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Title Page  
Master of Public Health Research Project

Association Between Parental Role-Modeling of Physical  
Activity and Child's Physical Activity: A Cross-Sectional Study of  
NSCH 2003 Data

by  
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## Abstract

Trends in childhood obesity have led to a generation that has a shortened lifespan, where excessive weight may decrease life expectancy by as much as five years. Physical inactivity is a major risk factor for childhood obesity as well as cardiovascular disease, osteoporosis, and cancer. Addressing inactivity in children could help keep the obesity epidemic from continuing to grow as well as help address other health concerns. The specific aims of this study are 1) To examine the effect of parental role-modeling of exercise on children's activity level by specifically looking at the role of the mother and the father, 2) To determine what variables affect the relationship between parental role-modeling of physical activity and child's physical activity, and 3) To assess what other variables are associated with children's physical activity.

This cross-sectional study uses data from the National Survey of Children's Health (NSCH) 2003. The results of this survey are weighted to represent the population of non-institutionalized children ages 0-17 nationally and in each state. This study focused on Virginia as approximately 13.8% of children ages 0-17 in Virginia are overweight and only 23.7% exercise vigorously everyday (26% nationally). The study sample was n=949 children. The sample was predominantly White (76.2%) with approximately equal numbers of males and females. The exposure of interest was parent's regular exercise (yes/no) and the outcome of interest was child's regular exercise (0-3 days a week/ 4+ days a week). Potential confounding variables included age, gender, race, BMI, the mother's and father's health, and smoking.

The crude results of the study show that children with mothers who did not exercise regularly were more likely to exercise than children with mothers who did exercise regularly (OR= 1.19, 95% CI [0.83, 1.72]). Children with fathers who did not exercise regularly were less likely to exercise than children with fathers that did exercise regularly (OR=0.86, 95% CI [0.57, 1.28]). However, after adjustment, children with mothers who did not exercise regularly were less likely to exercise than children with mothers who did exercise regularly (OR=0.99, 95% CI [0.71, 1.32]). The same was true for fathers (OR=0.77, 95% CI [0.49, 1.22]).

The results of this study could have possible policy implications. Interventions and programs that are implemented in schools and in communities need to have a family component as this study, as well as others, have shown that parents can influence their child's exercise behaviors purely by being active themselves. Encouraging and facilitating exercise by parents could be a cost-effective way of implementing obesity prevention efforts with children as well as helping to improve the health of the adult population. Further research needs to be undertaken where all current known risk factors for childhood obesity are included so that the relative importance of these factors can be investigated.

## Introduction

### **Descriptive Epidemiology**

Childhood obesity has become an epidemic in the United States. According to data from the NHANES survey 2003-2006, approximately 16.3% of 2-19 year olds were considered obese<sup>1</sup>. Weight status is assessed using a BMI (body mass index) calculation that takes into account weight and height. BMI is considered to be a dependable gauge for judging body fatness for most children and adolescents. It is an inexpensive and straightforward method of screening for weight problems. A normal BMI is considered to be between 18.5 and 24.9. Overweight status is described by a BMI between 25 and 29.9 and obese is defined as a BMI of 30 or over<sup>2</sup>.

There are differences in obesity incidence based on race, gender, age, socioeconomic status and geographic location in the United States. According to data from the CDC (2001-2004), approximately 17.5 % of children (6-11 years old) and 17% of adolescents (12-19 years old) were considered overweight<sup>3</sup>. More recent data from the CDC (2003-2006), indicated that about 18% of boys and 15.8% of girls 6-11 years of age were considered overweight. Furthermore, within this age range, Mexican boys (27.5%) and African American girls (24%) had the highest incidence of being overweight. For adolescents aged 12-19 years, boys (18.2%) had a higher incidence of being overweight than girls (16.8%). Again, within this age group, Mexican boys (22.1%) and African American girls (27.7%) had the highest incidence of being overweight. When looking at socioeconomic status as a factor involved in childhood obesity, the CDC found that children (6-11 years old) and adolescents (12-19 years old) had a higher incidence of obesity when the family's income was below 100% of the federal poverty line (22.0% and 19.3% respectively) than when it was 200% or more of the FPL (13.5% and 16.3% respectively)<sup>4</sup>. Obesity incidence also varies by geographic location. The National Survey of

