THE RELATIONSHIP OF THE DIET QUALITY INDEX TO PREVALENCE OF OVERWEIGHT IN BLACK AND WHITE ADOLESCENT GIRLS: AN EXAMINATION OF DATA FROM THE NATIONAL HEART, LUNG, AND BLOOD INSTITUTE'S GROWTH AND HEALTH STUDY

by

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(ABSRACT)

The NHLBI's Growth and Health Study (NGHS) data set provided an opportunity to test differences in diet quality and its relationship to weight classification for black (n=270) and white (n=243) adolescent females. Three-day food records from adolescents enrolled in the Washington, D.C. center of the NGHS were scored according to the Diet Quality Index (DQI) developed by Ruth Patterson and others. This index stratifies food intake into three levels for scoring across eight dietary factors. A score of zero showed that the goal was met, while a score of one indicated a fair evaluation, and a score of two indicated a poor rating to create an index score ranging from zero to 16.

Statistical analysis by a t-test showed whites had significantly better DQI scores than blacks in the NGHS sample (black mean = 9.4, white = 8.1). Black females had a greater prevalence of overweight than do their white counterparts. To evaluate how dietary quality relates to the development of overweight, DQI scores were compared to body mass index measurements to note the relationship of diet quality to increasing weight for body height. No relationship was found between BMI and DQI. When the independent variables of race and body weight classification were assessed for their impact upon the dependent variable of diet quality; the influence of race proved significant while weight classification did not. This evidence suggests that practitioners must assess the current dietary status of clients prior to assuming a particular dietary pattern based upon body weight for height alone.

DEDICATION

To the four men in my life who made numerous accommodations in their lives and expectations to make this dream a reality.

To my mother, who dreamed the dream of being an educated woman first.

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CHAPTER 1--STATEMENT OF THE PROBLEM

Obesity is of public health concern due to much reported associations with cardiovascular disease, hypertension, and diabetes in adults (1-4). Overweight in childhood and adolescence is predictive of overweight in adulthood (5,6) and is related to disease and death rates in later life (7-9). The Dietary Guidelines for Americans made broad recommendations for dietary choices for Americans (10). The 1989 publication from the National Academy of Science, *Diet and Health: Implications for Reducing Chronic Disease* (11), set specific numeric goals for these guidelines. Adoption of this set of dietary behaviors is expected to decrease rates of overweight as well as those diseases related to overweight in the population (11). There are few published reports regarding the degree to which populations or sub-populations currently consume diets of high quality consisten with these dietary guidelines (12). Indeed, evidence to show that adoption of this complete set of dietary recommendations will have an impact on long-term health outcomes is, as yet, unproven (13).

It is this set of quantified recommendations from *Diet and Health* (11) that Ruth Patterson and her co-workers choose to develop a measure of overall diet quality. This index can be used to assess the degree to which the general population may be following dietary guidelines that are part of national policy (12). The dietary factors that Patterson includes in her Diet Quality Index (DQI) are the following items.

- Reduction of total fat to 30 percent or less of total energy.
- Reduction of saturated fatty acid intake to less than 10 percent of total energy intake.
- Reduction of dietary cholesterol intake to less than 300 mg. daily.

- Eating five or more servings daily of a combination of fruits and vegetables.
- Increasing the intake of starches and other complex carbohydrates by eating six or more servings daily of breads, cereals, and legumes.
- Maintenance of protein intake at moderate levels (levels lower than twice the Recommended Daily Allowance (RDA).
- Limitation of the total daily intake of sodium to 6 gms. of salt or 2,400 mg. of sodium or less.
- Maintenance of adequate calcium intake (at approximately RDA levels).

A publication from the United States Department of Health and Human Services (DHHS), *Healthy People 2000* has set goals to improve the health of the nation (14). Goals regarding the dietary quality of the nation's intake mirror the recommendations in *Diet and Health* (11). A goal pertaining to adolescent overweight was set to maintain the 1976-1980 prevalence of 15 percent by the year 2000 (14). Data from the Centers for Disease Control and Prevention's third National Health and Nutrition Examination Survey (NHANES III) is used to track health trends in the population. Based upon the preliminary data collected for this study in Phase I (1988 to 1991), the prevalence of overweight for adolescent females, aged 12 to 19 years of age was 22 percent (15-16). This rate indicates an increase from that reported for NHANES II of 7 percentage points, as the prevalence from NHANES II data collected from 1976 to 1980 was 15 percent.

Health practitioners have long approached the issue of maintaining appropriate weight by promoting a simple balancing act; i.e. that energy intake should equal energy expenditure (plus growth needs during childhood, adolescent, and pregnancy). Yet, large cross-sectional studies have not shown that the obese consume more calories than their leaner counterparts (17-18).

Researchers look to the metabolism of the macronutrients as an explanation for the nuances of the equation (17,19). While controversial, there is some evidence that dietary intakes that are higher in fat, while while equal in calories can promote obesity (17,20-21) or that dietary fiber can provide satiety while decreasing energy density (20-21). This scientific evidence provides more support for the adoption of the dietary advice without emphasis on caloric intake alone as outlined in *Diet and Health* (11).

Healthy People 2000 states that "it may be easier to establish healthful habits, . . . such as those related to dietary and physical activity patterns, during childhood than later in life" (14, p.14). The report goes on to advocate the development of appropriate educational strategies that vary according to community and age group. There is also an acknowledgement that the improvement of the health of American children requires a wide range of social and economic interventions. Health educators will not be adequately prepared to develop these socially and economically sensitive interventions without describing and understanding the subgroups of the population. Without an understanding of the current state of adolescent nutritional health in the context of these dietary recommendations, these culturally sensitive strategies cannot be developed (22).

Researchers have documented a greater prevalence of obesity in black females than in white females in the United States (23) with differences reported as early as adolescence (24-25). Although health educators imply that the adoption of the eating behaviors outlined in the Dietary Guidelines for Americans (10) or in *Diet and Health* (11) will provide a good means for reversing the prevalence of overweight, few reports have documented the acceptance or lack of acceptance of prescribed dietary behaviors. Nor have reports documented the degree to which this group of behaviors will combat obesity. Indeed, racial differences regarding nutritional status are not well

documented as large national surveys have not included large numbers of non-white adolescent girls to draw conclusions with certainty.

Although health literature is full of reports discussing factors associated with the development of obesity, no simple, single explanation emerges as an explanation for overweight. The reason one individual becomes obese while another does not, appears to be the result of many inter-related factors rather than a single factor. Characteristics that have been documented in the scientific literature as being related to the prevalence of obesity include heredity (26-29), culture (30-34), family traits (28-30,35-36), metabolic idiosyncrasies (37-38), socioeconomic status (23,39-41), race (32-34,42-51), and lifestyle habits (32,38-39,45-47,51-52). No truly successful strategy for intervention can be developed without understanding multi-faceted influences upon weight gain.

One current set of dietary data that might be helpful in describing the degree to which black and white female adolescents follow the dietary guidelines set forth by *Diet and Health* is the National Heart, Lung, and Blood Institute's (NHLBI) Growth and Health Study (24,53). This study is a longitudinal, nine-year followup of females from childhood to early womanhood. The cohort is a large sample of approximately equal numbers of black and white girls. This population provides a unique opportunity to study black and white differences due to the large number of black adolescents included and the broad socio-economic status of participants. Dietary information in the NHLBI Growth and Health Study (NGHS) is collected by use of a three-day dietary record. Also collected from this cohort is socio-economic information, psycho-social factors, and physical measurements (24,53). Review of the data from this study would provide an excellent opportunity to evaluate the degree to which adolescent black and white girls currently follow dietary patterns similar to the dietary recommendations. In addition, with

information already collected the trends of acceptance or non-acceptance could be related to socio-economic status, psychological variables, and health status.

The application of the Diet Quality Index of Patterson *et al* to the findings of the NGHS cohort could describe diet quality and relate it to rates of overweight in black and white girls in the Growth and Health Study. The degree to which diet quality, as presented by Patterson's Diet Quality Index, predicts obesity in the NGHS population will speak to the validity of advocating this set of behaviors from *Diet and Health* as a valid method to achieve the goals of *Healthy People 2000* for adolescent females.

CHAPTER 2--STATEMENT OF HYPOTHESES

HYPOTHESIS ONE: Diet quality will be significantly better for white adolescent girls than for black adolescent girls based upon Year 5 dietary data from the Washington, D.C. center of the NHLBI Growth and Health Study.

HYPOTHESIS TWO: There will be an inverse relationship between body mass index and diet quality for both black and white adolescent females based upon Year 5 dietary data from the Washington, D.C. center of the NHLBI Growth and Health Study.

HYPOTHESIS THREE: Differences in diet quality between black and white adolescent girls will be associated with differences in the prevalence of overweight for the two groups of adolescent females based upon Year 5 data from the Washington, D.C. center of the NHLBI Growth and Health Study.

CHAPTER 3--REVIEW OF THE LITERATURE

Diet Quality of Adolescents

Optimal nutritional intake has moved from the mere avoidance of deficiencies to the maintenance of optimal physical health. Indeed, the prevention of heart disease, cancer, and general well being have been linked to nutritional intakes that individuals maintain over a lifetime. Popular wisdom holds that teenagers, especially females, do not consume diets that are healthy or always adequate in vitamin or mineral content. Adolescence is a period of rapid physical growth as well as increasing independence from parental influence. It is a time when a parental admonition to "please finish your vegetables" appears to have little impact upon actual food choice. While all these issues are hinted at, there is not clear research to indicate that all these perceptions are accurate evaluations of the way that adolescent females eat.

California researchers collected height and weight measures, three-day food diaries, and information with implications for nutrition programming in 1960 (54). Those issues included food likes and dislikes, attitudes about food and activity, individual perceptions of ideal body weight, and the history of special diets (54). Findings from this study showed that 29 percent of the group were obese. This group of obese girls had a lower caloric intake than did their normal weight counterparts. When evaluating the nutritional content of diets, Hampton *et al* used two thirds of the National Research Council's Recommended Dietary Allowances (RDA) their definition of nutritional adequacy (54). Nutritional analysis showed that five percent of this group had below adequate protein intake. Iron intake was below two thirds of the RDA in 24 percent of the group while 38 percent consumed less than two thirds of the RDA for ascorbic acid.

A 1963 report described 140 girls, aged 12 to 14 years, in a town of 14,000 residents in

Iowa (55). Data were collected regarding physical maturation levels, factors important to food selection, food enjoyment, nutrition knowledge, and psychological adjustment. Socioeconomic information was also collected. Dietary quality was estimated as a percentage intake of foods eaten from the Basic Four Food Plan. Findings showed that the girls that scored best in emotional stability, conformity, adjustment to reality, and family relationships missed fewer meals and had better diets than did the girls that scored lower. Those girls maturing earlier or later than the mean had poorer eating habits and were more overweight than other girls their age. In this sample nearly twice as many girls were judged to be overweight than were underweight based upon an undoumented standard. Girls with better diets tended to have a better understanding of nutrition, enjoyed a wider variety of foods, and were from families of higher socioeconomic status. In general, the girls studied ate less than recommended amounts of dairy products, less ascorbic acid, and fewer carotenoid-rich fruits and vegetables than recommended.

One hundred twenty-two male and female subjects kept four weekly food diaries over a period of two years for a 1968 publication (56). Two diaries were kept during the eleventh-grade year and twelfth-grade school years and two during the summers. The timing of the diaries was done so that the mean age for one set of the diaries was 16 years, and the mean for the second set was 17 1/2 years. Results showed that subjects skipped breakfast more frequently when they were older. Obese subjects ate less diary products, fruits and vegetables than did their normal weight counterparts. The lower the socioeconomic status the fewer the fruits and vegetables that were eaten. One third of the population studied showed variability in meal patterns from one day to the next in both the number and timing of meals. In the black subjects studied, this rate was 90 percent. As a whole, the group studied did not consume vegetables. Whites in this study ate more dairy products, vegetables, and fruits. Blacks ate more desserts and sweets. Orientals from

this survey led in the consumption of cereals; largely due to the greater consumption of rice. Consumption of servings of foods in the meat and legume group were led by oriental boys and black girls.

In 1979 Greger and co-workers reported on 178 girls in the sixth, seventh, and eighth grades from five schools in southwestern Indiana (57). The group collected two, one-day food recalls from weekdays. One recall was collected in the fall and the second was collected in the spring. The average age of the participants was 12.9 years. Meal patterns recorded were typical for 85 percent of the food recalls as verified by diet histories. The dietary intake was analyzed by Basic Four scoring. Based on this scoring 20 percent and 15 percent of the subjects in this study ate less than two servings of fruits and vegetables per day in the fall and spring, respectively. Those girls that ate the Type A school lunch ate more fruits and vegetables and had a greater variety of food intake than did the girls that ate packed lunches. Of the total group, 14 percent ate diets that could be classified as "poor", while only four percent consumed diets that conformed to Basic Four standards.

In a Canadian study of 276 female secondary students, 24-hour food recall records were collected and analyzed by Macdonald and associates in 1983 (58). These recalls were then scored for quality by use of the Canadian Food Guide to find two polar groups of 50 each with the worst and best dietary intakes. Additional data were collected on these 100 subjects including anthropometric measures, socioeconomic data, a rating of self esteem, level of activity versus inactivity, past and present dieting history, and based upon six body silhouette types ideal and present body sizes. Results showed that the group with the best dietary scores consumed more kilocalories and more total servings of food. Individuals in the poor dietary quality group were heavier, had greater body fat based upon skinfold measurement, skipped one or more meals per

day, dieted in greater numbers, dieted to a greater degree in the past, tended to select larger body types, and were involved in more inactive pursuits. These groups did not vary with regard to family size, mean age, or a number of socioeconomic factors. Those individuals in the good diet group ate an average of four servings per day of fruits and vegetables while girls in the poor diet group ate an average of only two servings per day.

In a study of 1,195 southern adolescent females Kenney and co-workers collected two 24-hour food recalls (59). Subjects were within six months of their 12th, 14th or 16th birthdays. The purpose of this research was to determine the contributions of various food groups to total intakes of selected food constituents. Food groups studied included a meat and protein group, egg, legumes, dairy products, mixed dishes, fruits, vegetables, starches (excluding desserts), and foods of low nutrient density. The low nutrient density food group included carbonated beverages, noncarbonated beverages, desserts, candy, other sweets, salty snack foods, fats and oils. Foods from that food group category provided more kilocalories, fat and carbohydrate than any other food group studied in this population of southern adolescents. In contrast foods from the fruit category contributed only four percent of the total kilocalories but was the most important source of vitamin C and folacin, and significant amounts of riboflavin and potassium. The dairy foods provided more vitamin D, riboflavin, pantothenate, calcium, phosphorous and potassium than any other food group. Mean caloric intake for the group studied was 2,017 $\pm$ 679 kilocalories, with 13.2 percent of calories from protein, 39.1 percent from fat, and 47.7 percent of calories from carbohydrate.

These researchers found that the nutrients most likely to be below recommended levels in these adolescents' diets were folacin, iodine, vitamin D, iron, calcium, vitamin B_6, zinc, magnesium, and vitamin A (59). Kenney and co-workers noted that differences in nutrient intake between black

and white female, adolescents were explained, in part, by differences in food group consumption. The white adolescent girls got more protein from dairy while the blacks' source of protein was more likely to be greater proportion of pork or poultry consumed. Blacks got a greater proportion of vitamin C from vegetables than did whites, while whites consumed more vitamin C from starches than did blacks in this study.

In an analysis the number of servings of fruits and vegetables consumed by the approximately 12,000 subjects studied for NHANES II, 17 percent ate no vegetables at all on detailed 24 hour recall (60). Only about one half of the study group consumed a vegetable that was not a potato or a component of a salad. Forty-one percent of the group had no fruit or fruit juice on the day studied. Indeed, only ten percent of the population actually met the Dietary Guidelines by consuming both three or more servings of vegetables and two or more servings of fruit or fruit juice.

Kimm and co-workers also analyzed the nutritional data from the second National Health and Nutrition Examination Survey to examine the consumption of macronutrients for children and youth aged 1 to 17 years (61). Generally, results showed that U.S. children above the age of four years have dietary patterns that do not meet current dietary recommendations for the prevention of cardiovascular disease. The diets of U.S. children are too high in total fats (35-36 percent as opposed to the recommended level of 30 percent), saturated fats (13 percent of calories versus the recommended 10 percent) and the ratio of polyunsaturated to saturated fatty acids (P/S ratio) is too low (0.4 instead of the recommended 1.0). For adolescent females this group's findings indicate that black females aged 11 to 17 years, consumed about 1 percent more of their calories as fat than did white girls of the same age. The P/S ratio of their diets were also less advantageous than those of white females adolescents.

Data from NHANES II were also used to evaluate dietary diversity between blacks and whites and to ascertain if the US population consumes a wide variety of foods by Kant and associates (62). This analysis used all black and white individuals between the ages of 19 to 74 years (n=11,967) that completed a 24-hour recall for the survey. The group used two scores to describe the diets of those studied. These researchers used a Food Group Score to count the number of foods eaten from each of five food groups with a maximum score of five. The Serving Score evaluated the day's food intake for the presence of the recommended number of servings from each of the food groups. The same food groups were allotted four points each with a maximum of 20 points for the day's intake. Two servings are recommended for the dairy, meat, fruit and vegetables groups at two points each while four servings at one point each are recommended from the grain grouping. Data reported by age categories indicate that less than 12 percent of the 19 to 34 year old white females studied ate the recommended servings from all five food groups. For black females in the same age category; fewer than eight percent consumed the recommended servings.

In another report using the same data, this group evaluated the food group patterns as predictors of the quality of nutrient intake from the NHANES II population (63). These authors also evaluated the relationship of the scores to selected biochemical markers. Slightly less than thirty-four percent of the population consumed a pattern that included all five food group categories which reflects a wide variety of foods is being eaten. Using the RDA's as the criterion this was the only pattern that provided mean amounts of all the key vitamins and minerals at recommended levels. Biochemical tests provided no significant variation associated with the food patterns noted. This analysis supports the contention that diets that contain foods from all major categories are more likely to be nutritionally adequate.

Eck and Hackett-Renner analyzed the calcium intakes of 3 to 18 year olds from the NHANES II data (64). Included in the analysis was the report of the effects that age, race, sex, and socioeconomic status had upon calcium's consumption. For all individuals with 24-hour food recalls between the ages of 13 and 18 years, 68 percent had calcium intakes below the RDA level. Eighty-two percent of the teen-age white females had suboptimal calcium intakes and nearly ninety percent of black females. As these authors note, adolescence is the primary time when bone mass is deposited and these lower than recommended intakes mean females may reach adulthood with less than their peak bone mass.

While studying the relationship of self-concept to nutrient intake and eating patterns in young women, Witte and co-workers at the University of Tennessee reported on the dietary intakes of 153 women between the ages of 18 and 35 years (65). Using nutritional composition data generated from 3-day food records, 52 percent of the sample had mean calcium intakes that were below RDA recommendations. In addition, 65 percent had mean iron intakes that were below RDA recommendations. The average from the three days of dietary intake met 84 to 97 percent of RDA values for other studied nutrients. The average caloric intake of 1,472 ± 496 represents an average of 23 kilocalories per kilogram of body weight per day. This level is considerably below the 1989 RDA recommendations for energy which is 38 kcal./kg. body weight for 19 to 24 year-olds and 36 for 25 to 50 year-olds.

Several reports from the Centers for Disease Control's Youth Risk Behavior Surveillance System (YRBSS) have provided recent insight into the eating patterns of high school students (66-68). High school students were questioned about the foods that they had consumed the previous day. The total number of servings of fruits and vegetables consumed during that day were counted. Foods included in the count were fruits, fruit juice, green salad, and cooked vegetables.

Another group of foods including hamburgers, hot dogs or sausage, french fries or potato chips, cookies, doughnuts, pie or cake were counted. This second group were foods that were high in dietary fat. Current dietary advice recommends five servings of fruits and vegetables and the avoidance of foods high in fat. Quality of diets of these high school students was reported based upon this advice. The South Carolina officials reported that the majority of students studied ate no fruit or green salad the previous day (68). At the same time greater than 60 percent of students reported eating french or potato chips and doughnuts, cookies, pies or cakes the previous day.

Reporting regarding the national trends from YRBSS, Moore and other state education officials found that most high school youth do not consume food in recommended patterns (67). Reporting by state, a range of 8 to 18 percent of the respondents to the national survey indicated that they had consumed five or more servings of fruits and vegetables as recommended by public health officials. At the same time, 57 to 83 percent of these same students reported two or fewer servings of the high fat foods. The authors state the need for considerable review of educational strategies if national health objective to reduce dietary fat intake and increase the consumption of complex carbohydrates and dietary fiber are to be met.

Crawford and her co-workers reported on the results of baseline nutrition analysis for the 2,147 black and white girls that kept three-day food diaries for the NHLBI Growth and Health Study at the first year of enrollment (53). Subjects were 9 and 10 years old at the time of the food diaries were kept. Results of that analysis were related to race, total family income, and highest level of parental education. From this report, parental education had the most consistent positive effect on the quality of the diets of the girls studied. There were no significant differences in intakes for protein, carbohydrate, Vitamin A, Vitamin B_6, folic acid, vitamin B_{12},

iron, copper, dietary fiber, or sucrose based upon race. Family income was positively related to higher intakes of Vitamin C and a lower percentages of fat and saturated fat in the diet. Inversely related to income were intakes of calcium and iron. After adjusting for family income and education, black girls had a greater mean intakes of Vitamin C than the white subjects of the study. Blacks studied had slightly but significantly higher mean daily caloric as well as higher intakes of total fat calories daily. The black girls had an average of 5 more grams of fat daily than did their white counterparts. Black girls studied had lower mean intakes of saturated fats and more favorable P/S ratios than did the white girls studied. The same favorable trend did not continue to dietary cholesterol intakes of the blacks as they consumed an average of 133 mg. cholesterol per 1,000 kilocalories while the white girls averaged 119 mg. per 1,000 kilocalories. Black girls had higher mean intakes of thiamin, iron, zinc, and selenium then did the white girls. The white girls had diets higher in those nutrients associated with diary foods; calcium, phosphorous, and riboflavin.

In a largely descriptive analysis, Schmalz reported on her survey of 600 east coast adolescent athletes (69). According to the report, 60 percent of these studied athletes ate lunches that were high in fat and an additional seven percent ate "junk food". Ten percent of the surveyed students reported individualized training diets. Only three percent of those reported diets were under the supervision of a coach, school nurse, or physician for weight control or a medical condition. The balance of athletes following these training diets devised them on their own. Carbohydrate loading was reported by 21percent of the athletes studied, 9 percent followed a high protein diet, and 2 percent reported the use of steroids. In an assessment of nutritional knowledge Schmalz noted many misconceptions.

None of the reports regarding the dietary adequacy of adolescent females reported on the

proportion of individuals that might be following the full set of dietary guidelines. However, some trends do emerge that may predict how adolescents may score on the Diet Quality Index. Servings of fruits and vegetables consistently appear less than ideal. Reports of dietary fat intakes show means that are above the guidelines set forth in *Diet and Health.* Calcium intakes appear to marginal for most adolescent females and well below recommendations for black adolescents. Many reports note the inadequate intake of iron by adolescent females. While no research report speaks to the full range of these questions with one study population it is apparent that the majority of adolescent females do not meet dietary guidelines set forth in *Diet and Health* (11).

Evidence that Dietary Composition Effects Rates of Obesity

While conventional professional wisdom holds that obesity is caused by an excessive intake of food energy, researchers have failed to document large differences between the caloric intakes of the obese and non-obese in cross sectional studies (17). Yet, metabolic studies have noted that extremely high caloric intake will induce weight gain in normal weight individuals and caloric restriction will promote weight loss, it is apparent that energy intake alone does not regulate body weight (70). Recent reviews on the subject was noted that the explanation is probably not as simple as the simple issue of energy balance (17,19-21) that dietary composition or diet quality as defined by the guidelines in *Diet and Health* (11) might impact the development of obesity.

In one review Swinburn and Ravussin argue that levels of glycogen (the body's endogenous carbohydrate) and protein stores are closely maintained (17). When protein and carbohydrate are consumed in larger amounts in the diet, those macronutrients are more likely to be oxidized to their component parts. Conversely, due to the metabolic costs, fat is less likely to to be oxidized. In addition, fat stores are not controlled and the body's ability to store fat seems to be endless. Some population studies appear to support that view as they indicate that the proportion of calories from total dietary fat or from saturated fats is more predictive of obesity than is total calories alone. Additional studies indicate that other dietary components such as dietary fiber may also play some sort of role.

