infants and children under the age of 6 were more likely to have both asthma and chronic bronchitis. In addition, FSP children between 3 and 16 were significantly *less* likely to have hay fever than comparably aged higher-income children.

Lead Poisoning

- Infants and children participating in the FSP were significantly more likely than infants and children in either group of nonparticipants to have been screened for lead poisoning (17% vs. 10% and 6%).

- Based on NHANES-III laboratory tests, FSP children were significantly more likely than children in either of the nonparticipant groups to have high levels of blood lead (6% vs. 4% and 1%).

Dental Health

- Among adults 80 and older, the mean number of missing, decayed, and filled teeth was significantly higher for FSP participants than for either group of nonparticipants. In addition, among children 2–11 years and adults 60-69 years, FSP participants had more missing, decayed,

or filled teeth than higher-income nonparticipants. Among females 40-49 years, the trend was reversed. In this cohort, FSP participants had significantly fewer decayed, missing, or filled teeth than either group of nonparticipants.

- FSP participants were significantly less likely than higher-income nonparticipants to have visited a dental health professional at least once (90% vs. 95%) or within the past year (45% vs. 70%).

Health Insurance Coverage

- Overall, FSP participants were *more* likely than income-eligible nonparticipants and *less* likely than higher-income nonparticipants to have health insurance (81% vs. 67% and 93%). FSP participants were significantly *more* likely to have Medicaid coverage (59% vs. 15% and 2%) and significantly *less* likely to have private health insurance (26% vs. 48% and 89%).

- Among preschool-age children (1 to 5 years), the difference between FSP participants and higher-income nonparticipants in health insurance coverage was not statistically significant. In these age groups, only about 5 percent of FSP participants and a comparable percentage of higher-income nonparticipants were lacking insurance. In contrast, 23 to 26 percent of income-eligible nonparticipants in this age group had no health insurance. Differences between FSP participants and income-eligible nonparticipants were statistically significant. A comparable pattern was observed for infants.

- Among the oldest adults (70 years and older), there were essentially no significant differences between FSP participants and either group of nonparticipants in health insurance coverage. In this age cohort, close to 100 percent of the individuals in all three participant/nonparticipant groups were covered by some form of insurance.

- Among other adults (20 to 69 years), the statistical significance of the difference between FSP participants and income-eligible nonparticipants varied by gender. Among males, there were no significant differences between FSP participants and income-eligible nonparticipants in rates of insurance coverage. This pattern was also observed for females between 50 and 69 years of age. Among women of childbearing age (20-49 years), however, FSP participants were significantly more likely than income-eligible nonparticipants to have health insurance.

Regular Source of Health Care

- FSP participants were *more* likely than income-eligible nonparticipants and *less* likely than higher-income nonparticipants to have a regular source of health care (81% vs. 74% and 84%).

- FSP participants were significantly less likely than higher-income nonparticipants to have a regular health care provider (63% vs. 73%).