Children's Health found that the three states with the highest incidence of obesity in their childhood populations were Washington DC, West Virginia and Kentucky, with 22.8%, 20.9% and 20.6% respectively. The three states with the lowest incidence of childhood obesity were Utah (8.5%), Wyoming (8.6%), and Colorado (9.9%)<sup>5</sup>.

### **Biological Risk Factors**

Biological risk factors for childhood obesity include poor diet, socioeconomic factors, genetics, psychological factors and neighborhood factors such as proximity to grocery stores<sup>6,7,8,9,10</sup>. In addition, it has been well documented that physical inactivity is a major risk factor for childhood obesity<sup>11</sup> as well as cardiovascular disease, osteoporosis and cancer<sup>12</sup>. Children who engage in regular physical activity are less likely to exhibit the risk factors for cardiovascular disease and are also more likely to be able to control their weight<sup>13,14</sup>. Addressing inactivity in children could help keep the obesity epidemic from continuing to grow as well as help address other health concerns. Another factor of interest is parent activity level. Based on the Social Cognitive Theory, parental role-modeling of physical activity should have a positive effect on children's activity level as modeling should help increase the child's confidence, competency, and self-efficacy in completing an activity.<sup>14,15,16</sup> Determining whether parental factors, such as activity level, are associated with childhood obesity can lead to these factors being actively addressed by parents, thus helping to improve the health of their child. The following studies look at the relationship between parent activity level and child obesity and child physical activity levels.

### **Behavioral Risk Factors**

Environmental factors and the home environment can promote the consumption of more calories than is required in a day and can encourage physical inactivity or sedentary behavior.

The home environment is irrefutably the major factor in shaping children's physical activity and diet behaviors.<sup>17,18</sup> It is extremely important, therefore, to address issues such as physical inactivity and sedentary behavior early in life and in the home so that these behaviors do not become part of a child's daily routine. It is also important to address lifestyle factors and childhood obesity early in life because infancy and adolescence have been acknowledged as key stages in the development of obesity<sup>17</sup>. Furthermore, parental contribution is essential in weight control endeavors of younger children in these key stages of development<sup>19</sup>.

### **Significance of Childhood Obesity**

Trends in childhood obesity have led to a generation that has a shortened lifespan.<sup>20</sup> Excessive weight may decrease life expectancy by as much as five years<sup>11</sup>. For the first time, children are now expected to live shorter lives than their parents<sup>20</sup>. Reducing the frequency of childhood obesity is of extreme importance as this condition has immediate consequences and long term effects that can lead to health problems both as an adolescent and as an adult<sup>20</sup>. Childhood obesity often leads to adult obesity<sup>21</sup>. Research has shown that approximately 80% of children who were overweight at 10-15 years of age were obese adults by age 25.<sup>22</sup> Furthermore, 25% of obese adults were obese as children and if children were overweight before age 8, obesity in adulthood was likely to be more severe<sup>23</sup>

Pediatric obesity is related to negative physical and psychological health problems<sup>19</sup> including children showing with diseases that were usually only associated with adults, such as high blood pressure, type 2 diabetes, symptoms of hardening of the arteries, polycystic ovary disease, non-alcoholic fatty liver disease and breathing disorders during sleep. In addition, being overweight during childhood can accelerate the development of heart disease, which can lead to heart attacks or stroke in later life<sup>20</sup>. In addition to the health concerns caused by obesity, this

condition can also affect a child's financial well-being in the future. More money will have to be spent on resources pertaining to diseases and conditions that are co-morbid with obesity<sup>24</sup>. For example, about 2 million children from ages twelve to nineteen have pre-diabetic health conditions associated with obesity and inactivity. Furthermore, the cost of treating diabetes is about \$132 billion per year in the United States<sup>11</sup>. Increased risk for disease, economic concerns, and a shortened lifespan are the fundamental reasons why we should study childhood obesity and determine risk factors, such as parental physical inactivity, that can be potentially prevented.