Rolls reviewed the theory that obesity is caused by the overeating that occurs due to carbohydrate craving (20). She notes that the evidence supports fat as the culprit in the discussion of macronutrients that are out of balance for the obese for a number of reasons. Another review

notes that high fat, calorie-dense foods become more satisfying for relief of hunger at an early age (21). According to this review, it seems that food volume consumption may be maintained even if caloric density is not. These same reviewers acknowledge that the possibility of newly formulated foods without substantial fat content may provide the mechanism for reducing caloric intake to achieve weight loss.

Researchers from Rockefeller University in New York argue that energy balance is the issue based upon the review of records from research subjects maintained on isocaloric metabolic liquid diets at varying levels of dietary fat (70). They did not see the deposition of adipose tissue enhanced due to higher percentage of fat in the diet. While living on a metabolic ward these 16 human subjects, 13 adults and 3 children, received formulas with precisely known composition and a widely varying fat content. Even with the extremes in fat-carbohydrate ratio, a detectable difference in energy need was not seen. All subjects in this study maintained the same weight on a caloric level that maintained that individual's weight.

In response to concerns that the failure to support large differences in caloric intake between the lean and obese was due to small sample sizes, Braitman and others analyzed the data from NHANES I (18). This large, national survey conducted from 1971 to 1975 had a sample size of 20,749 people. This sample was chosen to represent the entire civilian, non-institutionalized population of the United States. Results indicated that neither caloric intake nor caloric intake adjusted for physical activity demands was higher for individuals deemed to be obese than for nonobese individuals. Indeed, the obese individuals studied reported slightly more physical activity than did nonobese adults. The sample from NHANES I is a very large sample, with wide ranges in the variables studied; namely age, weight, and caloric intake. The lack of relationship between total calories and level of obesity indicates that the trend is not due to small

sample size.

Stanford University researchers collected seven-day food records from 155 sedentary, overweight men as a prerequisite to enrolling in a one year weight reduction program (71). Hydrostatic weighing determined body density and a measure of total body mass was done at baseline. Dietary analysis showed this group of men consumed a typical American diet with 15.6 ± 2.6 percent calories from protein, 40.7 ± 5.7 percent calories from fat, and 37.5 ± 6.9 percent from carbohydrate. When comparisons were made between dietary composition and measures of overweight the impact of dietary composition was clear. Total fat, saturated fatty acids, and monosaturated fatty acids all correlated significantly and positively with the percent of body fat. Those factors that correlated negatively with percent of body fat included plant protein, total carbohydrate, and dietary fiber. Total caloric intake failed to correlate with body weight. Dreon and co-workers (71) concluded that the modest caloric intake of these men and the absence of relationship between percent body fat and total calories indicate that calorie differences cannot explain the major differences in obesity in these men.

A group of researchers from the Harvard School of Public Health led by Romieu reported on their assessment of extensive dietary intake records from an age-stratified sample of female participants in the Nurse's Health Study that resided in the Boston area (72). The 141 women completed four 1-week weighed food records, a questionnaire assessing physical activity, and a self report of height and weight. Results showed a weak, inverse correlation between total caloric intake and body mass index (BMI). The amount of physical activity was negatively associated with obesity, but these researchers also noted an increased caloric intake with increased physical activity. Total fat intake as a proportion of caloric intake was positively related with obesity. Further statistical analysis indicated that most of the variation was due to the intake of saturated

fatty acids.

Slattery and co-workers analyzed data from the baseline examination of the Coronary Artery Risk Development in Young Adults (CARDIA) Study was collected during 1985 and 1986 (45). This data from a total of 5115 young adults examined in Birmingham, AL, Chicago, IL, Minneapolis, MN, and Oakland, CA. Dietary intake was assessed with the use of a detailed diet history questionnaire developed specifically for the CARDIA study. Food items were converted to nutrients by the Nutrition Coding Center at the University of Minnesota. Findings from the statistical analysis include the following. Protein intake was directly proportional to BMI in all race and sex categories. Carbohydrate intake was inversely related to BMI in males. Skinfold measures in all age-sex groups were inversely related to total physical activity as was BMI in white women. Relationship to waist to hip ratio circumference (WHRC) was positive for total calories in women, negative for percent of calories from carbohydrates in whites, grams of crude fiber to total calories (except in black men), and total physical activity (except in white women). Beer intake was consistently positively associated with WHRC in all race and sex groups.

Miller and his co-workers at the University of Indiana sought to evaluate the relationships of the specific components of dietary fat and carbohydrate and body fatness in lean and obese subjects (73). Subjects were recruited by local advertisements that offered free diet and body composition analysis in exchange for participation in a research project. Out of a pool of 200 individuals who responded to the advertisements, 23 lean and 23 obese men and 17 lean and 17 obese women were recruited using sex specific criteria for percent of body fat. Body composition was determined by hydrostatic weighing at residual volume, five to ten times. The three heaviest measurements were averaged to obtain the underwater weight and percent body fat was calculated. Dietary intake information was collected by a 24-hour recall, a food diary was used to record an

additional weekday and weekend day and a food frequency questionnaire. Nutrient analyses for total energy intake, total carbohydrate intake (including the carbohydrate fraction of fructose, glucose, and sucrose), total fat intake (also the saturated, monosaturated, and polyunsaturated fats), and dietary fiber were calculated by use of the Nutritionist III nutrient data bank.

Miller's group (73) reported that energy levels consumed were not different between obese and lean subjects, but dietary composition was significantly different. When energy intake was reviewed relative to body mass, the obese subjects were found to consume lower levels of energy than did their lean counterparts. Obese men and women consumed a higher percentage of calories from total fat and less from carbohydrates than did the lean subjects. The obese subjects consumed a significantly greater proportion of their carbohydrate in the form of added sugars when compared to the lean subjects. Lean men and women consumed significantly more grams of crude fiber than the obese individuals. Based upon these finding the authors suggested that an appropriate intervention for the reversal of obesity is to advise the overweight to substitute fruits, vegetables, low-fat meats and skimmed diary products for their usual food choices this approach could be successful approach without the metabolic problems that caloric restriction creates (73). The patterns suggested by Miller and co-workers are in agreement with the recommendations in *Diet and Health* (11).

Researchers from the School of Public Health at the University of Michigan recruited outpatients from hospital-based weight loss programs to test what role food choices might play in the development of obesity (74). Each of the 93 obese men and 386 obese women were asked to list their ten favorite foods. An analysis of the foods that these subjects listed showed they preferred foods that were major sources of fat rather than major sources of carbohydrate. These researchers noted that these data do not support the "carbohydrate craving" theory that is currently

being espoused as a cause for overeating that leads to obesity.

Canadian researchers studied healthy males to answer a series of research questions regarding the metabolic handling of the macronutrients (75). In their first trial eight healthy, males at close to ideal body weight were housed on a metabolic ward for two, two-day sessions. While staying on the metabolic units they were allowed free access to a variety of foods and were instructed to eat to satiety while no time limits for eating were enforced. In the first case the food composition was high fat, while the second stay presented low fat food. All foods were prepared and pre-portioned by nutritionists to aid in the measurement. The differences in caloric consumption were striking; a mean of 2987 kcal. were consumed on the low fat food and 4135 while on the high fat food choices.

This same clinical group analyzed the diets of 244 healthy adult males using a three-day food record (75). Body density was determined by hydrostatic weighing and several skinfold thicknesses were measured as assessment of body fatness. Analysis produced significant positive correlations between the percentage of dietary calories from fat and body fat mass, the percentage of body fat, and the sum of the skinfolds. Negative, significant correlations existed between the percentage of dietary calories from carbohydrate and all of the fatness indicators.

Tremblay and his group also studied the impact that strenuous exercise might have upon dietary composition (75). A group of six healthy, nonobese male adults that were moderately active were housed in a metabolic ward for two, two consecutive day sessions. Both sessions provided food choices that would be considered relatively high fat. The subjects were asked to remain sedentary for the two days previous to both sessions. During the second session the participants were required to ride a stationary bicycle for 90 minutes at the intensity of 0.60 of maximal oxygen uptake (VO_2max). Analysis of the differences in the two session regarding the

composition of the foods chosen showed either marked decreased appetite or overcompensation of the calories expended in the physical exercise. Carbohydrate intake was maintained at levels that would be expected to match the metabolic needs of the subjects.

University of Iowa researchers selected 53 preadolescent children from the cohort of the Muscatine Ponderosity Study to assess the relationship between dietary composition and body fatness (76). Subjects were selected and grouped according to their relative weight into obese and nonobese. Three 24-hour dietary and activity recalls were collected along with height, weight, skinfold thicknesses and resting energy expenditure (REE) by indirect calorimetry. Findings include a positive correlation between percentage of body fat to total dietary fat, saturated, monosaturated, and polyunsaturated fatty acids. There were negative associations between the percentage of body fat and carbohydrate intake and total energy intake adjusted for body weight. After adjustment for caloric needs for REE and physical activity the associations between dietary fat and carbohydrate intake remained. These authors concluded that diet composition alone may contribute to rates of childhood obesity.

Astrup and associates studied the metabolism of 38 overweight or obese and 35 nonobese women to assess differences in the rates of fat oxidation (77). Each of the 73 women stayed in open-circuit respiratory chambers for 24 hours and followed a specific protocol for physical activity and dietary composition. Twenty-four hour substrate oxidations were collected to ascertain the rate of fat oxidation. Results showed a increasing percentage of fat oxidation with increasing size of body fat mass. The authors discuss this finding as a possible compensatory mechanism to manage a high fat diet in certain susceptible individuals. Because the body requires a fixed supply of carbohydrate from the diet, attaining a sufficient level of carbohydrate becomes increasingly difficult to attain as fat content increases in the diet and carbohydrate content

becomes diluted. Excess energy from the fat is readily stored as fat. The body has adjusted to the acute need for carbohydrate and the dietary fat content is managed by deposition in body fat stores. Eventually to bring the individual into equilibrium insulin resistance becomes a factor in increasing the rate of fat oxidation to accommodate less acute needs for energy. These authors argue that individuals with a genetic predisposition to obesity might have a decreased capacity to oxidize fat as required by a high fat diet.

Fiber is also implicated in the issue of dietary composition and the development of obesity. The evidence in this dietary component is less compelling for its impact on obesity. If dietary recommendations for lowering the caloric density of intake, then fiber will be one of the factors that are included in the overall mechanism of food intake and weight maintenance.

Porikos and Hagamen conducted a trial to assess if a high dietary fiber preload can subsequently decrease the intake of both normal weight and obese men (78). While mislead about the actual intent of the research in question these subjects were presented with two roast beef sandwich halves (the preload) that were isocaloric and contained either 5.2 grams or 0.2 grams of crude fiber. The meal was intentionally interrupted and the subjects were allowed to complete another eating session (the test meal) 30-45 minutes later. The obese subjects ate significantly fewer sandwich halves after the high fiber meal than they did after the low fiber meal. These results suggest that fiber content can reduce caloric intake in obese individuals.

Sixteen overweight, otherwise healthy college males volunteered to participate in an eight-week feeding program to assess the differences in the effects of a high fiber bread as opposed to a regular bread on weight loss (79). The men were randomly assigned to the groups that were asked to eat 12 slices of bread daily of either high fiber or regular bread. After the eight week session was completed the men consuming the high fiber bread diet had lost an average of 8.77

kg. as opposed to the 6.25 kg. of the men on the regular bread regimen. These results suggest that fiber supplementation may aid the success of weight loss programs.

Six physically well individuals participated in an eight-week trial of various dietary patterns to assess the changes in eating habits that would result from the inclusion of high a fiber food in the diet (80). The first two weeks were used as a control period to collect the usual dietary patterns of participants. The next three weeks required the six individuals to consume 3 ounces of All Bran Cereal. The final two weeks of the trial allowed the subjects to again make free food choices. Results showed a decrease in the ingestion of high cholesterol breakfast foods due to most subjects preferring to eat their All Bran Cereal at the breakfast meal plus the addition of milk and fruit to eat with the cereal. None of the subjects choose to continue with eating the high fiber food despite knowledge of the benefits of a high diet. Differences in weight were not reported.

Cornell University researchers studied the caloric intake 12 nonsmoking females without chronic disease on a programmed trial of various fiber supplements (81). Crackers with a wheat paste batter base were fed without fiber supplement, with psyllium gum, with wheat bran, and with the two dietary fibers in combination were fed to the subjects in 2 week time periods. Information was collected on the accompanying physical symptoms and food intake information. The gum and combination fiber supplements did decrease mean caloric intake by 153 kcal./day and 115 kcal./day respectively. The wheat bran fiber did not decrease caloric intake in this trial.

Diet clubs in England enrolled 135 members on one of two sets of dietary advice for 1,000 kcal. diets (82) One set of dieters was given a low carbohydrate/low fiber meal pattern and the second group was given a higher carbohydrate/higher fiber meal pattern. After three months of following the dietary advice those individuals on the low carbohydrate/low fiber protocol had

lost more weight on average (5.0 versus 3.7 kg.). Based on these results the researchers question previous reports of the benefits of high fiber diets for weight loss.

While the preceding evidence makes a strong case for the role of dietary fat and diet composition in general, additional studies present mixed findings regarding the role that dietary fiber might play in the scenario of body weight regulation. As noted by some reviewers the issue of dietary fat's relationship might be due to the increasing caloric density of high fat diets (20-21) and diets of larger volume provide the satiety that indicates food needs are met. Most reports in the literature regarding fiber and overweight relate to its efficacy in helping the overweight or obese reduce caloric intake and/or reduce body weight. Many of the reports have limited application as placebo controls were not studied, only one meal was observed, changes in caloric density were not strictly limited to the effect of the dietary fiber, or trials are of very short duration (83). In addition to these limitations of the research, results as to fiber's effect are mixed.

Scoring Systems for Dietary Quality

Within the last generational span, science has begun to measure and analyze ever smaller units of biochemical molecules and has made major breakthroughs in the understanding of chronic diseases. These scientific advances have radically changed how we all should view the food that we eat. Nutritionists have long struggled with the methods for translating scientific findings regarding nutrients into simple recommendations for eating and the ways that adoption of those recommendations should be measured. At the heart of the problem is the fact that making nutritious food choices is a complex matter filled with exceptions to the simple rules. The theme in the reporting of dietary or nutritional quality has been to report an analysis of the degree to which individuals or groups of individuals have been able to adopt the recommendations that nutritionists have made regarding good eating practices.

The most long standing of all nutritional recommendations are the Recommended Dietary Allowances that have been established by the National Research Council (NRC, RDA's) first in 1943 and periodically updated (84). These standards are often used as a measure of nutritional quality. The intention of the Food and Nutrition Board of the National Academy of Science is to set recommended levels to prevent the diseased states that result in undernutrition. Therefore the levels recommended include a large safety margin making the 100 percent level too high as a measure of pure adequacy. Researchers often use the two thirds level for judging if the diet is inadequate for a particular nutrient. If diets are evaluated with the RDA as the standard, the results tend to be descriptive of the sample studied, and are reported as a laundry list of the means of the specific nutrient levels. This descriptive data makes comparison from one group to the next very difficult.

As more information became available regarding the role that dietary fat played in the development of chronic disease, there was interest in measuring and reporting the level of dietary fat in the diet. Often this assessment was simply another factor added to the laundry list of nutrient levels. After the introduction of the Dietary Guidelines for Americans (10) interest in dietary fiber and the level of complex carbohydrate added more items to the list of good eating practices and standards to be measured. Measurement of nutrient adequacy and limitation of dietary components are difficult to report as one general standard of dietary quality. Patterson's Diet Quality Index provides a verified instrument that could report one reasonable multi-dimensional measure of diet quality.

Nieman and his group used the RDA's as a standard of "dietary quality" intake for his report on the food intakes of marathon runners (85) as did Lenhart and Read (86). The report by Nieman and associates (85) illustrates the limitations of the use of the RDA's to describe diet quality if researchers are attempting to relate diet quality as an entity to other population trends. This report used two thirds of the RDA as an evaluation tool. The results of the evaluation were reported in this way in the report.

> Intake by the runners exceeded two thirds of the Recommended Dietary Allowance for all nutrients except vitamin D and zinc in female runners. Energy and nutrient intake levels in the marathon runners were higher than those of the general U.S. population except for total fat, vitamin B_{12}, and zinc in both men and women and sodium in men.

In addition, the issue of the composition of the diet regarding the macronutrients is not addressed so a separate evaluation of these patterns is necessary, which essentially adds more description of the dietary pattern. This example from the report on marathon runners illustrates this issue (85).

> The percent kilocalories consumed as fat, carbohydrate, and protein are close to the levels recommended by the American Heart Association (<30 percent fat, 50 to 55 percent

carbohydrate, remainder protein). The runners consumed far less energy as fat and more as carbohydrate in comparison with the general population. However, the percent of calories consumed as carbohydrate fell far below the 60 to 65 percent recommended by the American Dietetic Association for non-elite endurance athletes.

Other researchers (87-88) have attempted to solve this issue of multiple factor reporting of the RDA evaluation by use of a concept of a mean adequacy ratio. Once nutrient content was calculated by computer analysis, nutrient adequacy ratios (NAR) were calculated for each of the twelve nutrient studied. The NAR equaled the subject's daily intake of a nutrient divided by the RDA for that subject's age and sex. To judge the overall quality of the diet a second ratio, the mean adequacy ratio (MAR) was calculated by summing the NAR's for all the nutrients for that subject and dividing by the number of nutrients being assessed. All NAR values were truncated at 1.0 so that no one nutrient could compensate for the adequacy of another. This method provided for a single factor to compare and validate other variables in the population, but does not speak to the actual foods that might be more appropriate, nor to the issue of the macronutrient composition in chronic diseases.

The Guthrie and Scheer article cited above used the MAR to validate a scoring system based upon the Basic Four Food Guide, also titled Food for Fitness (87). This article reported upon a scoring system for dietary intakes that is appropriate for nutrition education purposes and ease of application without computer analysis. In the Guthrie and Scheer version, points were awarded for each serving of food within each of the Basic Four groups up to the recommended number of servings for that food group. The range of that score was zero to 16 as two servings from the milk are recommended, two servings from the meat and protein group, four servings from the fruits and vegetables group, and finally four servings from the grains group. Guthrie and Scheer did find that both the NAR's for individual nutrients and the MAR for the total diet were

positively correlated with the dietary score based upon the Basic Four Food Guide.

Numerous additional reports have used food group scoring to report about dietary quality and to relate the level of dietary quality to other factors under study (62-63,65,89-90). The Basic Four Food Guide was the standard nutrition education tool in use at the time and thus these reports were consistent and timely with the prevalent best of nutritional advice for the population. Since then the Dietary Guidelines for Americans (10) and emphasis has changed from the prevention of deficiency to the avoidance of overcomsumption particularly of dietary fat from animal sources. Cronin and colleagues described a new food guidance system in 1987 (91) as a basis for updating nutrition education efforts. This food guidance system was used for the nutrition education course was developed by the Human Nutrition Information Service for the American Red Cross and has been commonly referred to as the Nutrient Guide. It organized food information into a wheel format so that food choices could be made for nutrient adequacy as well as keeping moderation in those food components that had been related to major chronic diseases. Foods were organized into six food groups; protein foods (meat, poultry, fish and eggs), vegetables, fruits, grain foods (grains, breads and cereals), dairy products, and a moderation group (fats, sweets and oils). Included were subgroup recommendations that helped individuals to meet nutrient requirements.

In 1986 Ries and Daehler presented a scoring system based upon the Nutrient Guide system that could be used to judge the dietary adequacy of individual's food intake (92). Foods were grouped and the portions counted in the Nutrient Guide so that the quantity of each item (exchanges) would supply equivalent amounts of designated nutrients. The food groups are (a) iron and protein; (b) iron, protein, and thiamin; (c) iron, protein, and B-vitamins; (d) calcium and protein; (e) vitamin A; and (f) vitamin C. The scoring system was set up so that the maximum

score per food group is 20 points with individual servings contributing the fraction of the 20 points that corresponds to recommended number of servings. Reis and Daehler validated the accuracy of this scoring system using the 12-hour recalls of 300 men. They found that the scoring system corresponded to the MAR based upon the eight nutrients included in the food groups. This scoring scheme did not address the issue of recommended dietary patterns of protein, fat, and carbohydrate composition.

In another adaptation of the Cronin scoring system Krebs-Smith and Clark used data from the children, teenagers, and pregnant and lactating women from the United State Department of Agriculture's (USDA) 1977-78 Nationwide Food Consumption Survey (NFCS) to validate their scoring system (88). With this scoring system the number of normal-sized servings within each of the major food groups were counted. The upper limits of the recommendation could not be reached if certain emphasized food subgroups were not reported on the dietary intake. These emphasized foods included whole grain products; citrus, melon and berries; dark green or yellow vegetables, and starchy vegetables. Krebs-Smith and Clark outlined three steps for scoring diets.

> Step 1. Assign one point for each mention of a food within a subgroup, but restrict the number of points from nontargeted subgroups to the upper limit shown. This limits the score if targeted subgroups are missing.
>
> Step 2. Within each major group, add together the number of points from each subgroup, but restrict the points from each major subgroup to the upper limit shown. This limits the total score when any of the major groups are missing.
>
> Step 3. Add together the points from each major group to get the final dietary score.

Daily nutrient intake is measured by this score. In the case of the sample studied the points for the three days of the intake assessed were added together and divided by three to ascertain the final dietary score. The score proved to be feasible as a method for evaluating diets in clinical

situations to assure that diets meet the level of two thirds of the RDA for problem nutrients for children, teenagers, and pregnant and lactating women based upon the correlation of the dietary score and MAR. These authors do note that other assessments will need to be completed to assess full dietary quality such as intakes of food energy, total fat, fatty acids, sodium, caloric sweeteners and cholesterol.

Hertzler reviewed a number of scoring systems for diet quality (93) based upon previous food guides and more recently the food guide pyramid that were developed for nutrition education purposes. Her goals were to outline the development and validation of food scores and to illustrate how nutritionists have used food guides to help audiences plan menus, assess and evaluate diets, and make the best of food choices. Included in her review were the plans of Guthrie and Scheer (87), Krebs-Smith and Clark (88), and Cronin *et al* (91) described earlier in this report. While the plans reviewed proved to be reliable indicators of nutrient adequacy, most require hand scoring of the number of servings eaten in each of the food groups. Hertzler also notes that food guides allow ethnically diverse participants to rate their own food habits, rather than following the patterns and interests of mainsteam culture.

Scoring systems for the evaluation of quality with regard to dietary fat have been reported as well (94-95). Both reports outline similar guided scoring sheets that assign predetermined values to the choices of foods containing fat as reported from a day's intake from recalls or diaries (94) or food frequency (95) information. These methods of assessment were predictive of the total dietary fat, saturated fatty acids and cholesterol in the diet. The relationship to serum lipid profiles were also documented.

Anderson *et al* (94) reported on the use of the Dietary Assessment Score (DAS) that was created to evaluate diets for the Nutrition Education Program in the Heart Saver Program of the

Chicago Heart Association. This score used previous clinical research that established the predicted serum cholesterol (PSC) and the potential serum cholesterol elevating potential of particular foods. Scoring was organized across five fat and cholesterol containing food groupings; meat, fish and poultry; dairy foods; eggs; fats and oils; and baked goods. The scoring system was summarized for practitioner's use on a scoring sheet. While the dietary instructions directed participants to consume four servings of fruits and vegetables and four servings of grains and enriched cereals, no assessment of the intake of these foods was included in the DAS scoring.

Connor and associates (95) reported on the use and reliability of a 32-item eating behavior questionnaire, the Diet Habit Survey, that was developed for use in the Family Heart Study in Portland, Oregon. The questions collected information eating behaviors for the month previous to completing the questionnaire. Twenty questions concerned the consumption of cholesterol, saturated fats, complex carbohydrates including dietary fiber, and salt. The scoring was based upon computations that accounted for the content of saturated fats and cholesterol in that particular food. Three questions related to the intake of salt. A number of the questions regarded carbohydrate consumption. Two scores are generated from the Diet Habit Survey; the Cholesterol-Saturated Fat Score and the Carbohydrate Score. These scores were used to classify the diets of the subjects. Reliability to 24-hour dietary recalls was established. The article by Connor and co-workers (95) did note that the scoring scheme accounted for additional fruits and vegetables in the diets but did not speak to the nutrient adequacy of the diets evaluated.

Few of the methods reviewed for the assessment of dietary quality speak to the whole set of dietary recommendations that have been proposed by health educators. Food group scores do measure diet adequacy with regard to micronutrients, but are difficult to apply to large sets of dietary data already compiled on nutrient analysis data tapes. The systems for analyzing the

dietary fat sources do not assure nutrient adequacy. In order to evaluate the appropriateness of current dietary recommendations for intervention into major chronic diseases in general, and obesity specifically for this research the score needs to assess both halves of this question.