### **Literature Review**

The hypothesis that parental role-modeling of physical activity will increase the child's physical activity has been supported by the Framingham Children's Study. This study, and research conducted by Freedson and Evenson,<sup>25</sup> found that children who had two active parents were approximately six times more likely to be active themselves when compared to children whose parents were sedentary.<sup>26</sup> Madsen, McCulloch, Crawford et al. looked at parent modeling of physical activity to determine if it affected the activity level of daughters. The study found that girls who physically observed their parents' modeling exercise behaviors were more likely to exercise themselves. Physical activity is a risk factor for obesity and, therefore, girls who participated in exercise activities regularly were less likely to be obese.<sup>27</sup>

A recent study by Martin et al. investigated the interactions between parents who exercised and whether or not their children played a sport. The results showed that boys participated in sports more often when they had a father who was active and that girls had less participation in sports when they had inactive mothers.<sup>28</sup> Kimiecik and Horn (1998), however, determined that there was no relationship between parents' exercise behavior and children's participation in moderate to vigorous physical activity.<sup>29</sup> This conclusion was further supported



by research conducted by Trost et al. (2003) which found that parental modeling may not be enough to influence youth activity patterns as it does not remove important barriers to physical activity.<sup>30</sup>

Race is a factor involved in physical activity levels and parental role-modeling. Non-Hispanic Blacks and Hispanics had lower levels of moderate to vigorous physical activity as well as lower inactivity in general.<sup>31</sup> Ornelas et al. (2007) agreed with Gordon-Larson's findings and looked further for evidence supporting racial differences in exercise frequency. Their study determined that white female adolescents were more likely to participate in five sessions of moderate to vigorous physical activity per week than females of other races, and that African-American female adolescents were less likely to participate in five or more sessions per week than females of other races.<sup>32</sup> Parental influence, especially the role-modeling of fathers, was found to be related to attraction to physical activity in overweight Chinese children.<sup>33</sup> In contrast, Bauer et al. (2008) found that parental role-modeling of physical activity may not be enough to inspire their children to exercise but that physical activity-specific encouragement and support may be crucial.<sup>34</sup>

Research has shown that inadequate physical activity leads to obesity<sup>35</sup> and that approximately 30% of adult Americans have reported that they have no participation in any physical activity.<sup>30</sup> Based on the research summarized above, inactive parents appear to lead to inactive children (based on modeling), which can lead to childhood obesity. Physical activity also appears to vary according to race and gender. Knowing these risk factors for childhood obesity at birth can help identify children who might need early obesity prevention efforts.

## **Specific Aims**

1. To examine the effect of parental role-modeling of exercise on children's activity level by specifically looking at the role of the mother and the father.
2. To determine what variables affect the relationship between parental role-modeling of physical activity and child's physical activity.
3. To assess what other variables are associated with children's physical activity.

These issues are important to address as obesity has become an epidemic in the United States. If factors that affect childhood obesity can be determined then perhaps this condition can be prevented, or its frequency reduced, in the future. The current study confirms and adds to previous literature because it looks at the role that parental modeling of physical activity, from both the mother and the father, can play.

## Methods

### **Study Design**

This study is cross-sectional in design. It involves secondary analysis of the National Survey of Children's Health (NSCH) 2003 dataset. This survey will be used to: 1) examine the effect of parental role-modeling of exercise on children's activity level by specifically looking at the role of the mother and the father, 2) determine what variables affect the relationship between parental role-modeling of physical activity and child's physical activity, and 3) assess what other variables are associated with a child's physical activity. Specifically, this study will obtain data on the following variables: a child's age, gender, race, BMI, general health, regular exercise, parent's highest education level, mother's general health, father's general health, smoking status within the household, mother's regular exercise and father's regular exercise. The data are de-

identified to protect the confidentiality of the child and their family members. NSCH 2003 data are available to the public by request from the NSCH website.

### **Study Sample**

For this particular study only data from Virginia were used. The focus was on this state because, according to data from NSCH 2003, approximately 13.8% of children ages 0-17 in Virginia were overweight based on their body mass index measurements. In addition, only 23.7% of children aged 6-17 exercised vigorously everyday during the past week as compared to 26% nationally. Furthermore, in 2007, Virginia was given the title of being the 25<sup>th</sup> heaviest state in the nation with respect to childhood and adult obesity. Finally, within the past three decades the rate of overweight and obesity among young Virginians aged 5-17 more than doubled.<sup>36</sup> Taking all these factors into consideration it was decided that Virginia should be the focus of the study as the state has increasing childhood obesity issues as well as low participation in regular physical activity.

A child was eligible to participate in this study if he/she were over the age of 5 (child exercise questions were not asked about children under that age). Children with guardians or relatives other than a mother or father who answered the survey were not eligible. Complete case data on a child were necessary to include him/her in the study. Once these criteria were met, the study sample consisted of n = 949 Virginian children.

### **Instrument - National Survey of Children's Health**

Data from the 2003 National Survey of Children's Health (NSCH) were used to complete this study. This survey includes data about a variety of topics from children's health and mental status to parent's health status and activities. The purpose of this survey is to estimate national

and state level prevalence of a variety of physical, emotional, and behavioral child health indicators in combination with information on the child's family context and neighborhood environment. It also aims to generate information about children, their families, and neighborhoods to help guide policymakers, advocates and researchers. NSCH is primarily funded by the Maternal and Child Health Bureau and the U.S. Department of Health and Human Services. The data in the survey were collected using the SLAITS (State and Local Area Integrated Telephone Survey) program. Telephone numbers were dialed randomly in Virginia to find households with children ages 0-17. One child within this age range living in the household became the subject of the interview. The results of the NSCH survey were weighted to represent the population of non-institutionalized children ages 0-17 nationally and in each state. Nationally, 102,353 surveys were collected. The survey allows for collection of data at the national and state level. By applying and using the weights provided, state level estimates could be calculated. Approximately 2179 surveys were collected in Virginia.

### **Determinants**

The exposure of interest is parental role-modeling of physical activity because research has shown that parental role-modeling of physical activity has mixed effects on influencing the physical activity of children.<sup>27,28,29,30</sup> The specific question asked on the survey was "During the past month did you (child's mother, father) regularly exercise or play sports hard enough to make you breathe hard, make your heart beat fast, or make you sweat for 20 minutes or more." If the mother was asked this question she would respond about herself and about the father's activity level. The same was true if the father was completing the interview. This was a yes/no response question.

## **Outcome**

The outcome of interest was the child's regular physical activity, which was assessed using the question, "During the past week, on how many days did the child exercise or participate in physical activity for at least 20 minutes that made him/her sweat and breathe hard such as basketball, soccer, running or similar aerobic activities." The mother or father responding to the survey would answer the question about the child and self-report how many days they believed the child exercised during the past week. Thus, the answer to the question was in terms of number of days. For analysis, child exercise was divided into whether the child exercised 0-3 days a week or 4 or more days a week. Questions about the child's physical activity level were only asked of children aged 5-17 years.