CHAPTER 4--MATERIALS AND METHODS

Description of the Sample

A total of 513 three-day, food records were scored for diet quality by the use of the Diet Quality Index developed by Patterson and co-workers. (12) The sample used for the present analysis is a subset of participants in the NHLBI Growth and Health Study and includes 270 black and 243 white girls enrolled in the Westat/Humana Group Health Plan center located in the suburban Washington, DC area. Subjects that completed three full days of food records in Year 5 (baseline plus four years of follow-up) were included in data set analyzed for this report. This sample represents 82 percent of the original 621 individuals in the Westat the cohort at baseline. These 513 individuals comprise 88 percent of those participants that completed any part of the data collection for Year Five.

Westat's cohort was recruited from the age-eligible children from the membership roster of Group Health Association (currently Humana Group Health Plan) a health maintenance organization (HMO). To be eligible for inclusion in the NHLBI Growth and Health Study the girls had to declare themselves as either black or white, to be no younger than 2 weeks of age 9 or no older than two weeks of age 11 at the time of the first clinical visit. Parent(s) or guardian(s) had to identify themselves as the same race as the child and live in the same household as the child. The parents had to complete a household demographic information form.

The sample was randomly selected from households with age eligible girls with approximately equal numbers of black and white girls recruited. The families represented the full spectrum of socio-economic status for both races. The aim of the participant recruitment by NGHS was to provide data on a large sample of pre-adolescent black and white girls of this age with a wide range of family education and income levels. Previous national samples included low

numbers of black females at the ages covered by NGHS. For instance, the combined NHANES I and II data included 71 black girls at age 9 and only 62 girls at age 10 (42).

Data collection was done per protocol as documented in the Manual of Operations for the NHLBI Growth and Health Study (96). Procedures at the Westat center were reviewed by the Institution Review Board of the company that assures that procedures are conducted appropriately and that all research participants were duly informed of the risks and benefits of the research project. Please refer to Appendix A for the example of the informed consent form.

Collection of Food Records

Dietary intake data was collected by use of a three-day food record. This method was validated as appropriate and most accurate for the age group of the girls that were to be studied (97). Nutritionists involved in the collection of these food records were trained according to the certification guidelines of the University of Minnesota Nutrition Coordinating Center. Appendix B outlines the content and exercises required for certification as a Dietary Interviewer for the NHLBI Growth and Health Study. Nutrient composition was determined by use of that center's Nutrient Data System.

All participants were instructed in keeping the three-day food record prior to completing the diary. The majority of the participants in Year 5 of the data collection received a refresher training on keeping a food diary from a videotaped rap video. Those few participants with scheduling difficulties were instructed face to face or by phone according to specified protocol. Appendix C contains the text of that rap video and the procedure for in-person instruction. Age-appropriate materials were given to each of the participating girls including a notebook with written and pictorial instructions and food record pages, an eight-inch ruler with quarter inch markings, and measuring cups and spoons, to assist in the recording of the foods eaten. A sample of the food diary pages can be found in Appendix D. Subjects were directed to record all food and drinks consumed for two weekdays and one weekend day. Participants were also instructed to record the time of eating and the place that the food was prepared, i.e. home, friend's house, school, etc. Girls were requested to complete the food records themselves and not to worry about spelling or handwriting.

Trained nutritionists reviewed the food records individually with each subject within 15

days of the intake. The content of the Debriefing Kits were standardized for all three centers of the NHLBI Growth and Health Study. A list of the items in those kits can be found in Appendix E. In most cases, the food records were reviewed in-person at the clinic visit but a portion of the records were reviewed by telephone if it was impossible at the clinic visit. All interviews were completed by study certified nutritionists. Study-wide probing guidelines were developed and used with each debriefing to assure consistent collection of data. The complete text of the Probing Guidelines is available in Appendix F. Additional information was not sought from parents as confidentiality was important so that eating behaviors that parents were not aware of could be elicited. During these confidential interviews information was obtained from the participants regarding food preparation, brand names, and portion sizes. A system was devised to uniformly estimate missing information when the subject could not provide specific data. In those cases, default values were used based upon the comprehensive default system used by the University of Minnesota Nutrition Coding Center. Girls were always encouraged to provide food labels and recipes. Portion sizes were determined with the aid of rulers, sets of graduated bowls, glasses, spoons, thickness bars, and geometric shapes of varying sizes. Food models were not used since girls of the age studied may be impressionable to conform to food portions as presented.

Measurement of Height and Weight

The large majority of the girls were seen at the HMO clinic, but a small number who had difficulty in scheduling a visit to the clinic were seen in their homes for the examination. All participants were provided with an oversized t-shirt and socks for the completion of the physical measurements. All measurements were taken by health examiners trained and certified in study procedures and techniques by study master trainers or individuals certified as trainers at the Westat clinical center. Certification procedures included demonstrating taking actual measurements within range of the site trainer, specified recording methods, equipment calibration, and potential sources of error. Recertification of health examiners is required every year.

All physical measurements were taken once and then repeated a second time. If the measurements were beyond a specified range then a third measurement was taken. Height measurements had to be within 0.5 cm. and weight had to be within 0.3 kg. The two measurements for each variable were then averaged. If a third measurement was required, the two closest measurements were averaged.

Height was measured to the nearest 0.1 cm. on a portable stadiometer, designed specifically for the NHLBI Growth and Health Study using the Accustat stadiometer by Genetech. The subject was asked to stand erect with the heels, buttocks, and shoulders touching the measuring board. For those girls where this created an uncomfortable stance a cedar block was provided at the heels. The feet were to be placed with heels together and the feet at a 45° angle to each other. The axis of vision was to be horizontal and the subject was asked to look straight ahead. From the side, the auditory meatus, acromion process, trochanterion of the hip, and lateral malleolus of the fibula should all be at the same perpendicular line. When positioned in this

manner the subject was asked to take a deep breath and stand as tall as possible without lifting her heels from the ground. The sliding header of the stadiometer is slid down firmly to the crown of the head. The girl was asked to step forward away from the stadiometer and the height measurement was recorded. For the girls that had braids or hairpieces that could not be quickly removed, a small centimeter stick was used to measure the height of the braids or hairpiece and that measurement was recorded for later reconciliation of the height.

Weight was measured on a Health o meter$_{TM}$ upright electronic scale or a Seca electronic floor scale to the nearest 0.1 kg. The subjects were positioned standing comfortably with the abdomen relaxed, arms at the sides, and feet together but not touching. For larger subjects that found it uncomfortable to stand with their feet together instructions were given to find a comfortable stance with their feet as close together as possible.

Body weight itself cannot provide an estimate of the degree of overweight since such an evaluation is also dependent upon height. Body mass index (BMI), kilograms body weight/(height in meters)^2 was calculated from these two measurements based on the standard formula: This calculation is used as a measure of appropriate weight for height with cutoffs established from large population studies (11,p.563, 24) and is the most commonly reported criteria of appropriate weight for height. Ranges of 20 to 25 for the BMI are considered to indicate normal weight by the British and Australians, while the range of 25 to 30 is defined as overweight, and obesity is based upon a BMI over 30 kg./m^2 (11). In setting health goals for the nation *Healthy People 2000* (14,p.403, 98) used 23.4 kg./m^2 as the cut point for obesity based upon the 85th percentile of gender and age-specific values for females aged 12 through 14. The females in this current study were 13 and 14 years of age at the time of this data collection. It seems reasonable to use this value as the definition in this analysis. The level of low weight for height will the 15th

percentile from the same source of data (14, 98). This is a level of weight for height that is likely representative of underweight.

Calculation of the Diet Quality Index

Ruth Patterson and her group felt that the recommendations from *Diet and Health* (11) provide a standard for evaluating diet quality (12). These guidelines were developed by an interdisciplinary team that weighted a variety of epidemiological, clinical, and laboratory evidence to support their conclusions. For the Diet Quality Index Patterson *et al* (12) weighted the *Diet and Health* (11) guidelines and established cutoffs for the index scoring, and scores were summed across the recommendations. These factors made the measure an index; i.e. a grouping of somewhat related issues that tap separate components to reveal a larger description.

For the scoring of the DQI the food intake of an individual is evaluated on a total of eight variables. Those individuals that meet the specific goal from *Diet and Health* (11) are scored as a zero for that variable, while those that did not meet the goal but had a fair diet are scored as one point, and those individuals with a poor diet score two points. For the total of eight variables scored the DQI ranges from zero for an excellent diet to 16 for a poor diet. The DQI scores on the following variables.

- Reduce total fat to 30 percent or less of energy.
- Reduce saturated fatty acid intake to less than 10 percent of energy.
- Reduce cholesterol to less than 300 mg. per day.
- Eat five or more servings daily of vegetables and fruits.
- Increase intake of starches and other complex carbohydrates by eating six or more

servings daily of breads, cereals, and legumes.

- Maintain protein intake at moderate levels, i.e. lower than two times the RDA.
- Limit total daily intake of salt to 6 gms. (2,400 mg. sodium) or less.
- Maintain adequate calcium intake (approximately RDA levels).

The specific recommendations along with the cut points for "fair" diet and "poor" diet scoring are summarized in Table 1.

Table 1--Scoring for the Diet Quality Index

Recommendations	Intake	Score
Reduce total fat intake to 30% or less of energy	≤ 30%	0
	30-40%	1
	>40%	2
Reduce saturated fatty acid intake to less than 10% of energy	≤ 10%	0
	10-13%	1
	> 13%	2
Reduce cholesterol to less than 300 mg. per day	≤300 mg.	0
	300-400 mg.	1
	> 400 mg.	2
Eat five or more servings daily of vegetables and fruits	5+ servings	0
	3-4 servings	1
	0-2 servings	2
Increase intake of starches and other complex carbohydrates by eating six or more servings daily of breads, cereals, and legumes.	6+ servings	0
	4-5 servings	1
	0-3 servings	2
Maintain protein intake at moderate levels, i.e. levels lower than twice the RDA	≤ RDA	0
	100-150% RDA	1
	> 150% RDA	2
Limit total daily intake of salt to 6 gms. (2,400 mg. sodium) or less	≤ 2,400 mg. sodium	0
	2,400-3,400 mg. sodium	1
	> 3,400 mg. sodium	2
Maintain adequate calcium intake (approximately RDA levels)	≥ RDA	0
	⅔ RDA	1
	< ⅔ RDA	2

Scores (0,1, or 2) are summed across the eight recommendations to develop a Diet Quality Score for individuals.

Adapted from: Patterson *et al*, Diet Quality Index: capturing a multidimensional behavior, *J Am Dietet Assoc* 94:57-64, 1994.

Diet and Health (11) was prepared by the Committee on Diet and Health of the National Research Council (NRC). The committee did not intend for the recommendations to be ranked in importance. For purposes of the DQI, Ruth Patterson's group gave additional weight to the recommendations on dietary lipids. The NRC recommendations for dietary fat were included in a single recommendation while Patterson scored this factor on three of the eight variables included in the DQI. This essentially gave dietary lipid composition a weight of three on the Patterson scale.

For various reasons the Patterson group decided not to include four of the recommendations from *Diet and Health* in their Diet Quality Index. The recommendation to balance food intake and physical activity to maintain appropriate body weight as Patterson felt body weight was an outcome of diet quality, physical activity, and additional non-avoidable attributes that included metabolic efficiency and heredity. The factor regarding moderation in the consumption of alcoholic beverages due to the indication that alcohol use and alcoholism are psychoactive substance abuses and as such they should not be evaluated as dietary shortcomings. Patterson excluded the recommendations regarding fluoride supplementation and the avoidance of taking dietary supplements in excess of RDA levels because she felt they were not of enough consequence to major chronic illnesses to warrant their inclusion.

Determining Portion Sizes

Analysis of the dietary data to determine the numbers of servings of fruits and vegetables or grains was done by computer analysis. This required that decisions need to be made about the amount of portion sizes. The dietary data is stored on the magnetic data tape in grams consumed. In *Diet and Health* serving sizes are defined in terms of household measures or sizes of whole fruits or vegetables. The mere size of the data file prevents the analysis program from line by line definition of individual foods in gram servings. Therefore, categories of food types with the accompanying definitions of portion sizes must be defined. A review of the few papers published that determine portion sizes from retrospectatively collected dietary data indicate that gram-portion determinations were made in similar ways (12,99). Examination of serving size data from standardized references such as Bowes and Church's *Food Values of Portions Commonly Used* (100) determined appropriate portion sizes. In addition, unpublished documentation by Patterson's group were used (101).

Blossum Patterson and co-workers at the National Cancer Institute (NCI) described such a protocol when they analyzed the 24-hour recall data from the Second National Health and Nutrition Examination Survey (99). Their efforts were to determine if Americans were eating the number of fruit and vegetable servings that are recommended by the Surgeon General's Report on Nutrition and Health as a preventative against a number of cancers. They noted that a mere examination of actual food records for some individuals showed amounts for fruits and vegetables that were too small to a be considered as a serving. Her examples include a slice of onion or lemon added to tea. At the same time some amounts were too large to be considered one serving alone. The NCI group chose a lower limit of one ounce (or 30 grams) for any serving of fruits or vegetables and two ounces (or 62 grams) for fruit juice. The group also chose an upper limit

for portions so that large portions would be treated as more than a single serving.

This group determined a "typical" number of grams in a half cup serving of vegetables and a medium weight of an "average" piece of fruit. The determinations is that a half cup of many vegetables weighs about 75 grams and many whole fruits weigh 120 grams. Any eating occasion where more than 150 grams of vegetables, with the exception of green salads; was counted as two servings of vegetables. Fruits weighing more than 240 grams was determined to be two servings. For fruit juices; individuals consuming between 12 and 18 ounces (372 to 557 grams) were determined to have ingested two servings of juice, while those consuming more than 18 ounces (558 or more grams) were determined to have consumed three servings. Green salads, in any amount, at one eating occasion, with any number of ingredients, were credited as one vegetable serving up to a maximum of four servings of salad per day.

The Ruth Patterson group used similar cut points for serving sizes for fruits and vegetables (101). This group expanded the guidelines to include foods with high complex carbohydrate content; legumes, cooked starches, yeast breads, ready-to-eat cereals, crackers, quick breads, and standards for various mixed foods. Based upon Ruth Patterson's documentation, servings of legumes weigh 120 gms.; cooked starches weigh 100 gms.; 25 gms. is the average size of a serving of bread, ready-to-eat cereals, and crackers; while a serving of quick bread would average 50 gms. Grains or complex carbohydrates that were part of a casserole or other mixed dish was considered to be one half of weight and portions were calculated appropriately. For the calculation of her Diet Quality Index Ruth Patterson established half portion sizes for some foods whose weight was large enought ot warrant it.

Serving size cut point for fruits and vegetables are summarized in Table 2. For

Table 2--Portion Sizes in Gram Weights for Fruits and Vegetables

Category	Number of Servings					
	0.5	1.0	1.5	2.0	2.5	3.0
	Weight in Grams					
Vegetables & Salads	≥25 gms. to ≤ 70 gms	>75 gms. to ≤ 115 gms.	>115 gms. to ≤ 160 gms.	>160 gms. to ≤ 200 gms	>200 gms. to ≤ 250 gms	> 250 gms.
Fruits & Juices	≥30 gms. to ≤ 90 gms	>90 gms. to ≤ 150 gms	>150 gms. to ≤ 210 gms	>210 gms. to ≤ 270 gms	>270 gms. to ≤ 330gms	> 330 gms.
Dried Fruits	~	≥15 gms. to ≤ 45 gms	~	>45 gms. to ≤ 75 gms	~	> 75 gms.
Casseroles & Soups	~	≥125 gms. to ≤ 375 gms	~	>375 gms. to ≤ 625 gms	~	> 625 gms.
Frozen Dinners	~	≥ 150 gms. to ≤ 450 gms	~	>450 gms. to ≤ 750 gms	~	> 750 gms.

complex carbohydrates these cut points are summarized in Table 3. When counting the number of fruit and vegetable servings Ruth Patterson included fresh fruits, fruit juices, dried fruits, vegetables, and half the mixed foods that contained any of the listed, included foods. Ruth Patterson did not exclude or limit green salads as Blossum Patterson had documented. Green salads were counted in the same category as vegetables in the Ruth Patterson scoring scheme. Foods that were excluded from this count were fruit pies or other desserts, and fruit "drinks". Any salty, high fat snacks made from fruits and vegetables were excluded, i.e. potato chips. Foods that were included in the count of servings for the complex carbohydrates include legumes, grains, pastas, crackers, cereals, and breads. Excluded foods in the grain and carbohydrate category are cakes, pies, cookies, or other pastries.

The Nutrient Data System from the University of Minnesota lists some foods on the data tape as the component ingredients rather than the whole food. In most cases this actually makes the counting of serving sizes an easier process than dividing combination foods. The food codes that create problems for this assessment are those for all purpose flour and corn meal. All purpose flour is the chief ingredient for pizza crusts, some muffins, and baked goods (that should be counted) and also for cookies and pies (that are not to be counted) in the Patterson schematic for complex carbohydrates. In order to sort those observations of all purpose flour that should be included in the count, the observation was qualified to a sugar to flour ratio of less 0.30 at the same line of food data to be included. Corn meal is listed as a food component for both flavored tortilla chips (not counted) and cornbread (which is to be counted). To sort for the appropriate observations of corn meal, it was included if listed with all purpose flour, but excluded when flour was absent (as is the case for the flavored tortilla chips).

Table 3--Portion Sizes in Gram Weights for Complex Carbohydrates

Category	Number of Servings					
	0.5	1.0	1.5	2.0	2.5	3.0
	Weight in Grams					
Legumes	≥30 gms. to ≤ 90 gms	≥ 90 gms. to ≤ 150 gms	≥ 150 gms. to ≤ 210 gms	≥210 gms. to ≤ 270 gms	≥270 gms. to ≤ 330 gms	> 330 gms.
Cooked Starches	≥25 gms. to ≤ 75 gms	≥ 75 gms. to ≤ 125 gms	≥125 gms. to ≤ 175 gms	≥175 gms. to ≤ 225 gms	≥225 gms. to ≤ 275 gms	> 275 gms.
Yeast Breads, RTE Cereals, & Crackers	~	≥ 12 gms. to ≤ 38 gms	~	≥ 38 gms. to ≤ 62 gms	~	> 62 gms.
Quick Breads	~	≥ 25 gms. to ≤ 75 gms	~	≥75 gms. to ≤ 125 gms	~	> 125 gms.
Casseroles & Soups	~	≥ 120 gms. to ≤ 360 gms	~	≥360 gms. to ≤ 600 gms	~	> 600 gms.
Sandwiches & Mixed Ethnic Food	~	≥ 40 gms. to ≤ 120 gms	~	≥120 gms. to ≤ 200 gms	~	> 200 gms.
Frozen Dinners	~	≥ 150 gms. to ≤ 450 gms	~	≥ 450 gms. to ≤ 750 gms	~	> 750 gms.
Dry Weight, Cooked Starches	~	≥ 20 gms. to ≤ 60 gms	~	≥ 60 gms. to ≤ 100 gms	~	> 100 gms.

All decisions regarding included or excluded foods was discussed with a panel of nutritionists to determine by consensus which foods should be included. One classification of foods, starches that are normally cooked when eaten but reported as dry weight or measure, was not included in Patterson's determination of portion sizes by gram weight. A review of portions reported by Bowes and Church (100) established the average portion size with cut points for the specific number or portions following the Patterson *et al* protocol (12).

CHAPTER 5--RESULTS

With the exception of the dietary cholesterol, scoring of Diet Quality factors according to Patterson's Index (12) showed that a minority of the studied adolescents from the NGHS Westat sample met the individual guidelines from *Diet and Health* (11). This is based upon the number of subjects that scored as a "0" for each of the factors in question. These results are summarized in Table 4.

A majority of the 13- and 14-year-olds did meet the recommendation for a cholesterol intake of less than 300 mg. per day (77.4 percent). While, this finding is positive, less than one fourth (24.5 percent) had average saturated fatty acid intakes at less than 10 percent of total energy and only slightly more than one fourth (26.5 percent) limited total dietary to recommended levels of 30 percent of calories daily.

Only a small portion of the NGHS participants consumed the recommended servings of fruits and vegetables (18.3 percent) and complex carbohydrates (15.8 percent). This finding indicates that dietary variety may be limited and that it is unlikely that micronutrients and dietary fiber are being consumed in adequate amounts by many in this group of adolescent females. These plant foods should form the basis of a healthy diet as they are excellent, lower fat sources of vitamins, mineral, and fiber necessary for good health.

Only 18.7 percent of the NGHS Westat sample limited protein intake to RDA levels. Overemphasis on protein sources of food in the diet requires animal sources of food with the chronic disease risks that are associated with those foods. Appropriate sodium levels were consumed by only 26.5 percent of the Westat NGHS sample. This finding may represent the consumption of salty snack foods.

Table 4--Distribution of the scores for individual factors of the Diet Quality Index from Westat NGHS participants in Year 5 dietary intake data.

Component Scored	Breakdown of the Component Scoring					
	Excellent (or 0)		Good (or 1)		Poor (or 2)	
	n	%	n	%	n	%
Percent Calories from Fat	136	26.5	293	57.1	84	16.4
Percent Calories from Saturated Fat	126	24.5	203	39.6	184	35.9
Dietary Cholesterol	397	77.4	70	13.6	46	9.0
Servings of Fruits and Vegetables	94	18.3	154	30.0	265	51.7
Servings of Complex Carbohydrate	81	15.8	200	39.0	232	45.2
Limit Protein Intake	96	18.7	205	40.0	212	41.3
Dietary Sodium	136	26.5	203	39.6	174	33.9
Dietary Calcium	61	11.9	126	24.6	326	63.5

Alarmingly, more than sixty percent of the adolescent females consumed less than two thirds of the RDA of calcium. This is at a time when bone growth and deposition is occuring faster than at any other time in life for these young females.

The average intakes of the studied dietary components are summarized in Table 5. This information is also stratified by the DQI scores received. Generally, the trends of the means of the studied variables follows the progression of the level of dietary quality reflected by the DQI score of that strata. As the quanity of the component moved further away from the goal set by *Diet and Health* (11), the score increased. Generally, the larger intake of servings of fruits and vegetables and complex carbohydrates as recommended by the *Diet and Health* guidelines were not reflected by higher caloric levels (See Table 5).

Table 5--Mean values for dietary components scored for Year 5 dietary intake data from Westat NGHS sample

DQI Score	n	Kcal.	Energy from Fat	Energy from SFA	Dietary Chol.	Servs. Frts. & Veges.	Servs. Comp. CHOH	Protein	Sodium	Calcium
Units		calorie	%	%	mg.	serv.	serv.	gm.	mg.	mg.
3	2	1820	18.1	6.5	88	6.6	4.6	57.3	2291	1090
4	12	1558	24.5	8.1	123	5.4	4.3	52.8	2442	718
5	25	1687	25.6	8.8	134	3.4	4.7	57.2	2624	862
6	54	1664	26.6	9.5	155	3.3	4.1	55.6	2593	744
7	73	1703	31.0	10.5	174	3.0	4.0	59.5	2679	700
8	72	1743	32.1	11.4	199	2.8	3.8	62.2	2874	680
9	81	1836	34.7	12.4	217	2.6	3.7	64.0	3093	723
10	70	1942	36.7	13.8	249	2.4	3.6	72.7	3205	795
11	54	2047	38.0	13.9	269	2.4	3.8	73.5	3664	754
12	38	2132	39.7	14.7	324	2.4	3.7	78.0	3782	774
13	21	2163	40.2	14.0	437	2.3	3.8	87.4	4017	702
14	8	2088	41.6	15.2	477	1.5	3.2	85.8	3426	637
15	2	1861	46.0	17.8	572	1.0	2.8	85.8	4059	560
16	1	1368	51.0	15.3	574	0.7	1.7	115.4	5104	671
Total	513									
Means		1847	33.6	12.0	228	2.8	2.8	66.3	3087	738

HYPOTHESIS ONE: Diet quality will be significantly better for white adolescent girls than for black adolescent girls based upon Year 5 dietary data from the Washington, D.C. center of the NHLBI Growth and Health Study.

If the assumptions for the two sample test are met, i.e. that the two samples are independent and there is equality of variance then analysis can proceed as for one sample methods. To determine if differences noted were not the result of chance a two tailed t-test was performed (102).

The mean of the DQI for the black adolescents studied was 9.38 and the mean for the white adolescents was 8.10. (Recall that the range for the DQI is 0-16, with 0 being the highest ranking score for diet quality and 16 the poorest rating.) Upon statistical analysis the differences observed were determined to be highly significant at the $p< 0.00001$ level of confidence. Therefore Hypothesis One is accepted, i.e. white adolescent females from the Westat NGHS Year 5 data collection do have significantly better diet quality scores than do the black adolescent females in the sample. The results of the statistical analysis are presented in Table 6.