## **Confounders**

Confounding variables of interest are race/ethnicity, age, and gender as these variables have been shown to be associated with amount of physical activity.<sup>27,28,30,31</sup> Race/ethnicity was categorized into four categories; White (non-Hispanic), Black (non-Hispanic), Multiracial/Other (non-Hispanic), and Hispanic. Age was divided into four categories: 5-7 years old, 8-11 years old, 12-14 years old and 15-17 years old. Additionally, a child's general health was analyzed because it could affect the child's ability to exercise. The child's general health was categorized as excellent/very good, or good/fair/poor. Child Body Mass Index (BMI) is also a confounder of interest as it can affect a child's ability to exercise and his/her comfort with exercising. Child BMI was derived from responses from parents to questions about the child's height, weight and age. Highest education level of parent, parent's general health status and parent's smoking status was also assessed as these variables could affect their ability to role-model physical activity to their children. Highest education level of the parent was classified as high school graduate or

less, or some college education. Parent health was labeled as excellent/very good, or good/fair/poor. The smoking status question was added late to the survey. Therefore, there was a low response to the question, thus contributing to the decreased sample size due to eligibility criteria for complete case data. Smoking status was assessed by whether someone in the household smoked cigarettes or no one in the household smoked cigarettes.

## **Statistical Analysis**

Overview: For the purpose of this study, mother's and fathers regular exercise was considered the primary determinant of interest while child's regular exercise was the outcome of interest. All potential confounding variables (age, gender, race, BMI, child's general health, parent's highest education level, mother's general health, father's general health, and smoking status with the household) were included based on their hypothesized associations with the exposure (mother/father's regular exercise) and outcome (child's regular exercise) of interest. Un-weighted frequencies and weighted percents were calculated to describe the sample surveyed. A frequency procedure was used to find the frequency and percent of children in each exercise group by all the variables included in the study. All statistical analyses were performed using Statistical Analysis Software 9.1.3 (SAS Institute, Cary, NC).

Specific Aim 1: To examine the effect of parental role-modeling of exercise on children's activity level by specifically looking at the role of the mother and the father.

To assess the role of parental role-modeling of physical activity on child's regular exercise, logistic regression was used to calculate crude odds ratios and 95% CI's. The primary outcome is the dichotomous variable for child's physical activity (0-3 days a week vs. 4 or more days a week), while the main independent variable is parent's regular exercise.

Specific Aim 2: To determine what variables affect the relationship between parental role-modeling of physical activity and child's physical activity.

To determine what variables affect the relationship between parental role-modeling of physical activity and child's physical activity, multivariate logistic regression was used to calculate the odds of child's regular exercise while adjusting for potential confounders (given the literature on confounders and our findings during the model building phase).

Specific Aim 3: To assess what other variables are associated with child's physical activity.

To assess what other variables are associated with child's physical activity, logistic regression was used to calculate crude odds ratios and 95% CI's on the role of the confounding variables on child's physical activity. Multivariate logistic regression was used to adjust for confounders.

## Results

The purpose of this study is to: 1) To examine the effect of parental role-modeling of exercise on children's activity level by specifically looking at the role of the mother and the father, 2) To determine what variables affect the relationship between parental role-modeling of physical activity and child's physical activity, and 3) To assess what other variables are associated with a child's physical activity.

Of the 949 children included in this study, 75.6% (n=728) exercised four or more days a week leaving 24.3% (n=221) children who exercised only 0-3 days a week. Approximately 32.0% of the study sample (n=299) were considered at risk of being overweight/overweight based on BMI measurements. There were 606 children (63.4%) who had mothers who exercised regularly and 693 children (74.2%) who had fathers who exercised regularly. Table 1 shows the frequency counts and weighted percents that describe the characteristics of the study population.

Table 2 shows the frequencies and weighted percents of characteristics of the study population based on the child's exercise level. More males (58.5%) than females (41.5%) exercised only 0-3 days a week. Of the children in the 0-3 days exercise group, 94.3% of them were in excellent/very good health. Approximately 31.6% of children in the 0-3 day exercise group had a BMI where they were considered at risk for overweight/overweight. In this lower exercise group, 60.3% had mothers who exercised regularly and 76.4% of the children had fathers who exercised regularly. In the higher exercise group (4+ days a week), there were more females (53.5%) than males (46.5%). For children who exercised four or more days a week, about 67.9% had a BMI where they would be considered under/normal weight and 32.1% had a BMI where they would be considered at risk overweight/overweight, again consistent with previous literature. In this higher physical activity group, 64.4% of the children had mothers who exercised regularly and 73.5% had fathers who exercised regularly.

Crude and adjusted odds ratios with 95% confidence intervals for the association between parental physical activity and a child's physical activity are shown in Table 3. Crude odds ratios were calculated (specific aim 1) and then stepwise logistic regression was performed to determine if any of the variables included in the study were confounders (specific aim 2). A variable was considered a confounder if it caused a 10% difference in the crude odds ratio when added to the model. In this study no variable caused a 10% change and thus there were no confounders. The adjusted odds ratio model was a full model that included all of the potential confounders (age, gender, race, BMI, child's general health, parent's highest education level, mother's general health, father's general health, smoking status of household, mother's regular exercise, and father's regular exercise).



Specific Aim 1: The crude odds ratios indicate that children with mothers who do not exercise regularly are more likely to exercise than children who do have mothers who regularly exercise (OR = 1.19, 95% CI [0.83,1.72]). Children who have fathers who do not regularly exercise are less likely to exercise than children who have fathers who do exercise regularly (OR=0.86, 95% CI [0.57,1.28]).

Specific Aim 2: After adjustment for all confounders, there were minor changes to the odds ratios. Children who have mothers who do not exercise regularly are less likely to be physically active than children with active mothers (OR=0.99, 95% CI [0.71,1.32]). Children with fathers who do not regularly exercise are less likely to exercise themselves than children with fathers who are regularly active (OR=0.77, 95% CI [0.49, 1.22]). Both the crude and adjusted odds ratios in Table 3 include 1 in all of their 95% confidence intervals, thus indicating results that are not significant.

Specific Aim 3: Table 4 shows crude and adjusted odds ratios for variables that may be associated with children's exercise frequency. From the crude analysis it was found that being of a younger age (5-7 years old OR=1.91, 95% CI [1.16, 3.14]), and being male (OR=1.62, 95% CI [1.13,2.33]) was significantly associated with more exercise regularity. After adjustment, using a full model with all possible confounders included, being of the highest age group, 15-17 years old (OR=2.56, 95% CI [1.77,3.72]), and being Hispanic (OR=1.98, 95% CI [1.07, 3.66]), was associated with children who exercise 4 or more times a week. After adjustment, being male was found to be associated with not exercising regularly (OR=0.64, 95% CI [0.48, 0.84]).

## Discussion

The results of this study indicate that children who have inactive parents are more likely to be inactive themselves. Children with mothers who do not exercise regularly are more likely

to be less physically active (OR=0.99, 95% CI [0.71,1.32]) than children with an active mother. Children with inactive fathers are more likely to be less active (OR=0.77, 95% CI [0.49,1.22]) than children with active fathers. These findings are consistent with previous studies that found a positive correlation between parental role-modeling of physical activity and child's physical activity.<sup>27,28,34,37,38,39</sup> Early in life, children spend a majority of their time in the home where many of their lifestyle factors are learned from watching their parents. Based on Bandura's observational learning theory, children learn many of their behaviors and actions from observing their parents.<sup>40</sup> If they see their parents regularly exercising or playing a sport, they are more likely to follow suit as it is considered a norm in the family's lifestyle.

When looking at the correlates of children's exercise in Table 4 we found that being Hispanic was associated with increased physical activity. Previous research contradicts our secondary findings saying that Hispanics and non-Hispanic Blacks are more likely to be inactive and participate in less moderate to vigorous physical activity than children of other races.<sup>31</sup> Our result could be due to the fact that our sample was mainly White and only 4.2% (n=64) of the sample was Hispanic. Small sample size could have skewed the results. Another secondary significant finding is that children in the oldest age bracket (15-17 year olds) were more likely to exercise regularly than children of the younger age groups (OR=2.56, 95% CI [1.77, 3.72]). This finding could result from adolescents in this age group participating in structured sports activities in high school or having regular physical education classes.