Table 6--Results of the Statistical Analysis of the Difference of Means between the Diet Quality Scores of Black Adolescent Females and White Adolescent Females in the Westat NGHS Year 5 Data Collection ($p<0.00001$)

t-Test, Two Samples Assuming Equal Variance

	Black DQI	**White DQI**
Mean	9.3778	8.0988
Variance	5.2545	5.1968
Observations	270	243
Pooled Variance	5.2272	
Hypothesized Mean Difference	0	
df	511	
t	6.3265	
P(T<=t) one-tail	2.7411E-10	
t Critical one-tail	4.3053	
(T<=t) two-tail	5.4823E-10	
t Critical two-tail	4.4619	

HYPOTHESIS TWO: There will be an inverse relationship between body mass index (BMI) and diet quality for both black and white adolescent females based upon Year 5 dietary data from the Washington, D.C. center of the NHLBI Growth and Health Study.

Correlation coefficients were calculated for the total sample and both racial groups by use of the Pearson product-moment correlation coefficient. (102,pp.70-88) The relationships were judged upon the rule of thumb for the strength of relationship which presents the following interpretations.

.90 to 1.00 (-.90 to -1.00)	Very high positive (negative) relationship
.70 to .90 (-.70 to -.90)	High positive (negative) relationship
.50 to .70 (-.50 to - .70)	Moderate positive (negative) relationship
.30 to .50 (-.30 to -.50)	Low positive (negative) relationship
.00 to .30 (-.00 to -.30)	Little if any correlation

The calculated correlation coefficient yielded no statistically significant relationships. Therefore, hypothesis two is rejected. Several correlations were calculated to assess if any trends existed by weight or race category. Again, either results showed no statistical significance or in the case of the black underweight group due to the very number involved (n=6). This series of correlations are presented in Table 7. In addition scatterplots were generated to assess if any clustering of values indicated that other factors may be impacting the relationship of the DQI to BMI for the total sample, white females and black females in the sample. No apparent clusters appear on this analysis. Scatterplots are included as Figures 1, 2, and 3.

Table 7--Calculated Correlation Coefficients for the Studied Population of Year 5 Westat NGHS Participants

Group Studied	n	Variables Assessed	Correlation Coefficients
Total Westat NGHS Year 5 Sample	513	BMI:DQI	0.0246
Whites from the Sample	243	BMI:DQI	0.0196
Whites Stratified as Underweight	20	BMI:DQI	0.0955
Whites Stratified as Normal Weight	176	BMI:DQI	-0.0387
Whites Stratified as Overweight	47	BMI:DQI	0.2242
Blacks from the Sample	270	BMI:DQI	-0.0919
Blacks Classified as Underweight	6	BMI:DQI	0.7955
Blacks Classified as Normal Weight	165	BMI:DQI	-0.10612
Blacks Classified as Overweight	99	BMI:DQI	-0.1414
Total Westat NGHS Year 5 Sample	513	Average Kcal:BMI	-0.0556
Total Westat NGHS Year 5 Sample	513	Average Kcal:DQI	0.2520

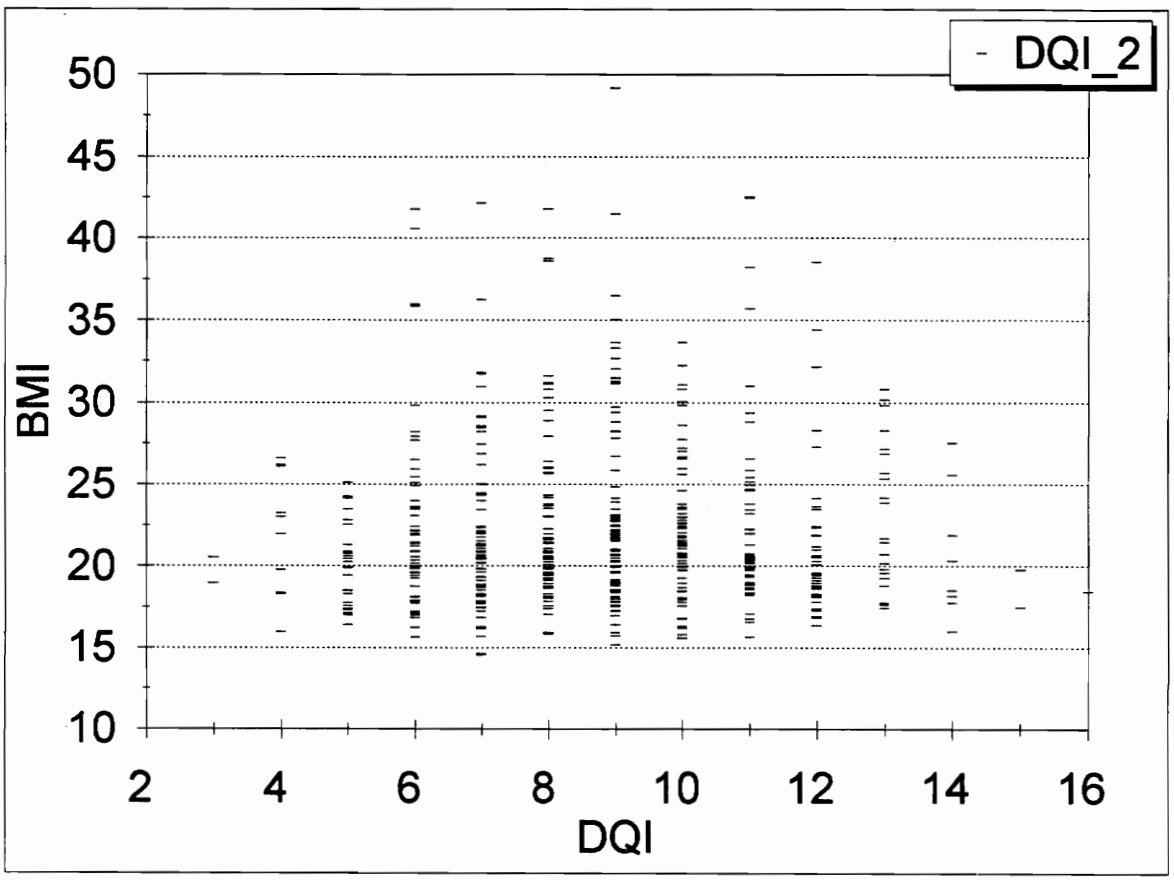

Figure 1--Scatterplot of DQI vs. BMI for Total Westat Participants' Year 5 Data Collection

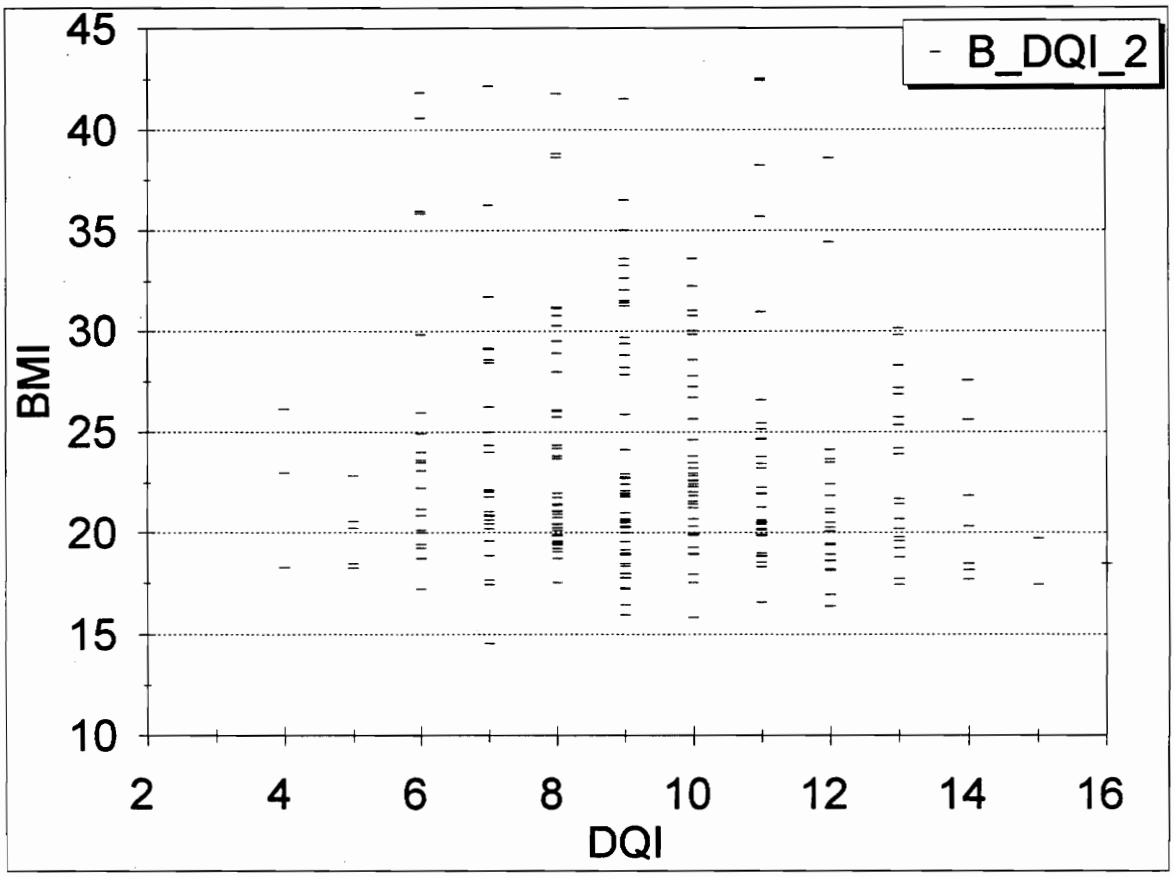

Figure 2--Scatterplot of DQI vs. BMI for Black Westat Participant's Year 5 Data Collection

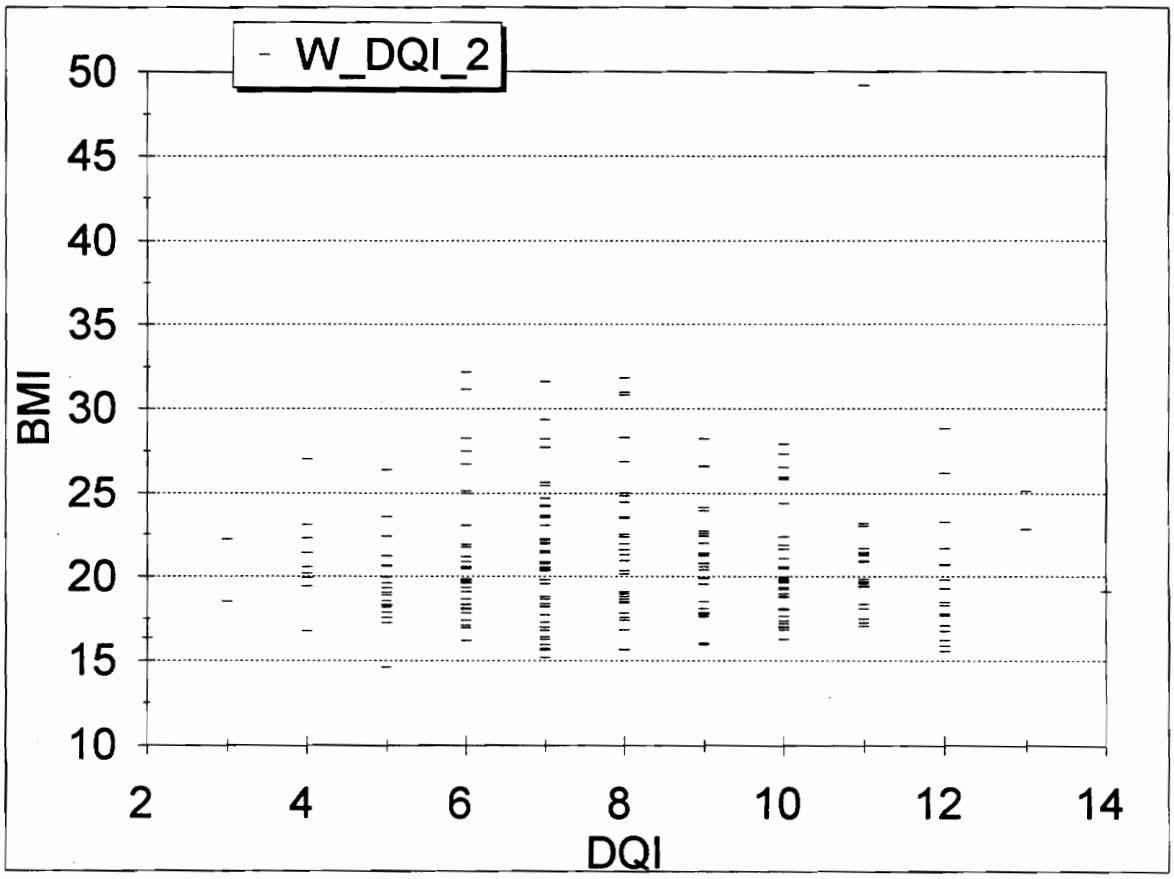

Figure 3--Scatterplot of DQI vs. BMI for White Westat Participant's Year 5 Data Collection

HYPOTHESIS THREE: Differences in diet quality between black and white adolescent girls will be associated with differences in the prevalence of overweight for the two groups of adolescent females based upon Year 5 data from the Washington, D.C. center of the NHLBI Growth and Health Study.

This hypothesis was tested by use of analysis of variance (ANOVA). Due to the disproportionate cell frequencies the unweighted means analysis method of ANOVA (102, pp.322-328). The variables were tested according to the lay-out of Table 8. The statistical findings are summarized in Table 9. DQI score frequencies are listed by weight classification in Table 10.

Each of the adolescent's weight for height as calculated by BMI was classified according to underweight, normal weight and overweight classifications. These classifications are based upon the percentile ranks of BMI from the NHANES II data collection in 1988-91. The cut points at the level of the 15th percentile for underweight and the 85th percentile rank for overweight. These are the same cut points that were used for the *Healthy People 2000* (14) health goals for adolescents and in reporting on the progress towards these goals by the National Center of Health Statistics, Center for Disease Control (15, 16).

Analysis of the variance indicates that the variance of the dependent variable of diet quality can be explained by the independent variable of race but not by the independent variable of weight classification. This reaffirms the earlier findings from this population that diet quality is significantly different between the blacks and whites studied and the lack of correlation of the DQI to body weight measures.

Table 8--Format of the ANOVA Statistical Analysis Testing the Effects of the Independent Variables; Race and Weight Classification Upon the Variation of the Diet Quality Index

	BMI Below Ideal Levels or Underweight (≤16.8)	BMI Within Ideal Levels or Normal Weight (>16.8 and <23.4)	BMI Above Ideal Levels or Overweight (≥23.4)	Total (n=513)
Blacks	Mean = 9.6667 n = 6	Mean = 9.4303 n = 165	Mean = 9.2727 n = 99	Mean = 9.3778 n= 270
Whites	Mean = 8.4500 n = 20	Mean = 8.0625 n = 176	Mean = 8.0851 n = 47	Mean = 8.0851 n = 243

Table 9--Summary Table of the Analysis of Variance by Race and by Weight Category Calculated by the Unweighted Means Analysis for Two Way ANOVA with Disproportionate Cell Frequencies

Source of Variation	SS	df	MS	F	F-crit (p< .05)
Rows	2.3714	1	2.3714	63.069	3.84
Column	0.1639	2	0.0819	2.178	3.84
Interaction	-24.991	2	0.00955	0.2540	3.84
Within		507	0.0376		
Total		512			

Table 10--DQI Score Frequencies Classified by Weight Category and Race

Diet Quality Index Score		3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
		n														
White	Underweight	0	1	1	2	4	2	2	5	2	0	0	1	0	0	20
	NormalWeight	2	6	15	25	31	23	22	23	14	14	1	0	0	0	176
	Overweight	0	2	4	7	9	5	7	4	5	3	1	0	0	0	47
	Total	2	9	20	34	44	30	31	32	21	17	2	1	0	0	243
Black	Underweight	0	0	0	0	1	0	2	1	1	1	0	0	0	0	6
	NormalWeight	0	2	5	10	17	25	31	23	19	15	10	5	2	1	165
	Overweight	0	1	0	10	11	17	17	14	13	5	9	2	0	0	99
	Total	0	3	5	20	29	42	50	38	33	21	19	7	2	1	270
Total		2	12	25		73	72	81	70	54	38	21	8	2	1	513

CHAPTER 6--DISCUSSION

General Findings

Based upon the Year 5 data collected in 1991-92, a greater percentage of the adolescents from the NHLBI Growth and Health Study (NGHS) met the three dietary recommendations for limiting fats from *Diet and Health* (11) than those adults studied by Patterson *et al* (12) from the 1987-88 Nationwide Food Consumption Survey (NFCS).

This fits with reports from nationwide surveys of a decreasing percentage of kilocalories from fat as a nation (104). In the NGHS Year 5 sample studied 26.5 percent met the goal of limiting total dietary fat to 30 percent of calories as compared to the 14.8 percent that met this goal in Patterson *et al's* report (12). Similar trends were seen for percent calories from saturated fatty acids; 24.5 percent met the goal in the NGHS sample versus 16.1 percent in the NFCS sample. A majority of both samples met the limitation suggested for dietary cholesterol of less than 300 mg. daily, but a larger percentage (77.4 percent) from the NGHS sample met the guideline than did the adults from the NFCS (61.4 percent).

For the rest of the *Diet and Health* dietary recommendations included in Patterson's DQI, the adults from the NFCS met the guidelines at higher rates than the adolescent females studied in NGHS. The low percentages of adolescent individuals that eat the recommended number of servings of fruits and vegetables is documented in earlier research (56,57,67) and thus is consistent with differences between the NGHS sample where 18.3 percent ate the recommended number of servings of fruits and vegetables as compared to 21.9 percent of the adults studied from the 1987-88 NFCS (12). More of the adults studied in NFCS than the adolescent females from

NGHS met goals for servings of complex carbohydrates (22.6 versus 15.8 percent) and limiting dietary protein intake (27.0 versus 18.7 percent). Only 26.5 percent of the NGHS sample consumed sodium in recommended levels as compared to the 34.2 percent of the adults of both sexes from the NFCS sample studied. Only a small proportion, 11.9 percent, of the NGHS sample consumed calcium in their diet at RDA levels as compared to 27.0 percent of the adults in the NFCS sample. This comparison is not completely balanced as research has shown that males consistently have better calcium intakes than do females (64).

Higher Diet Quality Index Scores for Whites When Compared to Blacks

Evidence in the literature indicates that whites might have a better quality intake than would blacks. Kimm and co-workers reported that black children consumed a diet that was more conducive to the development of cardiovascular disease, i.e. with higher levels of dietary fat than whites from their evaluation of NHANES II data (61). Crawford *et al* in their report of the baseline dietary intakes NGHS sample noted that more blacks than white girls (at ages 9 and 10 years) ate a diet with more than 30% of calories from fat (53). Whites from this evaluation also had a better intake of calcium than did the blacks. Eck and others also reported that blacks consumed considerably less calcium than did whites based upon NHANES II data (64). Calcium intake is one of the factors that is scored for the DQI. From a sample with similar characteristics to the NGHS cohort, Kenney and colleagues noted that black female adolescents consumed protein levels well above requirements, and higher than that of the white female adolescents studied at the same time (59). Kenney's group also found that blacks ate more desserts and other low nutrient density foods, a factor that likely would score those diets at lower diet quality on Patterson's DQI.

Kant and others re-evaluated NHANES II data and found that blacks scored lower on two scales that evaluated the quality of food intake; the Food Group Score and the Serving Score (62). Therefore, the finding in this report of better scores for whites on this DQI is consistent with previously documented findings.

The Lack of Relationship of Diet Quality to BMI

While it is often assumed that choosing a diet of high quality will help prevent the development of overweight, some very wise dietary practices actually probably have little impact upon the development of overweight. Some of the factors that were included in the *Diet and Health* recommendations and in the DQI factoring by Patterson's group do not have reported impact upon the development of high weight for height. Those components include dietary calcium and sodium. In addition, the limitation of protein intake to RDA levels most likely is not highly sensitive to the prevalence of overweight. Because these factors are part of the DQI, and often without relationship to the prevalence of overweight, the relationship of DQI to BMI is likely weakened.

Family income and parental education have been related to the adequacy and quality of dietary intakes (53,58-59). The issue of socio-economic status was not addressed in this analysis. Individuals with better family resources may deal differently with the issue of increasing overweight. Therefore, socio-economic status may confound the direct relationship between DQI and BMI, and is an issue that should be controlled before speaking with certainty regarding this relationship.

Other reports of non-relationship of diet quality to body weight measures have been reported in the literature. Haus and co-researchers from Michigan State University studied past participants in a worksite weight control program to assess the characteristics of individuals that maintained weight versus those who regained weight (105). This group studied two measures of diet quality; the Index of Nutrient Quality (INR) and MAR. Neither rating related to current weight, the success of weight loss, or the ability to avoid weight regain. Neither weight

maintainers nor weight regainers had consistently good or poor dietary quality. It appears that factors other than diet quality may play a significant role in the development and maintenance of overweight.

In fact, health care practitioners may cling to destructive stereotypes based upon misinformation according to a commentary by Wooley and Gardner (106). They note reports from the literature that document physicians regard the overweight as weak willed, ugly, and awkward and that other health care professionals consider the obese to be self-indulgent. In other words, the prevailing assumption is that overweight individuals eat more, exercise less, and are more emotionally immature than are their normal weight counterparts. These authors note that these misconceptions persist even for individuals that are involved in the study of obesity. This evidence from the NGHS may illustrate the opposite point, i.e. the overweight may not eat poorly or diet quality does not always decrease with increasing overweight and that the overweight may actually be involved in the improvement of the quality of their dietary intake.

A report by Schreiber and others regarding the participants in the NGHS and weight modification efforts may provide some explanation for the lack of relationship of BMI to DQI (107). These researchers found that about 40 percent of the 2,379 girls aged 9 and 10 years old reported they were trying to lose weight. This rate increased to 75 percent for the individuals in the 4th quartile of BMI. After adjustment for relative weight no significant black-white differences were seen. About 25 percent of the girls in the 4th quartile described themselves as chronic dieters. At the 1st quartile of BMI these researchers found that 50 percent of 9 year old and 43 percent of 10 year old black girls were trying to gain weight versus 16 percent and 12 percent of the white girls studied. Those individuals at the lower end of the BMI range could be making choices to promote weight gain that are likely not of high dietary quality. Individuals at

the upper end of BMI range are making choices to promote weight loss which might be more consistent with diets of high quality. It would follow that the correlation of DQI to BMI would be confounded by these dieting practices. Further analysis is needed to see if chronic dieting impacts the non-correlation of diet quality and increasing weight for height.

Wooley and Garner note that a substantial portion of the population, the eating disordered, are successful in terms of maintaining either normal weight or levels of underweight, yet few would describe their diet quality as good (106). The commentators were asking that health practitioners think of this issue, when the evaluation of weight management (loss) programs tie success rates to short term weight loss and not the improvement of indicators of good health. Those individuals with bulimic or anorectic tendencies would again confound the linear relationship of BMI to the DQI.

Weighing the Options:Criteria for Evaluating Weight Management Programs, a set of criteria to evaluate weight management programs developed by a committee of the Food and Nutrition Board of the National Academy of Science states that "obesity is one of the most pervasive public health problems in this country" (108). This committee along with other public health educators (109) advocate that programs move from an emphasis on weight loss to an emphasis on weight management. Due to concern that short-term weight losses with subsequent weight regain actually exacerbate chronic disease (110), this committee recommends that criteria to measure the success of weight programs be moved from weight loss alone to criteria that are based more upon the overall health of participants.

The committee presented a model for evaluating obesity-treatment programs. This evaluation should be based upon (a) the match between program and consumer, (b) soundness and safety of the program, and (c) outcomes of the program. As part of matching a program to the

individual consumer, the Committee to Develop Criteria notes that personal, situational and global factors should be evaluated as part of any program that will successfully aid in the weight management of the individual consumer.

CHAPTER 7--CONCLUSIONS

This analysis again supports the finding that measures of optimal dietary intake are consistently better for whites than for blacks. This finding is parallel to the finding from other reports from this sample that the black girls have a significantly higher average BMI and prevalence of overweight than do the white girls (24). The role that this higher rating of dietary quality plays in the higher prevalence of overweight remains unresolved at this time.

It is clear from this evaluation from the Westat NGHS sample that dietary quality cannot be inferred from a BMI measure alone or the degree of overweight of an individual. A detailed assessment of current eating practices, health status, and goals of the individual would ideally be the initiation into weight management program. Findings from this assessment process should guide the course of counseling. McNutt *et al* have documented a series of eleven such weight-related eating practices that blacks are more likely to engage in than their white counterparts (52). These behaviors were those targeted in behavior modification weight reduction programs. All were associated with higher caloric intakes for those who frequently practiced the behavior than those who did not practice the behavior with the exceptions of "skip meals" and "eat alone". These authors speculate that their findings are significant in light of a possible link between eating practices and obesity.

According to Wooley and Garner (106) current weight loss programs often assume the starting point for intervention in overweight is the weak-willed nature of participants. These assumptions can be destructive for therapeutic counseling relationship as the goal is to provide a situation where the patient has a sense of being valued, respected, and understood. Behavioral change then becomes extremely difficult as well as the success of change.

In other words, chronic overweight is the result of a myriad set of psychological, social and physiological issues. Intervention to reverse overweight must be based upon the current status of the individual rather than the perceived conventional wisdom of current methods. Assessment may be the first and most important step in weight management.

CHAPTER 8--SUMMARY

This study tested three hypotheses: (1) the diet quality of white adolescent females enrolled in the NHLBI Growth and Health Study (NGHS) would have higher diet quality than would the black adolescent females that were enrolled, (2) there would be an inverse relationship between the body mass index of the enrolled individuals and the score of a Diet Quality Index developed by Patterson and her co-workers, and (3) differences in the diet quality between black and white adolescents would explain the differences in the prevalence of overweight between the two groups. A sample of 243 white and 270 adolescent females, aged 13 and 14 years, from the NGHS were used for the analysis. This group of 513 completed three-day food diaries and their height and weight were measured at study clinics from May, 1992 until March, 1993. Dietary intake data was scored according to the Diet Quality Index (DQI) developed by Patterson and co-workers (12) to create a multi-dimensional score of diet quality.

Statistical analysis proved the first hypothesis that the quality of the dietary intakes is better for the white adolescents than for the blacks enrolled in the NGHS. No significant statistical relationship existed between BMI and DQI. While the relationship of race was statistically supported for the effects of the independent variable of race upon the DQI, the influence of weight classification upon DQI failed to be supported. These associations were tested by two-way analysis of variance.

The higher diet quality of whites is documented by various other evidence (53,59,61-62,64). There is some evidence that average diet quality measures do not change with body mass index. It is yet to be determined what role this association may play in individual change. It seems unlikely that diet quality plays no role in the development of overweight, but it may that

dieting practices or other adaptions in response to increasing weight for height may confound the relationship between the Diet Quality Index and body mass index. Further research is necessary to test the effects of adaptive dietary habits to reverse increasing weight for height.

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APPENDIX A--NHLBI Growth and Health Study Informed Consent Form

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE (NHLBI) GROWTH AND HEALTH STUDY (NGHS)

INFORMED CONSENT

Part I. Description of the Study

Before agreeing to participate in this study, it is important that the following explanation of the proposed procedures be read and understood. It describes the purposed, procedures, benefits, risks, discomforts, and the precautions of the study. It also guarantees the right to withdraw from the study at any time. It is undersood that the refusal to participate in the study will not influence any benefits or services that you are entitled to from Group Health Association. The NGHS examination does not take the place of a complete medical examination and the NGHS program does not provide "medical" treatment. If your examination or blood test reveal any condition which might require treatment, you will be contacted by a GHA health care provider.

1. Procedures:

Girls who are 9 and 10 years of age at the time of their first examination will be randomly selected from the membership roster of the Group Health Association. They and their parents or guardians will be invited to participate in the study. All girls will be tested once a year for five years. Parents or guardians will also be examined or interviewed annually.

Because the purpose of this study is to learn about normal growth and the appearance and development of factors that will influence adult health later in life, a variety of facotrs will be measured, including: (1) height, weight, skinfold thicknesses, and body composition; (2) physical activity; (3) health beliefs and attitudes; (4) blood pressure; (5) blood cholesterol and other major blood fats; (6) diet; and (7) behavioral influences.

A 5-10 minute portion of the examination will include the assessment of normal development. The girls' physical appearance will be compared to developmental standards. For this the girls will need to undress and wear an examination gown. Privacy will be carefully maintained by using a private room or specially partitioned area, and all growth and development examinations of the girls will be done by female GHA nurses.

Because growth and changes in these factors associated with growth are being studied, it is important that both girls and their parents realize that they are consenting to participate in a five-year study.

Following a 12-hour fast, a blood sample will be drawn to measure blood cholesterol and other blood fats, insulin, and blood sugar. Two tablespoons of blood will be take. Blood tests

will be done once only in year 1 for parents and guardians and one time only in years 1, 3, and 5 for the girls.

The percent of your child's body fat will be measured by means of bioelectrical impedance. In this procedure a small electric current is used and the body's resistence, or impedance, to this current is measured. This test is similar to an electrocardiogram (EKG). There is no feeling or sensation associated with this test. The measurement is made by two electrodes on the hand and two on the foot. During this procedure, which takes less than five minutes she will be lying down. There are no known risks associated with this procedure.

2. Risks:

The risk in this study is the risk of drawing blood from a vein. The risks of simple venipuncture commonly include the occurence of discomfort and /or bruise at the site of puncture; and less commonly the formation of a small blood clot or swelling of thevein and surrounding tissue, and bleeding from the puncture site. Infrequently, a child will feel faint in anticipation, during, or after the blood sample is taken. There are essentially no other risks associated with the screening procedures, which, except for the body composition measurement by bioelectrical impedance, are themselves standard clinical procedures. All blood drawings will be conducted by a licensed GHA nurse or phlebotomist.

3. Confidentiality of Records:

All the records identifying subjects in the study will be coded and handled in the usual way in which doctor/patient records are handled. Examination and laboratory results will be placed in your GHA medical records. Except for this, any information gathered for this investigation will be used for the purposes of the study by the research team. Except for this inclusion in your medical records, no information with names or addresses will be released to anyone other than the research team without your signed permission, except as otherwise required by law. Scientific data reported from this study will contain no information that would enable individual study participants to be identified. If abnormalities or unusual results are detected during an examination, they will be reported to you for followup through the GHA medical care system. The participating child answers to questions will also be treated similarly. Except for information from or about your child that is essential to her health and welfare, information will not be shared with parents or guardians and, like all other personally identifiable information from the study, will not be released in any form which would allow the child to be identified, without written permission from you or your child, except as required by law. The assurance of the confidentiality of information collected for this study was reviewed by an Institutional Review Board established under the Health Research Extension Act of 1985, 42 U.S.C. 289, and is provided for by Federal regulations.

4. Availability of Information:

Any questions you have concerning any aspect of this investigation will be answered by Dr. George Schreiber, project director (251-8241).

5. Compensation:

The Group Health Association follows a policy of making all decisions concerning compensation and medical treatment for injuries occurring during or caused by participation in biomedical or behavioral research on an individual basis. If you believe that you have been injured as a result of the research, contact Dr. George Schreiber at 251-8241.

Part II. Certification

1. I, _____, agree to participate in a research study, the purpose of which is to learn more about normal growth in girls and the appearance and development of factors that influence adult health and disease--fitness, blood pressure, blood cholesterol, body weight and health behaviors.

2. I understand that I am free to withdraw from this investigation at any time. Should I wish to withdraw, I have been assured that my standard GHA benefits are not affected in any way.

3. Witnessing and Signatures:

Subject _____ Date _____

Parent/Guardian
of Subject _____ Date _____

Study Representative _____ Date _____

APPENDIX B--Certification Requirements for Dietary Interviewers for NGHS

I. INTRODUCTION TO THE DIETARY INTERVIEWER TRAINING PROGRAM

The training program for interviewers who collect dietary to be processed by the Dietary Data Entry Center (DDEC) consists of the following phases:

- Attendance at a Two-Day Training Session
- Documentation and Coding of Six Standard Menus
- Collection, Documentation and Coding of Study Records

Through the training program you will learn new skills and review old skill necessary to the research interview. You will learn the standardized protocol for dietary data collection as well as the basis of the coding system to be used in this study. Completion of all components is necessary to learn the high level of detail required to ensure accurate coding and calculation of dietary intake data, an essential part of nutrition research studies. The training and certification process must be completed before any data are sent to DDEC.

II. OVERVIEW OF DIETARY DATA COLLECTION

The Nutrition Data System is a highly standardized system for collecting and analyzing dietary data for medical research studies which has been developed at the University of Minnesota's Nutrition Coordinating Center (NCC) with support from the National Heart, Lung and Blood Institute. This system has been used for theMultiple Risk Factor Intervention Trial (MR. FIT) and the Lipid Rearch Clinic's program (LRC) as well as for many other medical research studies. The system is unique in that it requires a high specificity of detail particularly in regards to fats, both as an ingredient and in food preparation.

The major steps in obtaining and processing dietary data are:

Research Interview	by Interviewer
Documentation	by Interviewer
Cross Check of Documentaion	by Interviewer
Coding	by DDEC
Coding Quality Control	by DDEC
Nutrient Calculations	by DDEC
Interpretation of Data	by Researcher

Research Interview--Standardized techniques and tools are used by the dietary interviewer in probing for the necessary detail of food intake required.

Documentation--The data obtained in the research interview must be completely and accurately recorded on approved forms using standardized procedures in order for accurate coding to be acheived.

Cross Check of Documentation--All dietary records must be rechecked in detail by a certified dietary interviewer before forms are sent to DDEC for processing. This step is required to ensure that the information is correct, complete, and legible.

Coding--The written dietary recorded is reduced to a set of numeric and alphabetic codes with standardized meanings. The NCC Codebook is the basic reference for coding and contains the codes, procedures and guides used to code dietary records.

Coding Quality Control--Duplicate coding is performed on 10% of intake records. The two codings are compared and any differences resolved by a staff nutritionist.

Nutrient Calculations--Calculations of nutrients are generated according to the study specific requirements and are provided to the study at agreed upon sequences of time throughout the duration of the study.

Interpretation of Data--The research study utilizes the NCC data with a statistical analysis program for study conclusions.

III. THE NCC CODEBOOK

The NCC Codebook, a document of over 500 pages, is the basic reference manual for coding. The Codebook is organized by major food groups such as meats, dairy products, grains, etc. Each group is further subdivided, e.g. meats: beef, pork, veal, and lamb. The Codebook contains the following information used in the coding process.

Food Item List--The listing of food items with corresponding food codes numbers comprises the major portion of the Codebook. This includes listings of many foods by brand name.

Food Amounts--Foods can be coded as any standard unit of weight or volume, e.g., cup, tablespoon, teaspoon, ounce, or as food specific units. The computer converts the food amount to grams (grams weights are included with the Food Item List for reference only). A Math Formula Guide is used as an aid to convert food portions documented as dimensions, into standard units for coding.

Coding Rules--Coding rules (CR) are specific directions for coding foods or food combinations and are interspersed at appropriate places in the Codebook.

The following composite codebook pages provide and explantion of the codebook content.

Explanation of Codebook Content

CODE	ITEM	WEIGHT
54189	BAGEL, EGG	
	SM 1 SMALL	26.00 GM
	*MD 1 MEDIUM	55.00 GM
	LG 1 LARGE	76.00 GM
	SI 1 SQUARE INCH	7.78 GM

Numeric Code--Identifies food or beverage

Default Code (*)--Identifies which food item to code when the participant cannot specify the exact food item (e.g. bagel, unknown kind).

*60012	BAGEL, PLAIN	
	SM 1 SMALL	26.00 GM
	*MD 1 MEDIUM	38.00 GM
	LG 1 LARGE	76.00 GM
	SI 1 SQUARE INCH	7.00 GM

Default Unit (*)--Identifies the food specific unit to code when the participant cannot specify the size/amount of the food.

54015 APF-I	BISCUIT, BAKING POWDER	
	SM 1 SMALL	28.00 GM
	*MD 1 MEDIUM	38.00 GM
	LG 1 LARGE	60.00 GM
	SI 1 SQUARE INCH	8.91 GM
	REF 1 BISCUIT FROM REFRIGERATED DOUGH	19.00 GM

APF Code--Indicates the food or recipe has an "Added Principal Fat" (APF)
"I" indicates that the APF is the ingredient fat
"C" indicates that the APF is the cooking fat

53108 APF-C	TORTILLA, FLOUR, FRIED, COMMERCIAL; DISREGARD THICKNESS	
	SM 1 SMALL TORTILLA	15.00 GM
	MD 1 MEDIUM TORTILLA	23.00 GM
	* LG 1 LARGE TORTILLA	33.00 GM
	XL 1 EXTRA LARGE TORTILLA	60.00 GM
	JM 1 JUMBO TORTILLA	133.00 GM
	SI 1 SQUARE INCH	1.19 GM

Gram Weights--Used as reference only, not used in coding.

CODE	ITEM	WEIGHT
CR	BREAD OR TOAST, "BUTTERED" AMOUNT OF FAT UNKNOWN CODE 1 TS APPROPRIATE FAT PER SLICE OF APPROPRIATE BREAD, INCLUDING ½ ENGLISH MUFFIN, REGARDLESS OF SIZE	

Coding Rule (CR)--Used when participant cannot specify amount of food.

CR	TUNA SALAD WITH EGG CODE 0.50 EGG (25015) PER 1.0 CP TUNA SALAD (23360)	

Coding Rule (CR)--Used when participant describes a recipe different from the Codebook recipe and cannot provide an amount of the food variance.

Other Coding Rules are found at the ends of specific food group sections and are used for that group of foods when the participant cannto identify anamount or a type of food.

Examples of other Coding Rules are:

- Coffee, unknown type, code coffee (03012)
- Coffee with unknown amount of sugar, code 0.17 TS sugar (90084) per 1 oz coffee
- Cereal with unkown amount of sugar, code 1 TS sugar (90084) per 1 cup appropriate cereal
- Unknown amount of mayonnaise or salad dressing on sandwich, code 1 TB per sandwich
- Unknown % of fat in cream added to coffee, code 36202 (half & half)

DIETARY INTERVIEWER PRETRAINING EXERCISE

The following exercise will help to familiarize you with some of the principles of coding. Refer to the attached NCC Codebook pages (identified in parentheses) to assist you in finding the answers. Record the food code, the amount in the measure specified plus the preparation code with the fat code, if appropriate.

Fill in the blanks:

Food	Food Code	Amount	Prep Code	Fat Code
Beef blade roast--4 0z, trimmed, roasted, no added fat	_____ (p 7)	_____oz	_____ (p 16)	
Haddock--5 oz, pan fried in butter	_____ (p 8)	_____oz	_____ (p 16)	_____ (p 18)
4 commericial ginger snaps	_____ (p 9)	_____PC (p 9)		
Corn bread--2 pieces, 3" x 3" x 2" H each piece, made w Mazola corn oil	_____ (p 10)	_____ CI (p 15)	_____ (p 10)	_____ (p 19)
Cheese pizza, ¼ of 12" diam., pizza purchased, made w unknown fat	_____ (p 11)	_____SI (p 14)		
Fresh apple, 3" diam, w peel	_____ (p 12)	_____CI (p 15)		
Egg, 1 large, fried in butter	_____ (p 13)	_____LG	_____ (p 17)	_____ (p 18)
Eggs, 2 med, poached, w no added fat	_____ (p 13)	_____MD		
Eggs, 2 fried at Medium priced restaurant	_____ (p 13)	_____LG	_____ (p 17)	_____ (p 20)

Using the diagrams on pages 14-15, identify the shape that best represents the shapes of the following foods.

Food	Shape
Fresh apple	_____
Chocolate Chip Cookie	_____
Bar Cookie	_____
Hamburger Pattie	_____
Piece of Pie	_____
Egg Roll	_____
Muffin	_____
Pizza	_____

NUTRITION COORDINATING CENTER
CODEBOOK EDITION 11
BEEF

NAME	TRIMMED CODE	% FAT	UNTRIMMED CODE	% FAT
ARM ROAST	11015	9	13029	27
ARM STEAK	11015	9	13029	27
BACK RIBS	11015	9	13037	30
BACON, BEEF(SL = 1 SLICE)	*		13128	52
BACON, KOSHER (SL = 1 SLICE)	*		13128	52
BEEF, 2.5-7.4% FAT, CKD	*		10017	
BEEF, 7.5-12.4% FAT, CKD	*		11015	6
BEEF, 12.5-17.4% FAT, CKD	*		12013	9
BEEF, 17.5-22.4% FAT, CKD	*		13011	15
BEEF, 22.5-27.4% FAT, CKD	*		13029	20
BEEF, 27.5-32.4% FAT, CKD (NOT INCLUDING GROUND)	*		13027	27
BEEF, 37.5-42.4% FAT, CKD	*		13300	30
BEEF CUBES (FROM CHUCK)	11015	9	13029	42
BEEF CUBES (FROM SHANK)	10017	6	11015	27
BEEF CUBES (UNKNOWN SOURCE)	11015	9	13029	
BEEF JERKY (STR = 1 STRIP, RECTANGULAR) (STK = 1 STICK, CYLINDRICAL) (LI = 1 LINEAR INCH) (SI = 1 SQUARE INCH)	*		10082	9 18
BLADE ROAST	12013	15	13037	
BLADE STEAK	12013	15	13037	30
BOTTOM ROUND ROAST	11015	9	12013	30
BOTTOM ROUND STEAK	11015	9	12013	15
BREAKFAST STRIPS, BEEF(SL = 1 SLICE)	*		13840	15
BRISKET, CORNED	*		13940	34 19

* NO VALUES AVAILABLE, USE APPROPRIATE TRIMMED OR UNTRIMMED CODE

NUTRITION CODING CENTER
CODEBOOK EDITION 11
FISH AND SHELLFISH

NAME	CODE		FOOD SPECIFIC UNITS
DRUMFISH, FRESH WATER	20024		
DRUMFISH, RED	20016		
EEL	21014		
EULACHON	20024		
FISH, 0-2.9% FAT	20016		
FISH, 3.0-6.9% FAT	20024		
FISH, 7.0-10.9% FAT	20065		
FISH, 11.0-14.9% FAT	21014		
FISH, 15.0-18.9% FAT	20070		
FISH, % FAT UNKNOWN	20016		
FISH ROE, (EGGS)	22814		
FISH STICK, BRAND UNKNOWN	20016	BSF/BAS	1 STICK = 1.00 OZ
FISH STICK, BOOTH	20016	BSF/BAS	1 STICK = 1.00 OZ
FISH STICK, FISHER BOY	20016	BSF/BAS	1 STICK = 1.00 OZ
FISH STICK, GORTON'S	20016	BSF/BAS	1 STICK = 1.00 OZ
FISH STICK, MRS. PAUL'S	20016	BSF/BAS	1 STICK = 1.00 OZ
FISH STICK, NATIONAL	20016	BSF/BAS	1 STICK = 1.00 OZ
FISH STICK, VAN DE KAMP'S	20016	BSF/BAS	1 STICK = 1.00 OZ
FLATFISH	20016		
FLOUNDER	20016		
FLUKE	20016		
FROG LEGS	20016		1 LEG = 0.5 OZ
GOOSEFISH	20016		
GROUPER	20016		
HADDOCK	20016		

†TO BE CODED IF THE VARIETY IS UNKNOWN AND THE AMOUNT IS < 3 0Z, OR EATEN AT A RESTAURANT. IF ≥ 3 OZ, CHECK WITH STAFF NUTRITIONIST.

NUTRITION CODING CENTER
CODEBOOK EDITION 11
COMMERCIAL COOKIES

TYPE OF COOKIE	CODE	ONE COOKIE, SIZE UNKNOWN
ANIMAL (CP = 7.5 PC)	55616	0.25 PC
APPLESAUCE	55608	1.25 PC
ARROWROOT	55616	0.25 PC
BUTTER	55608	1.00 PC
CHOCOLATE	55616	0.75 PC
CHOCOLATE CHIP	55608	0.75 PC
CHOCOLATE WAFER	55574	1.00 PC
CHOCOLATE WAFER (THIN)	55574	0.50 PC
COCONUT	55608	0.75 PC
DIETETIC	55608	0.50 PC
FIG BARS	93104	1.00 BAR
FORTUNE COOKIE	93112	0.50 PC
GINGER SNAP	93088	0.50 PC
GRAHAM CRACKER (1 SQUARE)	60680	1.00 PC
GRAHAM CRACKER COVERED W CHOCOLATE (1 SQ.)	55608	1.00 PC
MACAROON	55087	1.00 PC
MARSHMELLOW	55616	1.50 PC
OATMEAL	55616	1.00 PC
PEANUT BUTTER	55608	0.50 PC
PEPPERIDGE FARM	55608	0.75 PC
SANDWICH	55608	1.00 PC
SHORTBREAD	55608	0.75 PC
SUGAR	55608	1.00 PC
SUGAR WAFER	55608	0.75 PC
VANILLA WAFER	55616	0.25 PC
WINDMILL	55616	1.00 PC
COOKIE, TYPE UNKNOWN--CODE AS SUGAR COOKIE 9		

CODE		ITEM	WEIGHT
*60095		BREAD, WHOLE WHEAT, MIXED GRAIN, WHEAT GERM, GRANOLA TYPE ETC	
		SL 1 SLICE	28.57 GM
		SI 1 SQUARE INCH	1.79 GM
60400		BREAD, WHOLE WHEAT, LOW SODIUM	
		SL 1 SLICE	25.00 GM
		SI 1 SQUARE INCH	1.56 GM
60442		BREAD, WHOLE WHEAT, THIN SLICED; E.G. WEIGHT WATCHER'S	
		SL 1 SLICE	17.00 GM
		SI 1 SQUARE INCH	1.06 GM
67180		BREAD, WHOLE WHEAT, THIN SLICED, CALCIUM FORTIFIED; E.G. HOLLYWOOD	
		SL 1 SLICE	18.71 GM
		SI 1 SQUARE INCH	1.34 GM
CR		CINNAMON TOAST CODE 1 TS SUGAR (90084) & 1 TS APPROPRIATE FAT PER SLICE APPROPRIATE BREAD. DISREGARD CINNAMON.	
54023	APF-I	CORNBREAD	
		PC 1 PIECE	58.50 GM
		ST 1 STICK	45.00 GM
60327		CROUTONS, COMMERCIAL	
		CP	35.50 GM
		PC 1 CROUTON	0.37 GM
CR		CROUTONS, HOMEMADE CODE 6 TS APPROPRIATE FAT PER CP APPROPRIATE CUBED BREAD, IF FAT UNKNOWN CODE AS UNKNOWN MARGARINE	
60244		LEFSE, DISREGARD THICKNESS	
		PC 1 PIECE	38.24 GM
		SI 1 SQUARE INCH	1.35 GM
*60426	APF-I	MUFFIN, PLAIN VARIETIES	
		SM 1 SMALL	20.00 GM
		*MD 1 MEDIUM	47.00 GM
		LG 1 LARGE	60.00 GM
		SI 1 SQUARE INCH	9.57 GM

CODE		ITEM	WEIGHT
16220	APF-I	PATE, LIVER	
		TB	17.00 GM
14670	APF-C	PEPPER STEAK (TRIMMED SIRLOIN W ONION, GREEN PEPPER, AND TOMATO)	
		CP	217.50 GM
*14084		PIEROGI W CHEESE (DUMPLING, BOILED)	
		PC 1 PIECE	23.76 GM
		SI 1 SQUARE INCH	7.76 GM
CR		PIGS IN A BLANKET	
		CODE AS 1 LK APPROPRIATE FRANKFURTER PLUS 9.09 SI PIE CRUST (57067 APF) OR 1 SM BISCUIT (54015 APF) OR ACCORDING TO PARTICIPANT'S DECRIPTION	
14571		PIZZA ROLLS, ALL VARIETIES; E.G. JENO'S	
		PC 1 PIZZA ROLL	14.00 GM
		SI 1 SQUARE INCH	5.64 GM
*38780		PIZZA, CHEESE, THIN CRUST OR FRENCH BREAD, FROZEN; DISREGARD THICKNESS	
		SM 1 SMALL PIZZA (9" DIAM)	311.85 GM
		*MD 1 MEDIUM PIZZA (12" DIAM)	567.00 GM
		FR 1 FRENCH BREAD PIZZA	175.00 GM
		SL 1 SLICE	70.88 GM
		SI 1 SQUARE INCH	5.01 GM
		MOD 1 PIZZA MODEL	96.40 GM
*15470		PIZZA, CHEESE AND MEAT, THIN CRUST OR FRENCH BREAD, FROZEN; DISREGARD THICKNESS	
		SM 1 SMALL PIZZA (9" DIAM)	368.55 GM
		*MD 1 MEDIUM PIZZA (12" DIAM)	623.70 GM
		FR 1 FRENCH BREAD PIZZA	159.00 GM
		SL 1 SLICE	77.96 GM
		SI 1 SQUARE INCH	5.51 GM
		MOD 1 PIZZA MODEL	106.03 GM