A major strength of this study is that the data are from a large, nationally representative survey which can be further broken down into state level data. This kind of a survey allows researchers to get reliable state population based estimates. A second strength of the survey instrument in general is that the results of the NSCH survey are weighted to represent the

population of non-institutionalized children ages 0-17 nationally and in each state so the results of this study can be generalized to all children 0-17 in Virginia who are non-institutionalized. The study has several limitations. First, NSCH is a telephone based survey. This means that anyone who does not have a home phone is automatically excluded from the survey and thus people without home phones are underrepresented. Second, the survey using self-reported measures. Parents reported on the behaviors of their children and this kind of reporting always has the chance of introducing bias into the study. Third, the sample was almost reduced by half once the eligibility criteria were applied. Having a small sample size could lead to inaccurate results. To be eligible for the study, the children had to have complete case data. Fourth, the smoking variable in the study was added late into the survey and so a smaller proportion of individuals actually answered this question causing a decrease in the sample size. Fifth, the main predictor and outcome exercise variables were very broad. For the mother and the father they were asked if they exercised regularly during the past month. There were no questions about what kind of activities they participated in or the duration of the physical activity events. The same is true of the children's exercise variable. This variable was a little more focused as it asked how many days a week did the child participate in some kind of physical activity but again there were no specifics about what kind of activities were taking place or the duration of time for which the children were exercising. Sixth, questions about the child's asthma status were initially going to be assessed as potential confounders in the parental modeling-child exercise association. However, there was so much missing data for these variables that it could not be included in this study because the eligibility criteria of complete case data would have decreased the sample size even further.

No one factor seems to be associated with childhood obesity. Further research needs to be performed where all current known risk factors for childhood obesity including diet, genetics, physical inactivity, socioeconomic status, health factors, insurance status are all represented in one model so that factors which have the strongest link to obesity can be assessed.

The findings in this study could have far reaching effects in the world of public policy. They show that children are more physically active when their parents are active. Thus, for interventions designed to reduce childhood obesity, a family/parent component should play a role. Parent should be as great a part of the intervention as the child. For interventions and programs implemented in schools and in the community, family components should be an integral part. Perhaps, having a father-specific component would be beneficial as this study has shown that fathers seem to have a higher impact on the child's regular exercise than the mother. Having family components in obesity prevention programs is supported by previous research.<sup>12,24</sup>

### Conclusion

Childhood obesity is a rapidly growing epidemic that is a major public health concern in the United States. The findings of this study show that parental role-modeling of physical activity leads to children who are more physically active. As physical inactivity is a key risk factor in developing childhood obesity, it needs to be addressed in environments where the children spend the majority of their time. Therefore, obesity prevention efforts should focus on the school and the home and should include the parents, especially the father, as active participants in these interventions. Further research needs to be undertaken where all current known risk factors for childhood obesity are included so that the relative importance of these factors can be investigated.

## Tables

**Table 1 - Characteristics of the Study Sample**

	<b>Total</b>	
	<b>N</b>	<b>% *</b>
<b>Age</b>		
5-7 years	128	13.9
8-11 years	292	34.4
12-14 years	246	26.4
15-17 years	283	25.4
<b>Gender</b>		
Male	483	49.4
Female	466	50.6
<b>Race</b>		
White non-Hispanic	740	76.2
Black non-Hispanic	95	14.9
Hispanic	64	4.2
Multiracial/Other non-Hispanic	50	4.7
<b>BMI</b>		
Normal/Underweight	650	68.0
Obese/ At Risk Overweight	299	32.0
<b>Child's Regular Exercise</b>		
0-3 days	221	24.3
4+ days	728	75.6
<b>Child's General Health</b>		
Excellent/Very Good	879	93.3
Good/Fair/Poor	70	6.7
<b>Parent/ Guardian Highest Education Level</b>		
High School or less	166	23.0
Some college	783	77.0
<b>Mother's General Health</b>		
Excellent/Very Good	693	73.9
Good/Fair/Poor	256	26.1
<b>Father's General Health</b>		
Excellent/Very Good	711	75.7
Good/Fair/Poor	238	24.3
<b>Someone Smokes in Household</b>		
No one Smokes in Household	678	72.0
Someone Smokes in Household	271	28.0