CODE	ITEM	WEIGHT
84137	APPLE, BAKED W SUGAR, UNPARED	
	CP	190.00 GM
	SM 1 SMALL	122.58 GM
	*MD 1 MEDIUM	152.34 GM
	LG 1 LARGE	221.16 GM
*82065	APPLE, BAKED W/O SUGAR, UNPARED	
	CP	187.00 GM
	SM 1 SMALL	98.58 GM
	*MD 1 MEDIUM	128.34 GM
	LG 1 LARGE	197.16 GM
83014	APPLE, DRIED, UNCKD	
	CP	86.00 GM
	RG 1 RING	6.40 GM
*81018	APPLE, FRESH W SKIN	
	SM 1 SMALL	106.00 GM
	*MD 1 MEDIUM	138.00 GM
	LG 1 LARGE	212.00 GM
81349	APPLE, FRESH, W/O SKIN	
	SM 1 SMALL	98.58 GM
	*MD 1 MEDIUM	128.00 GM
	LG 1 LARGE	197.16 GM
83560	APPLE CHIPS	
	CP	92.00 GM
84202	APPLE, SPICE OR PICKLED	
	RG 1 APPLE RING	24.05 GM
*84012	APPLESAUCE, SWT	
	CP	255.00 GM
82057	APPLESAUCE. UNSWT	
	CP	244.00 GM
84020	APRICOTS, CND, SWT	
	CP	258.00 GM
	PC 1 HALF W LIQUID	28.33 GM
	WHO 1 WHOLE W LIQUID	53.00 GM
83519	APRICOTS, DRIED, CKD, UNSWT	
	CP	250.00 GM

CODE	ITEM	WEIGHT
25015	EGG, WHOLE	
	SM 1 SMALL	37.00 GM
	MD 1 MEDIUM	44.00 GM
	*LG 1 LARGE	50.00 GM
	XL 1 EXTRA LARGE	57.00 GM
	JM 1 JUMBO	64.00 GM
	SL 1 SLICE (HARD BOILED)	5.00 GM
26013	EGG WHITE	
	SM 1 SMALL	25.00 GM
	MD 1 MEDIUM	29.00 GM
	*LG 1 LARGE	33.00 GM
	XL 1 EXTRA LARGE	38.00 GM
	JM 1 JUMBO	43.00 GM
25023	EGG YOLK	
	SM 1 SMALL	12.00 GM
	MD 1 MEDIUM	15.00 GM
	*LG 1 LARGE	17.00 GM
	XL 1 EXTRA LARGE	19.00 GM
	JM 1 JUMBO	21.00 GM

MATH FORMULAE

Key

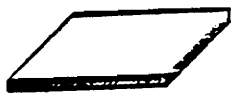
$\pi = 3.1416$	H = height or thickness
R = radius = ½ diameter	L = length
D = diameter	W = width

I. Two dimensional: square inches = SI = surface area

A. Circle $SI = \pi R^2$

Example: tortilla (6" diameter)
$SI = 3.1416 \times (3)^2$
$SI = 28.27$

B. Rectangle, Square $SI = L \times W$



Example: brownie (2" long, 1" wide)
$SI = 2 \times 1$
$SI = 2$

C. Triangle $SI = \frac{1}{2}$ base x H

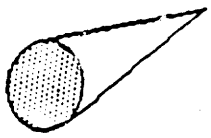
Example: cookie (2" base, 2" height)
$SI = \frac{1}{2} (2) \times 2$
$SI = 2$

D. Wedge $SI = \frac{\text{Width of rounded edge}}{2}$

Example: pizza (12" diameter, 3" width of rounded edge)
$SI = \frac{3" \times 6"}{2}$
$SI = 9$

II. Three dimensional: cubic inches = CI = volume

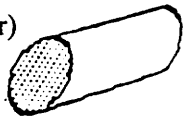
A. Cone $CI = \frac{1}{3} \pi R^2 H$



Example: croquette (2" diameter, 3" height)
$CI = \frac{1}{3} \times 3.1416 \times (1)^2 \times 3$
$CI = 3.14$

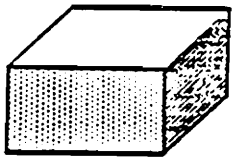
B. Cylinder $CI = \pi R^2 H$

Example: Italian Sausage (6" long, ¾" diameter)
$CI = 3.1416 \times (0.375)^2 \times 6$
$CI = 2.65$



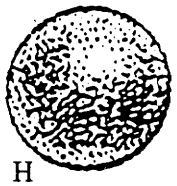
C. Rectangle, Square $CI = L \times W \times H$

Example: cake (2" long, 3" wide, 3" thick)
$CI = 2 \times 3 \times 3$
$CI = 18$



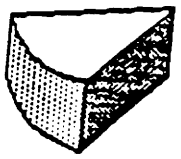
D. Sphere $CI = 1/6 \pi D^3 = 0.5236 D^3$

Example: apple (4" diameter)
$CI = 0.5236 \times (4)^3$
$CI = 33.51$



E. Wedge $CI = \frac{\text{width of rounded edge} \times R}{2} \times H$

Example: cake (3" rounded edge, 8" diameter, 2" thick)
$CI = \frac{(3 \times 4)}{2} \times 2$
$CI = 12$



NUTRITION CODING CENTER
CODEBOOK EDITION 11
FATS, OILS, NUTS
ANIMAL FAT

CODE	ITEM	WEIGHT
47019	BACON FAT	
	CODEWORD: BACN	
	TS	4.27 GM
47027	BEEF FAT	
	CODEWORD: BEEF	
	TS	4.27 GM
47035	BUTTER, SALTED	
	CODEWORD: BUTR	
	TS	4.73 GM
	STK 1 STICK (0.5 CP)	113.52 GM
	PAT 1 PAT	4.73 GM
47118	BUTTER, UNSALTED	
	CODEWORD: BUTU	
	TS	4.73 GM
	STK 1 STICK (0.5 CP)	113.52 GM
	PAT 1 PAT	4.73 GM
47076	BUTTER, WHIPPED	
	CODEWORD: BUWH	
	TS	3.00 GM
	STK 1 STICK (0.5 CP)	72.00 GM
	PAT 1 PAT	3.00 GM
47126	BUTTER, WHIPPED, UNSALTED	
	CODEWORD: BUWU	
	TS	3.00 GM
	STK 1 STICK (0.5 CP)	72.00 GM
	PAT 1 PAT	3.00 GM
47043	CHICKEN FAT	
	CODEWORD: CHIX	
	TS	4.27 GM
47084	DAIRY SPREAD (CANADA)	
	CODEWORD: DAIR	
	TS	5.30 GM
47100	DUCK FAT	
	(USE FOR ALL WILD FOWL)	
	CODEWORD: DUCK	
	TS	4.27 GM
47100	GOOSE FAT	
	CODEWORD: DUCK	
	TS	4.27 GM

NUTRITION CODING CENTER
CODEBOOK EDITION 11
BRAND NAME OILS

BRAND NAME	CODE	FAT CODE	P/S RATIO
JEWEL CORN OIL	40303	CORN	3.0-4.5
JEWEL OIL (INSTITUTIONAL)	40311	COTN	1.9
JEWEL T VEGETABLE OIL	41327	HSOY	3.0-4.5
KEY FOOD	41327	HSOY	2.0-3.5
KOHL'S	40303	CORN	3.0-4.5
KRAFT CORN OIL	40303	CORN	3.0-4.5
KRAFT PURE SAFFLOWER OIL	40337	SAFF	7.0-10.0
KRAFT PURE VEGETABLE OIL	41301	SOCO	2.5-3.5
KROGER VEGETABLE OIL	41327	HSOY	2.0-3.5
KROGER CORN OIL	40303	CORN	3.0-4.5
LADY LEE	41327	HSOY	2.0-3.5
LADY LEE CORN OIL	40303	CORN	3.0-4.5
LOU ANA CORN	40303	CORN	4.4
LOU ANA PEANUT OIL	42317	PNUT	1.9
LOU ANA VEGETABLE OIL	40311	COTN	2.1
MARINA VEGETABLE OIL	40303	CORN	3.0-4.5
MAZOLA CORN OIL	40303	CORN	3.0-4.5
MINI MAX SALAD OIL	41327	HSOY	2.0-3.5
MIXO VEGETABLE OIL	41327	HSOY	2.0-3.5
MORTON'S VEGETABLE OIL	41327	HSOY	2.0-3.5
MRS. TUCKER'S CORN OIL	40303	CORN	3.0-4.5
MRS. TUCKER'S SOY SALAD OIL	41327	HSOY	2.0-3.5
MY-TE-FINE	41327	HSOY	2.0-3.5
MY-TE-FINE CORN OIL	40303	CORN	3.0-4.5
NIFDA SALAD OIL, BLUE LABEL	41327	HSOY	2.0-3.5
NIFDA SALAD OIL, GREEN LABEL	40329	SOYA	3.5-4.5
NIFDA SALAD OIL, YELLOW LABEL	40311	COTN	1.9-2.4
NU MADE CORN OIL	40303	CORN	3.0-4.5
NU MADE SAFFLOWER OIL	40337	SAFF	4.5-6.0
NU MADE SOY-COTTONSEED OIL	41301	SOCO	2.5-3.5
NU MADE VEGETABLE OIL	41327	HSOY	2.0-3.5
ORVILLE REDENBACHER POPCORN OIL	40394	SBBC	2.0-3.5
PARADE VEGETABLE	41327	HSOY	2.0-3.5
PATHMARK VEGETABLE OIL	41327	HSOY	2.0-3.5
PERFECTO PURE VEGETABLE OIL	40329	SOYA	4.7
PLANTER'S PEANUT OIL	42317	PNUT	2.0
PLANTER'S POPCORN OIL	42137	PNUT	2.0
PLUS OIL	41327	HSOY	2.0-3.5
POPE	41376	BLOL	2.8
PURITAN	42325	CANB	5.3
PURITY SUPREME VEGETABLE OIL	41327	HSOY	2.0-3.5
RAMAZA (COMMERCIAL)	42309	OLIV	0.6
RED AND WHITE OIL	41327	HSOY	2.0-3.5

COMPUTERIZED FOOD PREPARATION CODES

FOR RECIPES WITH VARIABLE PRINCIPAL FAT SOURCES:

APF = "ADD PRINCIPAL FAT"--COMPUTER WILLADD STANDARDIZED AMOUNT OF DESIGNATED FAT TO RECIPES OR COMMERCIAL ITEMS DESIGNATED AS APR IN THE CODEBOOK

NAP = FOR USE ON APF ENTRIES WHEN FAT IS NOT ADDED TO APF ENTRIES

FOR MEAT, FISH, POULTRY, ORGAN MEAT, GAME:

PAN FRIED (OR GRILLED) WITH FAT AND/OR SALT:

PSN = PAN FRIED W FAT AND SALT

PAN = PAN FRIED W FAT W/O SALT

PSG = PAN FRIED GROUND MEAT W FAT AND SALT

PSR = PAN FRIED POULTRY W SKIN REMOVED BEFORE EATING; W SALT, FAT DISREGARDED

PAN FRIED (OR GRILLED), BROILED OR BAKED WITHOUT FAT, WITH SALT:

PSR = PAN FRIED POULTRY W SKIN REMOVED BEFORE EATING; W SALT; FAT DISREGARDED

STM = PAN FRIED W SALT W/O FAT

STG = PAN FRIED GROUN MEAT W SALT W/O FAT

BREADED AND FRIED*, BREADED AND BAKED*, OR BATTER-FRIED AND THE WEIGHT OR VOLUME DOCUMENTED

IS WITH BREADING OR BATTER. THIS INCLUDES COMMERCIAL ITEMS (WEIGHT INCLUDES BREADING OR BATTER) OR WHEN IT IS NOT SPECIFIED THAT THE WEIGHT DOCUMENTED IS WEIGH WTTH BREADING OR BATTER:

BAS = BATTER-FRIED W FAT AND SALT

BAT = BATTER-FRIED W FAT AND UNSALTED BATTER MIX

BSF = BREADED AND FRIED (OR BAKED) W FAT AND SALT

BDF = BREADED AND FRIED (OR BAKED) W FAT AND UNSALTED COATING MIX

BRS = BREADED AND FRIED (OR BAKED) W BREADING (INCLUDING SKIN ON CHICKEN) REMOVED BEFORE EATING

BREADED AND FRIED*, BREADED AND BAKED* OR BATTER-FRIED AND THE WEIGHT OR VOLUME DOCUMENTED IS WITHOUT BREADING OR BATTER. THIS INCLUDES CHICKEN BREASTS, DRUMSTICKS, THIGHS, WINGS, SHRIMP, CLAMS, SCALLOPS, ETC. WHICH ARE A STANDARD SIZE; MEAT WHEN WEIGHT COMES FROM MODEL WEIGHT (WHICH IS WITHOUT BREADING OR BATTER) AND WHEN IT IS SPECIFIED THAT THE WEIGHT DOCUMENTED IS WEIGHT WITHOUT BREADING OR BATTER:

BFS = BATTER-FRIED W FAT AND SALT

BRO = BATTER-FRIED W FAT AND UNSALTED BATTER MIX

FFS = BREADED AND FRIED (OR BAKED) W FAT AND SALT

FFO = BREADED AND FRIED (OR BAKED) W FAT AND UNSALTED COATING MIX

OOS = BREADED AND FRIED (OR BAKED) W BREADING (INCLUDING SKIN ON CHICKEN) REMOVED BEFORE EATING; W SALT, FAT DISREGARDED

BREADED AND PAN FRIED*, HOME PREPARED (DOES NOT INCLUDE COMMERCIAL COATING, COMMERCIAL FROZEN PRODUCTS OR RESTAURANT FOODS) WITH FAT AND/OR SALT

PFS = BREADED AND PAN FRIED W FAT AND SALT

PFN = BREADED AND PAN FRIED W FAT W/O SALT

PFB = BREADED AND PAN FRIED W BREADING (INCLUDING SKIN ON CHICKEN) REMOVED BEFORE EATING; W SALT, FAT DISREGARDED

BREADED AND BAKED* WITHOUT ADDED FAT. THIS IS FOR MEAT, ORGAN MEAT OR GAME <15% FAT, FISH OR POULTRY WITHOUT SKIN. (REFER TO P. 36 OF CODEBOOK FOR MEAT ≥ 15% FAT OR POULTRY W SKIN):

BSB = BREADED AND BAKED W SALT W/O FAT

BAB = BREADED AND BAKED W/O SALT AND FAT

BROILED (OR GRILLED) AND BASTED OR BRAISED:

BSS = BASTED OR BRAISED W FAT AND SALT

BST = BASTED OR BRAISED W FAT W/O SALT

MARINATED IN A NON-SOY SAUCE MIXTURE:

MRS = MARINATED W SALT, FAT DISREGARDED

MARINATED IN A SOY SAUCE, TAMARI SAUCE OR TERIYAKI SAUCE MIXTURE

MAS = MARINATED IN A SOY SAUCE, TAMARI SAUCE, OR TERIYAKI SAUCE MIXTURE

SELF-BASTING TURKEY:

SBT = ADDS SALT TO TURKEY WHICH IS COMMERCIALLY PRE-BASTED

FOR VEGETABLES, CEREAL, PASTA, RICE:

SEASONED, BOILED IN SALTED WATER, STIR FRIED OR MARINATED. (NOTE--CEREAL, RICE, AND PASTA HAVE ENTRIES FOR SALTED OR UNSALTED IN PREPARATION, THEREFORE SES SHOULD ONLY BE USED FOR THESE ITEMS):

SSS = COOKED VEGETABLES W FAT AND SALT

SES = COOKED VEGETABLES, CEREALS, RICE OR PASTA W FAT W/O SALT

SSO = COOKED VEGETABLES W SALT W/O FAT

FOR EGGS:

FRIED OR POACHED:

ESF = FRIED OR POACHED W FAT AND SALT

ESF = FRIED OR POACHED W FAT W/O SALT

EGF = FRIED OR POACHED W SALT W/O FAT

*BREADED AND FRIED OR BREADED AND BAKED = COATED WITH CRUMBS OR FLOUR BEFORE COOKING

CERTIFICATION PROCEDURES FOR DIETARY INTERVIEWING

Phase I--Review Pretraining Manual and complete exercise.

Phase II--Attend a NGHS sponsored Dietary Interviewer Training Session.

Phase III

1. Transcribe six Standard Menus onto Dietary Intake Forms (separate form for each day).
2. Enter all food codes, amounts, and prep codes in appropriate location on the Dietary Intake Forms.
3. Review the forms for complete and appropriate documentation and coding. Send the originals to the NGHS Dietary Master Trainer for evaluation no later than three weeks after completion of Phase II. Retain a copy for your records. Put your name on each page sent to the Master Trainer.
4. The six standard menus will be checked against corresponding masters. Any discrepancy will be evaluated as either:
   a. acceptable coding given the information on the Standard Menus and the current Codebook, or
   b. unacceptable

Interviewers submitting Standard Menus with nine or fewer errors have done satisfactory work and will proceed to Phase IV. Interviewers submitting Standard Menus with ten or more errors will be notified of areas that need special attention and will be asked to recode the specific Standard Menus containing significant errors. Recoded menus should be sent to the Master Trainer as indicated in item 3 above. If these recoded menus are deemed satisfactory the interviewer will proceed to Phase IV. If not, additional training or recoding may be requested.

Phase IV

1. Conduct the equivalent of five three-day dietary interviews on study-similar subjects using a dietary intake form. Complete the header questions on each form.
2. After reviewing the originals for complete and appropriate documentation, code ten days of these interviews. Be sure to record the FOOD CODE, AMOUNT FOOD UNIT, PREP CODE, SALT CODE, AND FAT CODE in the appropriate columns.
3. Review the coding and send the original forms to the Dietary Master Trainer for evaluation within four weeks of completing Phase III. Retain a copy for your records.

The original forms will be reviewed by the Dietary Master Trainer, with discrepencies tallied and evaluated. Satisfactory work will be determined by a subjective and objective evaluation of the following items:

1. quality of the forms (neatness, legibility, completeness)
2. percent of the lines with documentation shortcomings (as a general rule, 3% or less is satisfactory)
3. experience gained as evidenced by the variety of intakes of food items recorded on the recalls
4. kinds and repetitions of errors
5. percent of lines with coding errors (as a general rule, 6% or less is satisfactory)
6. percent or errors on study-specific header information

Those who have submitted forms deemed satisfactory will be notified of certification completion by the Master Trainer and the forms will be returned to the interviewer for review. Those interviewers whose forms are deemed unsatisfactory will be asked to submit five additional intake forms according to the instructions originally given for the first ten forms. If these second forms are deemed satisfactory, notification of certification will be sent. If the forms are again deemed unsatisfactory, the Master Trainer will recommend additional work or retraining.

Recertification Procedures for Inactive Interviewers:

1. Certified interviewers who are inactive for up to 6 months will be required to submit five intake forms for evaluation and recertification.
2. Certified interviewers who are inactive for 6 to 12 months or who change studies will be required to submit 10 intake forms for evaluation or recertification.

THE SIX STANDARD MENUS

STANDARD MENU I

Time	Place	Food and Beverages	Amount	Description
7:00 am	Home	Coffee, Instant	6-8 oz	Decaf.
		Orange Drink	½ cp	Hi-C canned
		Cinnamon Toast	2 slices	White bread with soft corn oil marg., sprinkled with cinnamon & sugar--amts. of marg., cinnamon & sugar unknown
		Raisin Bran	⅓ cp	
		Bran, unprocessed	1 TB	
		Milk	⅓ cp	Skim
		Coffee, brewed	8 oz.	Regular
10:15 am	Vending machine	Coke	6 oz	No Ice
	From home	Apricots	2	Dried, whole
12:20 pm	Inexpensive Cafeteria	Spaghetti w/ Meatballs		
		Spaghetti (pasta)	1 cp	No meat in sauce; Each meatball 1 ½ " diam, ingredients unkn, unkn if fat in preparation
		Italian Sauce	amt unkn	
		Meatballs	3	
		French Bread	1 sl	Approx. 4" x 3" x 1" thick
		Margarine	1 ts	Corn oil, stick
		Milk	8 oz	Skim milk
		Apple Pie	1 miniature	Double crust, 4" diam, conventional pastry, unkn if fat added to filling
3:30 pm	vending machine	Iced tea	10 oz	Presweetened w sugar, w ice
6:45 pm	Home	Broiled chicken		Marinated and basted w oil & seasoning mixture,
		Drumstick	1	unkn oil used, 1 avg, ate skin
		Breast	1	1 avg, ate skin
		French fried potatoes	½ cp	comm'l, frozen, heated in oven, brand unkn
		Peas & mushrooms	½ cp	cooked from frozen, soft
		Margarine	2 ts	corn oil margarine
		Dinner Roll	1	average size pan roll, white
		Margarine	1 ts	Soft corn oil marg.
		Catsup for Fries	1 tb	
		Ice Cream	½ cp	Butter Brickle, % fat unkn
		Coffee	2 cp	8 oz each, decaf
8:30 pm	Home	Milk	1 cp	8 oz, whole milk
		Chocolate chip cookies	2, 2" D	Homemade from scratch w unkn stick marg

STANDARD MENU II

Time	Place	Food and Beverages	Amount	Description
7:30 am	Home	Instant Breakfast	8 oz	Made with 1 pkt egg nog flavor and 8 oz 2% milk
9:45 am	At work	Muffin, Bran w raisins	1	Homemade (scratch), fat unkn, 3" diam x 2½" high
		Coffee	6 oz	6 oz regular, unkn amt dispensed from machine for both sugar & "cream"
		Sugar and "cream"		"Cream" unkn if liquid or powder
11:30 am	Cafeteria at work	Chicken noodle soup	1 cp	canned, 8 oz diluted
		Saltines	4 squares	
		Bacon/lettuce/tomato Sandwich:		
		Bacon	3 strips	
		Lettuce	2 leaves	large leaves
		Tomato	3 slices	2" D x ¼ " thick
		Toast	2 slices	white bread, "prebuttered" & w mayonnaise
		Fruit Gelatin Salad	½ cp	
		Whipped topping	1 TB	
7:00 pm	Home	Scotch and water	2 drinks	Each had 1½ oz Scotch
		Triscuit crackers	6	
7:45 pm	Home	Pork chops	2	Center cut, baked, trimmed, each chop 5 oz w bone
		Hash brown potatoes	¾ cp	Fried in olive oil
		Creamed mixed vegetables	½ cp	Cream sauce made with whole milk and butter
		Coleslaw	½ cp	With mayo-type dressing, all cabbage

STANDARD MENU III

Time	Place	Food and Beverages	Amount	Description
7:30 am	Medium Priced Restaurant	Sweetened grapefruit sections	½ cp	
		Eggs	2	Scrambled with whole milk, in unknown fat
		Sweet roll (round)w/jelly filling & confectioners frosting	1	3" D x¾ " H
10:15 am	Vending machine	Hot cocoa	6 oz	with whipped topping, unknown fat source
12:30 pm	Home	Chicken macaroni salad	½ cp	with Miracle Whip Salad Dressing, w/o egg, white meat w/o skin
		Cream of tomato soup	1 bowl	6 oz bowl; canned, made w whole milk
		Oyster crackers	10	Sunshine brand
		Chocolate ice cream	3 scoops	% fat unknow; each scoop = ¼ cp
		Coffee, brewed	2 mugs	8 oz/ mug; regular
6:30 pm	Home of Friend	Popcorn	½ cp popped	Popped at friend's home in unkn fat; with butter added
		Pretzels	20 sticks	
		Gimlet	2 drinks	4 oz each drink, with ice
		Filberts	4	2 nuts per drink
9:00 pm	Expensive Oriental Restaurant	Egg rolls	2	Each 4" x 1¾" diameter, kind of fat unknown
		Mustard	2 ts	
		Sweet & Sour Sauce	2 tb	unknown if fat in sauce
		Sweet & Sour Chicken	1 cp total	White meat, no skin, kind of cooking fat unknown
		Chicken chunks, breaded and fried	½ cp	unknown if fat in sauce
		Sweet & sour sauce	about ¼ cp	Kind unknown, unknown if fat added
		Assorted Chinese vegetables	about ¼ cp	Plain
		Rice, cooked white	½ cp	4 oz per cup, regular
		Tea, hot	2 cups	

STANDARD MENU IV

Time	Place	Food and Beverages	Amount	Description
7:00 am	Home	Grapefruit juice	6 oz	Unkn if swe or unsw
		Omelet:		Omelet fried in teflon pan w/o fat
		Egg Beaters	½ cp	
		Chopped green pepper	1 tb	
		Chopped onion	1 tb	
		Toaster Waffle	2	Each 4"square; frozen convenience
		Margarine	1 ts per waffle	Unknown kind
		Maple Syrup	¼ cp	Maple flavored
		Milk	8 oz	Reconstituted non-fat dry milk
		Coffee	2 cps	6 oz cups; reg., instant
		Sugar Twin	⅛ ts/cp	Artificial sweetener
11:00 am	At work	Fresh orange	1	2½ " diameter
		Vanilla wafers	4	Brand unknown
1:30 pm	Bag Lunch Carried from home	Sandwich:		
		Hamburger bun	1 bun	Average size
		Imitation cheese	1 slice	3" x 3" x ¼"
		Mayonnaise	2 ts	Real mayo, made w safflower oil
		Lettuce	1 leaf	
		Bologna, all beef	1 slice	Oscar Meyer Brand
		Cream of chicken soup	1 cp	8 oz reconstituted with skim milk
		Tossed green salad with Low Calorie Italian Dressing	1 bowl	1 cp; amount of dressing unknown
		Homemade chocolate cake: Made with ½ unkn stick margarine and ½ corn oil Frosted with white frosting	1 wedge	3" H x 4"R x 2" wedge (2" around the rounded edge) Cake & frosting made from scratch Boiled, 7-minuted frosting
		Tea	10 oz	Regular
6:30 pm	Home	Beef roast (Bottom Round)	2 slices	4" x 3" x ½" each; untrimmed
		Potatoes	2	Each ½ avg. cooked with roast
		Carrots, fresh	½ cp	From fresh, cooked with roast
		Gravy	3 tb	Made with roast drippings and flour, no milk
		Baking powder biscuit (homemade from scratch)	1	2½" diameter made with unknown shortening Unknown stick margarine
		Margarine	1 ts	4" x 3" x ¼" store bought
		Fruit Cake	1 slice	
		Sherry	3 oz	

STANDARD MENU V

Time	Place	Food and Beverages	Amount	Description
10:00 am	Home	Orange Juice	8 oz	Frozen, unsweetened
		French Toast	3 slices	Made w reg white bread, whole milk and egg, fried in unknown oil
		Unkn brand margarine	3 ts	1 ts per slice of French Toast, diet type
		Maple syrup	¼ cp	Real Maple Syrup
		Coffee, brewed	3 mugs	
3:30 pm	Home	Light beer	2 cans	12 oz each, low calorie
		Ritz type crackers	8	
		Old English cheese spread	8 ts	
7:30 pm	Home	Manhatten cocktails	2	Each cocktail 4 oz with ice
		Maraschino cherry	4	
		Spiced shrimp	8 med	Steamed with spices
8:30 pm	Home	Tenderloin of Beef, Broiled	1 piece	2½" diameter x 1" thick, partially trimmed
		Baked Tomatoes with Buttered Bread crumbs	2 halves	3" diameter, tomato w 1 tb crumbs per tomato half, real butter used
		Fresh cooked mushrooms	½ cp	Sliced, sauteed in butter
		Baked potato	1 avg	Skin eaten
		Butter	1 ts	
		Rhubarb Pied	1 piece	⅛ of 9" diameter pie, homemade (scratch), single crust, crust made with unknown shortening, rhubarb filling dotted with butter, sweet crumb topping made with butter

STANDARD MENU VI

Time	Place	Food and Beverages	Amount	Description
7:30 am	Home	Grapefruit Half	1	4½" diameter
		Bacon	2 slices	thick slices
		Eggs	2	Fried in unsalted, unkn brand sticke margarine
		Biscuits	2	Homemade from mix, each 2 " diameter
		Cherry Jam	2 tb	Regular
		Hot Tea	2 cp	Each cup = 6 oz, plain
12:00 N	Cafeteria at work	Sandwich:		Carried from home:
		Kaiser roll	1	4" diameter x 2" long
		Bologna	3 slice	Kind unkn; sliced very thin, 3 sl = 1 oz
		Beef Noodle Soup	1 cp	Cup = 6 oz, purchased at cafeteria
		Three Bean Salad	½ cp	Purchased at cafeteria, unkn kind of oil used
		Sprite	12 oz	Diet; one third amount was ice
7:00 pm	Seafood Restaurant Medium Priced	Bloody Mary Cocktail	6 oz	Ingredients unkn, no ice
		Fried Oysters, --Eastern Variety	8 med	Breaded and fried in unkn fat
		Tarter Sauce	1 tb	
		Cocktail Sauce	1 tb	
		Creamed Spinach	½ cp	Cooked from froz, Ingredients in sauce unknown
		Pickled Beets	½ cp	
		Red Table Wine	1 glass	4 oz
		Cheese Cake with Blueberry Topping and Graham Cracker Crust	1 piece	1/6 of 9" cake, 1½ " high, ingredients unknown in cake, topping and crust

APPENDIX C--Food Diary Instructions
NGHS VIDEO REMINDER RHYME

The Growth and Health Study
needs your support
to keep all records
so be a good sport.

It's time again
for us to review
those record keeping
instructions for you.

Meals, snacks, drinks,
activities, too.
Here is what we ask you to do:

The time, the place,
the amount yu eat,
well recorded
means you won't repeat.

One food per line
is best for us.
Two lines for a burger
makes a lot less fuss.
One line for meat,
one for the bun,
can make our time a lot more fun.

Write down for us
how food was made:
fried, baked, broiled
or microwaved.

If fat was used in cooking
or added to your food,
record the brand name
and we won't be rude.

Measure how long, wide
and high,
for foods like meat, pizza, and pie.

Let us know how much you ate,
or great confusion
will be our fate.

Stickers are new
one for each day,
They serve as reminders and
this is what they say:
Record vitamins, minerals by type and
brand,
Stick 'em in your diary
we'll give you a hand.

We also want to know
the times you move
and the times you sleep.
So mark your activities
to be complete.

Caltrac is
that magic machine
that follows your movements,
so please be keen.
On your side,
nice and snug,
give that belta little tug.

When you wake from nighttime dream,
write the number from your
magic machine.

Wear it to school,
wear it all day,
while watching TV or
out at play.

The magic machine
doesn't like water,
during bathing
and swimming
just don't bother.

Leave your numbers
on our phone,
one from morning
one from night.
Two numbers a day
means you
did it right.

NGHS 5
IN-PERSON DIARY AND CALTRAC INSTRUCTIONS

Materials

1. Instruction Card
2. Rap Rhyme Handouts
3. Girl's Bag Containing:
   - Diary notebook
   - Measuring cups and spoons
   - Ruler
   - 3 Vitamin/Mineral Supplement Stickers
   - Pen/Pencil Set
   - Watch
   - Caltrac
4. Extra Caltrac Pouches/Batteries

Set-up

1. The in-person instructions will usually be done one on one. However, at some split clinics there may more than one combo visit, in which case you will be instructing a small group.
2. Set-up an instruction area or office close to the phlebotomy station.
3. It will be your responsibility to have a snack ready for the girl when she finishes phlebotomy.

Introduction

Hello, my name is _____, welcome to the fifth year of the Growth and Health Study! This year we have a few new things for you to do. So, listen up while we review the diary and Caltrac instructions.

Reminder Rap Rhyme

1. Hand out the reminder rhyme.
2. Take turns reading the verses or have the girl read it to herself.

Food and Activity Diary

1. As the girl to take out her notebook and look to see which day she will be keeping her diary.
2. Ask the girl to turn to the next page--Keeping Your 3-Day Food Diary.
   a. Review points highlighted on your instruction page.
   b. Ask her to take the 3 vitamin/mineral stickers from her bag. Ask that she read the sticker and then place one sticker on the last page of each diary day.
3. Next, ask the girl to find the "Keeping Your 3-Day Activity Diary" page.
   a. Review each point briefly.
   b. Ask the girl if she has any questions about the food or activity diary.

Caltrac

1. Ask the girl to take her Caltrac out of the bag.
2. Have her try on the Caltrac, if she needs a larger belt, exchange the gray-belted pouch for a purple belted pouch.
3. Next, ask her to take the Caltrac Instruction Sheet out of the pouch.
4. Review the instructions; when to put it on, when to take it off, and what to do if there are problems.
5. Have the girl flip the sheet over. For each day, point out the boxes for the morning and bedtime reading, noting that this is different from Year 3 and Year 4.
6. Have the girl put the Caltrac sheet back in the pouch and put the pouch back in the bag.

Thank You

After you have completed your diary and returned your caltrac, you will receive a walkman radio like this one (show the walkman). Thanks for all your effort over the years. You're great.

Please carry your food and activity diary every place you go for these three days:

Day of week: _____. ____ Date: _____
Month Day Year

Day of week: _____ Date: _____
Month Day Year

Day of week: _____ Date: _____
Month Day Year

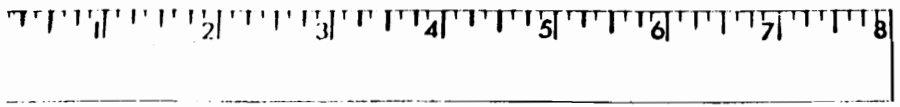
Name: _____ _____ _____.
First Middle Initial Last

THANK YOU!

KEEPING YOUR 3-DAY FOOD DIARY

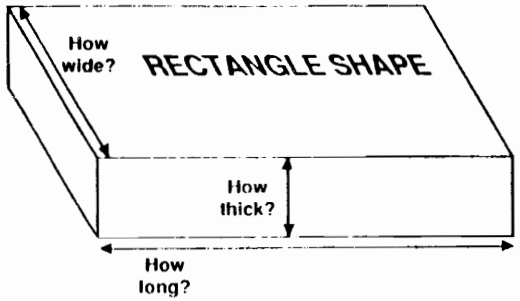
- Remember to write down what you eat and drink in your diary for three days. There are three pages for each day.
- Each time you start eating or drinking, write down the time.
- Write down the <u>place</u> where your food was made (home, friend's house, school, restaurant, etc.)
- Write only <u>one</u> food or drink on each line.
- <u>Describe</u> your food and drinks - give brand names and list ingredients in homemade dishes.
- <u>Describe</u> how your food was prepared (fried, baked, broiled, boiled, stewed, grilled, microwaved, etc.)
- <u>Measure</u> your food and drinks using your cups, spoons, and ruler whenever possible.
- Be sure to tell us how much you <u>actually</u> ate or drank, if you did not finish all of it.
- Write down any <u>snacks</u> you eat or drink.
- If you take a vitamin or mineral supplement, write it down.

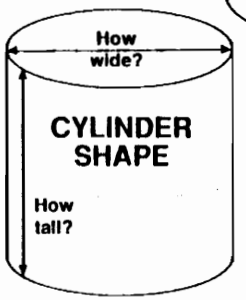
Use your ruler to measure your food.

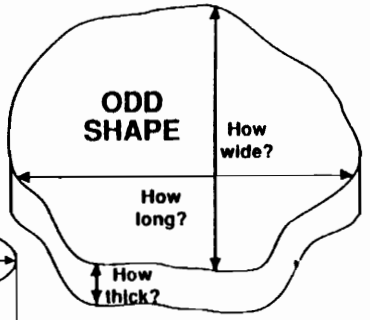


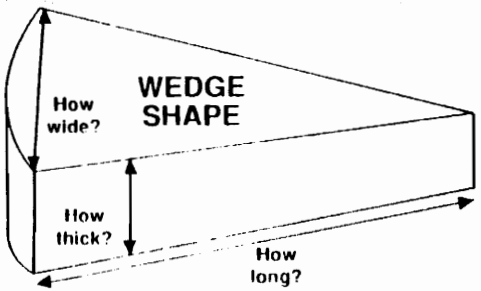
If your food is an odd shape draw a picture of it on the back of your diary page.

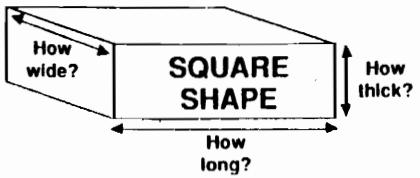
How long, how wide, how thick is it?

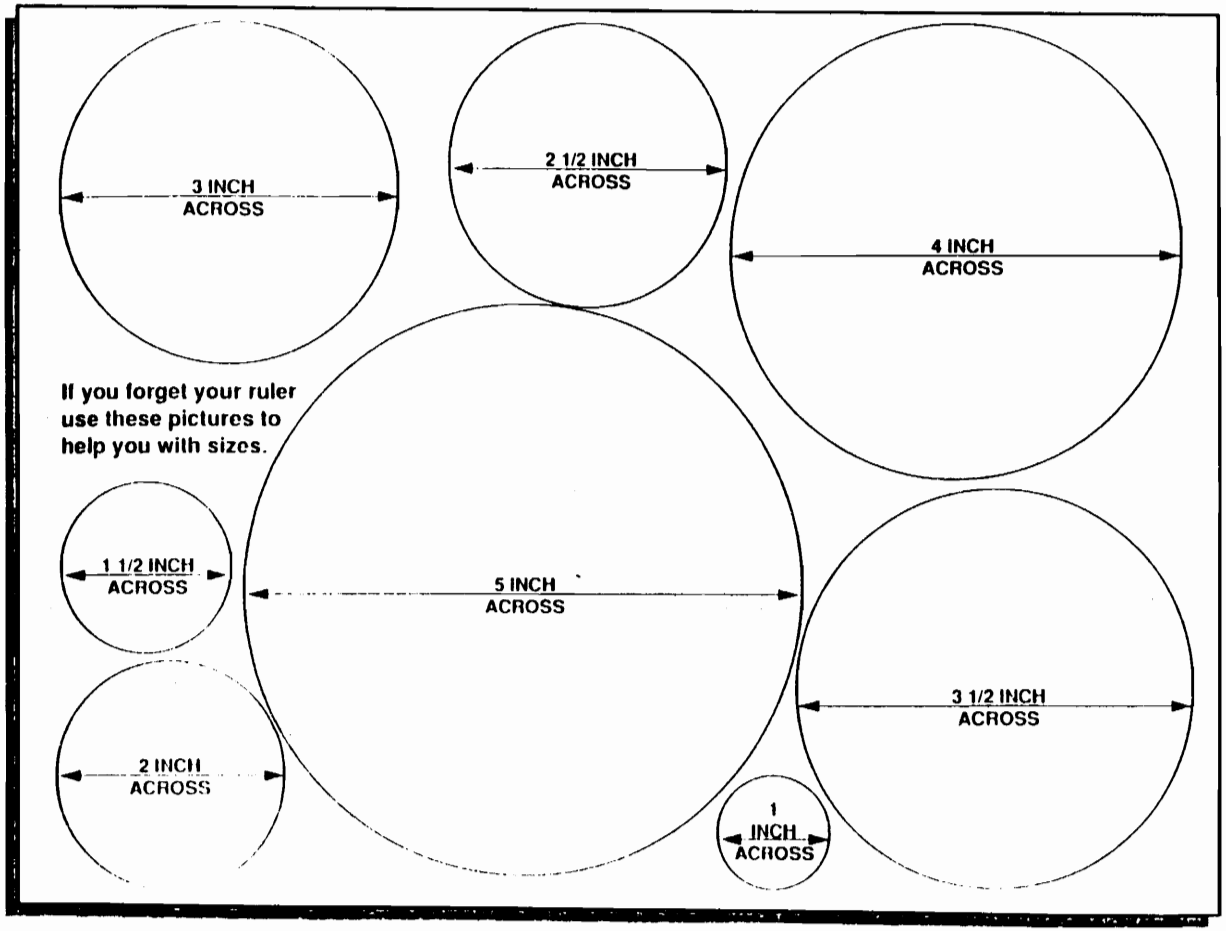











3 INCH
ACROSS
2 1/2 INCH
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4 INCH
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If you forget your ruler
use these pictures to
help you with sizes.
1 1/2 INCH
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5 INCH
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3 1/2 INCH
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2 INCH
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1
INCH
ACROSS

Please note: This NGHS Exhibit includes 3 pages of Day 1. The complete diary would include three sets of these three pages, labeled appropriately for each of the three days.

Page one

Name: First Middle Initial Last

Date: Month Day Year

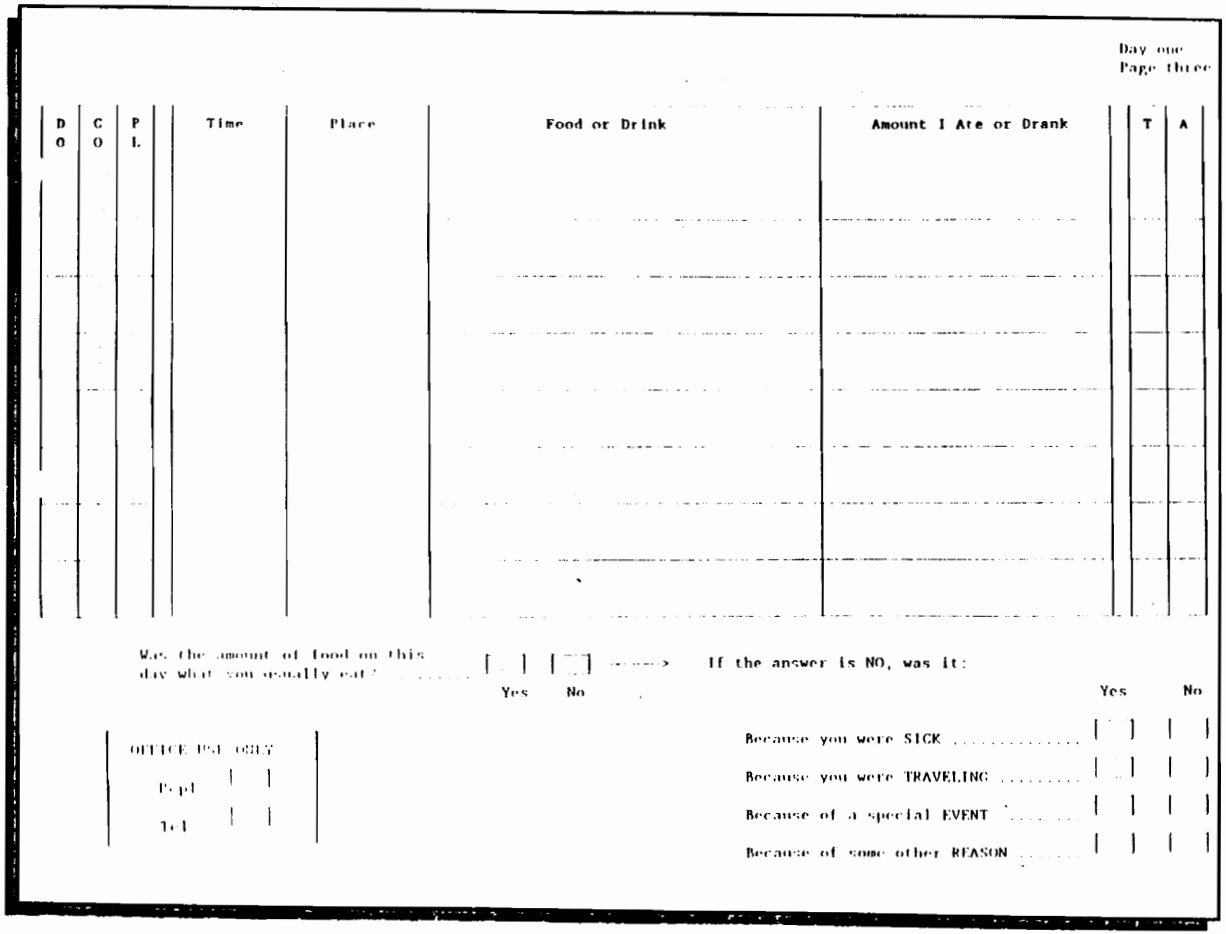
Three-Day Food Diary

Day of week: THURSDAY

Please do not write in this space

Please do not write in this space	Time	Place	Food or Drink	Amount I Ate or Drank	Please do not write in this space
D O O	C O L	P L			T A

DO	CO	PL	Time	Place	Food or Drink	Amount I Ate or Drank	T	A



Day one
Page three

D O	C O	P L	Time	Place	Food or Drink	Amount I Ate or Drank	T	A

Was the amount of food on this day what you usually eat? [ ] Yes [ ] No ----> If the answer is NO, was it:

	Yes	No
Because you were SICK	[ ]	[ ]
Because you were TRAVELING	[ ]	[ ]
Because of a special EVENT	[ ]	[ ]
Because of some other REASON	[ ]	[ ]

OFFICE USE ONLY

Pupl [ ]

Tot [ ]

APPENDIX E--Contents of Debriefing Kits and Debriefing Props

DIETARY DEBRIEFING KITS

Your debriefing kit should contain:

1. 1 set measuring cups and spoons
2. 5 glasses (with 2 fluid ounce markings)
   a. Juice size
   b. Short
   c. Medium
   d. Tall
   e. "Big Gulp" size
3. 5 bowls with graduated markings for volume measures
   a. Dessert size; ½ cup at mark
   b. Small; ½ cup, ¾ cup, and 1 cup markings
   c. Medium; ½ cup, 1 cup, and 1½ cup markings
   d. Large; 1 cup, 2 cup, and 3 cup markings
   e. Extra Large; 4 cup marking
4. styrofoam balls of varying, documented sizes
   a. 1-inch diameter
   b. 1¼-inch diameter
   c. 1½-inch diameter
   d. 2-inch diameter
   e. 2½-inch diamete
   f. 3-inch diameter
   g. 3½-inch diameter
   h. 4-inch diameter
   i. 5-inch diameter
5. 1 ruler
6. 1 diary notebook
7. 1 ring with study standardized shapes
8. 2 red pens
9. 2 pencils
10. 1 box binder clips
11. Diary Retrieval Forms
12. Postage Paid Mailing Envelopes (with Field Room noted for proper delivery)
13. Diary Coversheets
14. Dietary Interviewer Notebook

APPENDIX F--NGHS Dietary Interviewer Probing Guidelines

FOR THE DIETARY INTERVIEWER:

1. Check the appropriate default box whenever the girls is unable to provide the required information about type or amount. This includes those situations when :
   a. an item is not on the default list
   b. an item is on the default list
   c. an item is missing only a small piece of information; i.e. unknown % fat milk in macaroni and cheese recipe.
2. Be familiar with what to probe for and what not to probe for by memorizing as much as possible on the probing guidelines. **Do not probe too much or too little.**
3. Be sure to document those items specified as needing documentation.
   i.e., ribs--sauce or no sauce
   apple--skin or no skin
   hamburger/hot dog--with or without bun
4. Do not fill in type or amount information from the default list. The Reviewer is responsible for writing these in. **Simply check default as specified in # 1.** NOTE: The Dietary Interviewer should be able to turn the diary over to the Reviewer almost immediately after the interview is completed.

FOR THE REVIEWER:

1. Fill in the appropriate default when the type or amount default box has been checked.
   a. Record default information verbatim from default list.
   b. Record "NCC Coding Rule" when this appears in the default. DDEC will automatically supply the default information. **Do not enter the amount in this case.**
   c. For items not found on the default list; specify what is known and record in the Reviewer's Notebook on the appropriate page.
2. Check the default box and fill in the appropriate default for items where probing is not required by the Interviewer.
   i.e.; breakfast sausage--check default box for type and write in pork
3. Be familiar with items requiring documentation by the Interviewer. Check the default box and record default informaiton when documentation is missing.
   i.e.; hot dog--with or without bun
4. Other things to check while reviewing:
   a. The correct coding of place and occurrence.
   b. Be sure to check the coversheet for complete, accurate information.

PROBING GUIDELINES CONTENTS

BEVERAGES

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Beverage w/ice	--	--	--	N	--	25% ice
7-11 "Big Gulp"				Y	w/ or w/o ice	32 oz.
Carbonated Beverage	Y	Name/Type Reg. or diet Reg. or decaf.	Regular, Cola	Y	Amount w/ or w/o ice	8 oz.
Coffee	Y	Brewed or instant Regular or decaf. Additions (sweetner/ creamer)	Regular brewed	Y Y	Amount Amount of Additions	8 oz. NCC default
Cocoa	Y	Instant or with milk If milk - % fat	Instant	Y	Amount	6 oz. if regular cocoa or individual packet
Fruit drink	Y	Name/type Don't probe for sweetener	Sweetened with sugar	Y	Amount	8 oz.
Fruit Juice	Y	Type Don't probe for sweetened or unsweetened	Orange - unsweetened Cranberry/Grape - sweetened All other juice - unsweetened	Y	Amount	6 oz.
Fruit "punch"	Y	Name/Type Don't probe for sweetener	Code as fruit drink	Y	Amount	8 oz.
Fruit drink w/ice				Y	Only probe for amount of fruit drink, not amount of ice	8 oz. w/25% ice
Juice Box	Y	Name/type of beverage	Hi-C type drink	N Y	-- Portion of container drank	8.45 oz.
Slurpie (Slushie)	Y	Type/kind	Fruit flavored	Y	Size: S, M, L, XL S = 8 oz., M = 12 oz., L = 16 oz, XL = 24 oz.	Medium 12 oz.

BEVERAGES (continued)

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Tea (hot or iced)	Y	Brewed or instant Reg. or decaf. Sweetened, pre-sweetened or sugar free Other Additions (i.e., creamer)	Brewed, regular	Y Y	Amount Amount of Additions	8 oz. NCC default

CONDIMENTS

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Catsup/Mustard	Y	As additions to: sandwiches, burgers, hot dogs, french fries, meats, fish or poultry	–	Y	Amounts	Burger/sandwich, hot dogs - 1 TB Fries - 2 TB per 1/2 cup Meats, fish, poultry 1 ts/oz.
Sugar on rice or cereal	Y	Regular vs. substitute Type (granulated, brown sugar, or powdered)	Granulated	Y	Amount	1 TB/cup unsweetened cold cereal 2 TB/cup unsweetened hot cereal 1 ts per 1/2 cup rice

DAIRY

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Cheese (commercial slices or deli)	Y	Kind	Processed American	Y	Probe if pre-sliced Do not probe for dimensions, only probe for number of slices	.75 oz. (1 slice)
Cheese (sliced from chunk)	Y	Kind	Processed American (This is Velveeta type)	Y	Number of slices Size of pieces	1 oz. (1 pc.)
Cheese on salad	Y	Kind	Processed American	Y	Grated (amount) or stripe (number of strips)	1 TB grated/ cp salad .75 oz stripe/ cp salad
Egg	Y	Method of prep. Milk (%) if scrambled Fat in prep. (kind)	Scrambled Fat - unk. stick margarine	Y	Number of eggs or volume. Don't probe for size of egg	1 large
Ice cream	Y	Flavor, store brand vs. gourmet Don't probe for % fat Toppings	Vanilla, avg. fat	Y	Amount	1 cup
Ice cream, neopolitan	--	--	--	N	--	2/3 vanilla, 1/3 chocolate
Ice milk	Y	Flavor	Vanilla, avg. fat	Y	Amount	1 cup
Ice cream bar	Y	Flavor, coating	Chocolate covered	N	--	1 average bar
Milk	Y	% fat White vs. chocolate	2% white	Y	Amount	1 cup (for school and home)
Milk on cereal	--	--	--	Y	Amount	1/2 cup per 1 cup cereal
Milk, chocolate	Y	% fat	2% chocolate	Y	Amount	1 cup (for school and home)

DAIRY (continued)

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Milk shakes	Y	Flavor, homemade or commercial, gourmet or store brand ice cream	Vanilla ice milk fast food variety	Y	Amount	1.75 cup
Malt	Y	Flavor, homemade or commercial, gourmet or store brand ice cream.	Homemade, vanilla ice cream	Y	Amount	1.75 cup
Milk on cereal						
Yogurt	Y	Flavor & Brand, Regular, lowfat or no fat	1-2% fat, flavored	Y	Amount	8 oz.
Frozen Yogurt	Y	Flavor & Brand	1-2% fat, flavored	Y	Amount	1 cup

DESSERTS

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Cakes	Y	Kind (choc., white, carrot) Sheet or layer (# of layers) Commercial, mix or scratch If mix/scratch - ingredient fat, egg, pudding in mix	Chocolate cake sheet cake	Y	Dimensions Specify as sheet or layer (square or wedge)	3" x 3" x 1" sheet
w/frosting	Y	Kind (white, choc., etc.) Canned, mix or scratch	White, powdered sugar, canned, commercial	N	--	NCC default
Cheesecake	Y	Kind Commercial, mix or scratch If mix/scratch - ingredient fat for filling and crust plain or topping (fruit) crust (type)	Plain, regular with crust	Y	Dimensions	1/10 of 9"
Cookies	Y	Kind, brand Commercial, mix or scratch. If mix/scratch - ingredient fat	Commercial - chocolate chip Homemade - Chocolate chip, unknown stick margarine	Y	# of cookies diameter	1 - 2 ½" diam. (commercial) 1 - 3" diam. (homemade)
Custard	Y	Commercial, mix or scratch If commercial - regular or low-cal. If mix/scratch - % fat milk, with or without egg	Baked custard	Y	Amount	1/2 cup
Gelatin desserts	Y	Additions (fruit, etc.) Don't probe for sugar vs. nutrasweet	Plain (no additions or toppings) Sweetened w/sugar	Y	Amount	1/2 cup

DESSERTS (continued)

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Pies	Y	Kind (filling) Commercial, mix or scratch Graham vs. conventional If conventional - single vs. double crust If mix/scratch - ingredient fat for filling and crust	Fruit filling conventional pastry double crust commercial fat	Y	Dimensions	1/8 of 9"
Popsicle	--	--	--	Y	Single or double	single
Pudding	Y	Commercial, mix or scratch. If commercial - regular or low-cal. If mix/scratch - % fat milk	Mix, w/2% milk	Y	Amount	1/2 cup
Sorbet/Sherbet	Y	Flavor	Fruit flavored	Y	Amount	1 cup

FATS

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Butter	Y	Butter vs. margarine Don't probe for brand name		Y	Depends if: Bread Hot cereal Pancake Baked potato Noodles, fat added at table Rice, fat added at table Vegetables, fat added at table	 1 ts/sl 1 ts/cup 1 ts/cake 1 Tb 1 ts/cup (NCC CR) 1 ts/cup (NCC CR) 1 ts/cup (NCC CR)
	Y	Stick or tub	Stick, salted	N	Popcorn Vegetables, fat added in prep	2 ts/cup (NCC CR) 1 ts/cup (NCC CR)
Margarine	Y	Brand name Stick or tub Regular or diet	Stick, salted	Y/N	Same as butter	Same as butter
Mayo	Y	At home - type (mayo or salad dressing) Regular or lite	Mayo type dressing	Y	Probe for amount if participant made sandwich	1/2 TB / sl bread
	N	Away	Mayo type dressing	N	Don't probe for sandwich made away from home	1/2 TB / sl bread
Salad dressing	Y	Type of dressing Creamy or clear At home - probe for brand Regular or lite	1) Commercial - French 2) Unknown clear - Italian 3) Unknown creamy - Ranch	Y	Probe for amount of dressing if at home. Don't probe if away from home	1 TB/cup salad

FRUITS

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Fruit	Y	Type of fruit Eaten with or without skin	Raw apple w/peel fresh, uncooked unsweetened	Y	Dimensions or amount	1 medium or ½ cp
Canned fruit/fruit cocktail	Y	Type of fruit Don't probe for sweetened or unsweetened	Canned, sweetened w/sugar	Y	Amount	½ cp
Melon	Y	Type	Watermelon	Y	Number of wedges/slices or dimensions of slice Cups of chunks	½ cp or 1 slice/wedge

GRAIN PRODUCTS

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR	DEFAULT FROM DEFAULT LIST:
Biscuits	Y	Bakery, commercial, mix, or scratch	Baking powder commercial	Y	Dimensions	1 medium
Bread	Y	Type (French, Italian, Pumpernickel, white vs. whole wheat)	White	Y	Probe for size if other than standard	1 slice
Buns	Y	Type (hamburger, hot dog)	Hamburger bun	Y	Size	1 medium
Hamburger bun	–	–	–	Y	S, M or L or diameter Probe for number (1 med. = 3 1/2" diam.)	1 medium
Hot dog bun	–	–	–	Y	Probe for length only if non-standard	1 medium
Cereal	Y	Probe for brand	Sugar swt. cold cereal (e.g., Frosted Flakes)	Y	Amount	1 cup
			2% milk w/dry cereal	Y	Amount	1/2 cup (milk)
Cooked cereal	Y	Type Prep with water or milk (% fat) Additions at table	Cream of wheat, made with water	Y	Amount	1/2 cup
Cooked cereal, grits	Y	Prep with water or milk (% fat) Additions at table	Made with water	Y	Amount	1/2 cup
Corn bread	Y	Scratch, mix or commercial If scratch/mix - fat (kind)	Homemade w/unknown home fat	Y	Dimensions	1 piece
Croissant	Y	Bakery or commercial (dairycase)	Commercial	Y	S, M or L or dimensions (1 med. = 5-6" long)	1 medium
Crackers w/soup	Y	Kind, brand	Saltines	Y	# of crackers	5 crackers/cp soup
Crackers w/cheese	Y	Kind, brand	Saltines	Y	# of crackers	5 crackers w/cheese

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Snack crackers	Y	Kind, brand	Ritz	Y	# of crackers	8
Danish	Y	Bakery or commercial Frosted? Filling? (Type)	Commercial w/fruit w/frosting	Y	Dimensions Document shape	1 medium
Donuts	Y	Note: Probe for type of donut (powder, sugar, glazed, etc.) Do not probe for yeast or cake		Y	S, M or L or diameter Number of donuts (1 med. = 3 1/4" diam.)	1 medium
Donut			Cake, commercial, sugared			
Jelly donut			Yeast			
Powdered			Cake			
Chocolate covered			Cake			
Frosted			Cake			
Glazed			Yeast			
French toast	Y	Homemade or frozen If homemade - type of bread, type of fat, % milk fat If frozen - brand Any additions	Prepared w/egg White bread & margarine unk. stick NCC recipe	Y	Number of slices	1 slice
Granola	Y	Ingredient fat for homemade granola	Commercial w/coconut oil	Y	Amount	3/4 cup
Muffins	Y	Kind (bran, blueberry, etc.) Commercial, scratch or mix	Plain variety, commercial (e.g., blueberry)	Y	Dimensions	1 medium
Pancakes	Y	Mix, scratch, frozen If mix/scratch - % milk fat Ingredient fat Fat in prep Additions at table	Mix made with Crisco oil	Y	Number of cakes Diameter	1 medium
Pasta	Y	Type	Macaroni, white	Y	Amount	1 cup

GRAIN PRODUCTS (continued)

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Pasta salad	Y	Ingredients homemade, mix or deli	Oil/vinegar, meat free	Y	Amount	1 cup 3/4 cup pasta 1/4 cup vegetables 2 tsp unk. oil
Rice, plain	Y	Type of rice and additions at table. Do not probe for salt or fat in prep.	White	Y	Amount	1/2 cup
Rice, seasoned	Y	Brand or type of rice Do not probe for salt or fat in prep.	Seasoned	Y	Amount	1/2 cup
Rolls	Y	Type (white, whole wheat, rye) Probe for additions at table	White dinner roll	Y	Probe for number S, M or L or diameter (1 med. = 2 1/4 - 2 1/2" diam.)	1 medium
Sandwich roll	Y	Type (white, whole wheat, rye)	Hoagie	Y	Number of rolls S, M, L or dimensions	1 medium
Sweet roll	Y	Frosted or plain Bakery, commercial, mix or scratch	Yeast, frosted commercial	Y	Diameter Number of rolls	1 medium
Taco	N	(see mix dish for filling)	Taco shell tortilla	N	–	1 medium
Flour tortillas	N	(see mix dish for filling)	Tortilla plain flour	N	–	1 medium
Tortilla	N	–	Plain corn tortilla	N	–	1 medium

MEAT, POULTRY, FISH

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR	DEFAULT FROM DEFAULT LIST:
BEEF						
Ground beef patty (without bun)	N	–	Fried hamburger, ground beef, 27% fat	Y	Amount	2.8 oz. e.p. (= 1/4 lb. raw wt.)
Beef roast	Y	Trimmed or untrimmed Fat in prep. (kind)	Trimmed 10% fat	Y	Dimensions # of slices	2.5 oz. e.p.
Steak	Y	Kind, cut Trimmed or untrimmed Fat in prep. (kind)	Beef round, Trimmed	Y	Dimensions with or without bone	2.5 oz. e.p.
Steak-umm	Y	Fat in prep. (kind)	Beef	Y	# of steak-umms Don't probe for dimensions	1 pc. = 2 oz. e.p.
Meatloaf	N	–	Beef, 27% fat, egg and bread	Y	Dimensions # of pieces	1 pc. = 2.5 oz. e.p.
Meatballs	N	–	Beef, 27% fat, egg and bread	Y	Diameter # of meatballs	1" diameter 5 small = 2.5 oz e.p.
FISH						
Fish	Y	Kind Fresh, commercial, or canned (water or oil pack) Breaded or battered (commercial vs. homemade) Fat in prep. (kind)	Cod, breaded and fried, commercial fat	Y	Dimensions # of pieces Cooked or raw weight	2.5 oz.
Fish sticks	N	–	Commercial	Y	# of sticks Don't probe for dimensions	4 sticks

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
MISCELLANEOUS						
Hot dog	Y	Kind (beef, pork, chicken or turkey) Don't probe for prep. Document w/ or w/o bun (If w/bun see sandwiches)	Pork and beef	Y	# of hot dogs length if other than standard	1 average hot dog
Sausage sandwich	Y	Type Document w/ or w/o bun	Polish	Y	Dimensions # of links/pieces	1 link = 2.6 oz.
Cold cuts – luncheon or sandwich meats	Y	Type (bologna, ham, etc.) Commercial (brand) or deli	Bologna	Y	# of slices Don't probe for dimensions	1 slice = 1 oz.
Cold cuts – pressed, shaved	Y	Type (ham, turkey, etc.) Commercial (brand) or deli	"Carl Budding" ham	N	–	1 oz.
PORK						
Pork roast	Y	Trimmed or untrimmed Fat in prep. (kind)	Trimmed 14% fat	Y	Dimensions # of slices	2.5 oz. e.p.
Pork chops	Y	Trimmed or untrimmed Fat in prep. (kind)	Trimmed, 14% fat Pan fried in Crisco oil	Y	Dimensions # of pork chops with or without bone	2.0 oz. e.p.
Ham	Y	Trimmed or untrimmed Fat in prep. (kind)	Trimmed, 9% fat w/o bone	Y	Dimensions # of slices, with or without bone	2.5 oz. e.p.
Bacon	N	–	Regular (thin sliced)	Y	# of slices	2 slices
Sausage (breakfast type)	Y	Shape (link or patty) Don't probe for type of meat	Patty pork	Y	Dimensions - unless breakfast link or patty # of links/patties	1 breakfast link = 1 oz. 1 breakfast patty = 1 oz.
Ribs	N Y	Don't probe for type meat Sauce or no sauce (document) Trimmed or Untrimmed	Pork, untrimmed, BBQ	Y N	# of ribs Don't probe for amount of sauce	2.5 oz. total 1 TB BBQ sauce/ oz. meat

MEAT, POULTRY, FISH (continued)

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Scrapple	N	–	Pork type	Y	Dimensions # of slices	1 1/3 oz. slice
POULTRY						
Chicken	Y	Light or dark meat or name of part Prepared w/ or w/out skin Skin eat or not Breaded or battered and fried Fat in prep. (kind) W/ or w/out bone	Drumstick w/skin, breaded and fried commercial fat skin eaten	Y	Name of piece Don't probe for dimensions	1 pc. - 2 oz. or "avg" pc.
Sliced turkey or chicken (from bird)	Y	White or dark meat W/ or w/out skin	White meat Without skin	Y	Dimensions and # of slices	2.5 oz.

MIXED DISHES

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Burrito	Y	Filling type (meat, beans, cheese)	Bean and cheese	Y	Length	1 medium
Casserole	Y	Ingredients	27% fat beef, macaroni, tomato	Y	Total amount eaten Don't probe for amounts of ingredients	3/4 cup
Chinese fried rice	Y	Type (pork, chicken, beef, shrimp)	Pork	Y	Amount	1 cup
Chinese beef/pork dish	Y	Name of dish Ingredients?	Pepper steak (w/beef or pork)	Y	Amount	3/4 cup
Chinese chicken dish	Y	Name of dish Ingredients?	Chicken w/almonds	Y	Amount	3/4 cup
Chinese egg roll	N	–	–	N	–	1 medium
Macaroni and cheese	Y	Box vs. homemade % fat milk (document) Type fat (document)	Box w/ 2% milk unkn. stick marg.	Y	Amount	1 cup (NCC coding rule)
Stew	Y	Homemade or commercial, Ingredients	Beef, 20% fat, vegetables, commercial	Y	Total amount eaten Don't probe for amounts of ingredients	3/4 cup
Taco	Y	Type (beef, chicken) Ingredients Additions	Beef	Y	Number of tacos Don't probe for amounts of ingredients	1 medium

PIZZA

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Pizza	Y	Thick or thin crust Toppings Mix, scratch, frozen or carry-out	Cheese, thin crust	Y	Pizza size and shape Number of slices (Document shape)	1 slice = 1/8 of 16"
Pan pizza	Y	Toppings Mix, scratch, frozen or carry-out	Cheese, thick crust	Y	Pizza size and shape Number of slices (Document shape)	1 slice = 1/8 of 12"

SOUP

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Soup	Y	Homemade, canned, pkg. Condensed or ready to eat Kind (beef vegetable) Brand	Chicken noodle, regular, canned, diluted with water	Y	Amount	1 cup
Chunky soup	Y	Homemade or canned, etc. Condensed or ready to eat Kind	Chunky chicken noodle	Y	Amount	1 cup
Cincinnati chili	Y	W/ or w/out beans	Chili w/out beans	Y	Amount	3/4 cup
Cincinnati two-way chili	Y	W/ or w/out beans Ingredients	Chili w/out beans Spaghetti Grated cheddar cheese	Y	Amounts	3/4 cup chili 1/2 cup spag. 2 oz. cheese
Stew	Y	Homemade or commercial Ingredients	Beef, 20% fat, Vegetables Commercial	Y	Total amount eaten Don't probe for amounts of ingredients	3/4 cup

SANDWICHES

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Cincinnati Cony	Y	W/ or w/out beans Ingredients	Hot dog & bun Chili w/out beans Cheddar cheese	Y	Probe for hot dog length if other than standard Amounts of cheese and beans	1 avg. hot dog 1 sm. hot dog bun 1/2 oz. cheddar cheese 2 TB chili w/o beans
Deli sandwich	Y	Kind (ingredients) Type bread/roll W/ or w/out dressing (type)	Ham & cheese Kaiser roll w/mayo type	N	Don't probe for amounts	1 sandwich: 2 oz. boiled ham 1 ½ oz. cheese 1 med. Kaiser roll 1 TB mayo
Grilled cheese	Y	If made by participant - Type bread Ingredients Fat in prep. (kind)	White bread Cheese - processed American Margarine, stick	Y	If made by participant - # of slices of cheese or dimensions if chunk Amount of fat	2 slices bread 3/4 oz. cheese 2 ts. fat
Hamburger, "fast food" (with bun)	Y	Additions	Fried hamburger, ground beef, 27% fat with bun	Y	Name of burger (i.e., regular, quarter pounder, double, etc.) Amount eaten	1 medium (McDonald's size)
Hamburger, homemade (with bun)	Y	Preparation W/ or w/out bun/ bread (document) Additions	Fried hamburger, ground beef, 27% fat with bun	Y	Diam. & thickness of patty Diam. of bun or # of slices of bread	2.8 oz. beef e.p. 1 med. hamb. bun
Homemade sandwich	Y	Kind (ingredients) Type bread/roll W/ or w/out dressing (type)	Bologna White bread w/mayo type	Y	Amounts of ingredients	1 sandwich: 1 oz. bologna 2 slices bread 1 TB mayo
Hot dog	Y	Kind (beef, pork, chicken or turkey) Document w/ or w/out bun Don't probe for prep.	Pork and beef w/bun	Y	# of hot dogs length if other than standard	1 avg. hot dog 1 med. hot dog bun

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Peanut butter & jelly sandwich	Y	Ingredients Type bread	PB & jelly White bread	Y	Amounts of ingredients if made by participant	1 sandwich: 2 Tb PB 1 Tb jelly 2 slices bread
"Salad" sandwich	Y	Type (chicken, tuna, egg, turkey) Fat if at home If tuna - water or oil pack	Tuna salad	N	--	1/3 cup (NCC coding rule)
Sloppy joe	Y	Kind (beef or pork) Homemade or commercial sauce Document w/ or w/out bun	27% fat ground beef w/bun	Y	Amount Diameter of bun	1/3 cup 1 med. bun

SAUCES, GRAVIES, SYRUPS, TOPPINGS

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
BBQ sauce	Y	Homemade vs. commercial	Commercial	N	–	1/2 TB/oz. meat (NCC coding rule)
Chocolate sauce	Y	Type - hot fudge vs. chocolate sundae	Hershey's type	N	–	2 TB per 1/2 cup ice cream
Gravy	Y	Homemade vs. commercial	Beef	Y	Amount	1/2 TB/oz. of meat 2 TB per 1/2 cup potatoes or rice
Syrup	Y	Regular or lite	Maple flavored	Y	Amount	2 TB/pancake/ waffle/Fr. toast
Taco sauce	N	–	Commercial	N	–	2 TB/sl. bread as dip: 2 TB/ cup chips on tacos: 1 TB/ taco
Whipped toppings	Y	As addition to: pudding, jello, desserts Don't probe for real vs. non-dairy	Cool Whip	Y	Amount	2 TB per 1/2 cup or 1 serving

SNACKS/CANDIES

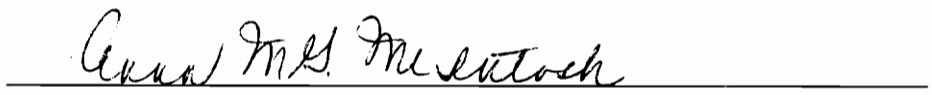
ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:
Candy	Y	Brand Type	M&M's	Y	Size (oz.) of bag	1.67 oz.
Candy bar	Y	Brand Type (chocolate, etc.)	Chocolate	Y	Size of bar (oz. or dimensions)	Reg. size = 2 oz.
Chips	Y	Type (potato, nacho, etc.)	Potato chips	Y	Size (oz.) of bag or # of chips	1 oz. bag
Popcorn	Y	Probe for cooking fat and added fat If microwave: brand and flavor	w/BCOM fat and unkn. stick marg.	Y	Amount of popcorn	3 cups
Pretzels	Y	Hard or soft Shape (twists vs. sticks)	Tiny twists	Y	Amount or # of pretzels	3/4 cup

VEGETABLES

ITEM	PROBE TYPE?	PROBE FOR:	DEFAULT FROM DEFAULT LIST:	PROBE AMOUNT?	PROBE FOR	DEFAULT FROM DEFAULT LIST:
Baked potato	Y	Skin or no skin	No skin	Y	Length and diameter	1 medium
Baked yam/sweet potato	Y	Additions in prep. Additions at table	Plain	Y	Volume or length and diameter	1 medium
French fries	Y	Frozen, homemade or place purchased Do not probe for steak fries vs. regular	Fast food type w/BCOM fat (AWAY) Commercial frozen (HOME)	Y	Size of order or # of fries (AWAY) Volume or number of fries (HOME)	1 regular order (away) 1/2 cup (home)
Hash browns or mashed potatoes	Y	Homemade or commercial	Homemade w/unkn. stick margarine	Y	Dimensions/frozen cups/homemade	1/2 cup
Salads	Y	Type of salad Additions at table	Lettuce salad	Y	Amount	3/4 cup
Tomato	Y	Fresh or canned	Fresh	Y N	Diameter if whole tomato Only probe for # of slices, not diameter	1 medium 1 medium slice on sandwich
Vegetables	Y	Type of vegetable Canned or fresh/frozen Additions in prep Additions at table Raw or cooked	Mixed vegetables Fresh or frozen, add margarine	Y	Amount	1/4 cup

VITA

Anna Gerdes McIntosh is a native-born Iowan. She is a graduate of Iowa State University in Ames, Iowa with a Bachelor's Degree in Foods and Nutrition with an emphasis in Dietetics. Ms. McIntosh served a Dietetic Internship at The New York Hospital-Cornell Medical Center. She has been a Registered Dietitian for 21 years. Since the completion of her internship she has worked professionally as the Research Dietitian at the Payne Whitney Psychiatric Clinic of The New York Hospital and a Consultant Dietitian to Long Term Care Facilities. Since 1987 she has worked on the NHLBI Growth and Health Study which is conducted in the Washington, D.C. area by Westat, Inc. of Rockville, MD. She currently serves as Clinic Coordinator for that study and as a Nutrition Consultant for several group homes for the developmentally delayed.



Anna M.G. McIntosh