**Mother Regularly Exercises**

No	343	36.6
Yes	606	63.4

**Father Regularly Exercises**

No	256	25.8
Yes	693	74.2

\* Weighted percent

**Table 2 - Descriptive Statistics by Outcome Variable - Child exercise**

	Child exercise			
	0-3 days		4+ days	
	N	%	N	%
<b>Age</b>				
5-7 years	73	23.0	119	10.9
8-11 years	127	37.0	338	33.6
12-14 years	70	23.3	321	27.4
15-17 years	67	16.7	355	28.1
<b>Gender</b>				
Male	203	58.5	560	46.5
Female	134	41.5	573	53.5
<b>Race</b>				
White non-Hispanic	229	72.9	764	77.3
Black non-Hispanic	53	19.8	172	13.4
Hispanic	29	3.7	98	4.3
Multiracial/Other non-Hispanic	21	3.6	77	5.0
<b>BMI</b>				
Normal/Underweight	211	68.4	701	67.9
Obese/ At Risk Overweight	100	31.6	371	32.1
<b>Child's General Health</b>				
Excellent/Very Good	318	94.3	997	92.9
Good/Fair/Poor	19	5.7	136	7.1
<b>Parent/ Guardian Highest Education Level</b>				
High School or less	94	27.0	249	21.7
Some college	243	73.0	881	78.3
<b>Mother's General Health</b>				
Excellent/Very Good	217	71.4	724	74.7
Good/Fair/Poor	95	24.7	324	25.3
<b>Father's General Health</b>				
Excellent/Very Good	202	75.3	608	75.9
Good/Fair/Poor	62	24.7	228	24.1
<b>Someone Smokes in Household</b>				
No one Smokes in Household	215	68.6	810	73.1
Someone Smokes in Household	121	31.4	315	26.9
<b>Mother Regularly Exercises</b>				
No	106	39.7	401	35.6
Yes	204	60.3	643	64.4
<b>Father Regularly Exercises</b>				
No	62	23.6	235	26.5
Yes	200	76.4	598	73.5

**Table 3 - Child's Exercise Adjusted for Mother and Father Regular Exercise**

	N	%	Crude		Adjusted*			
			OR	95% CI	OR	95% CI		
<b>Mother Regularly Exercises</b>								
No	401	26.9	1.19	0.83	1.72	0.99	0.71	1.32
Yes	643	48.7	1.00			1.00		
<b>Father Regularly Exercises</b>								
No	235	20.0	0.86	0.57	1.28	0.77	0.49	1.22
Yes	598	55.5	1.00			1.00		



**Table 4 - Correlates of Children's Exercise**

	<b>Crude OR</b>	<b>95% CI</b>		<b>Adjusted OR*</b>	<b>95% CI</b>	
<b>Age</b>						
5-7 years	1.91	1.16	3.14	0.51	0.33	0.78
8-11 years	1.00			1.00		
12-14 years	0.77	0.47	1.25	1.38	0.96	2.00
15-17 years	0.54	0.33	0.87	2.56	1.77	3.72
<b>Gender</b>						
Male	1.62	1.13	2.33	0.64	0.48	0.84
Female	1.00			1.00		
<b>Race</b>						
White non-Hispanic	1.00			1.00		
Black non-Hispanic	1.57	0.89	2.74	0.78	0.48	1.26
Hispanic	0.90	0.45	1.82	1.98	1.07	3.66
Multiracial/Other non-Hispanic	0.77	0.36	1.65	1.61	0.91	2.86
<b>BMI</b>						
Normal/Underweight	1.02	0.69	1.52	0.78	0.57	1.08
Obese/ At Risk Overweight	1.00			1.00		
<b>Child's General Health</b>						
Excellent/Very Good	1.26	0.63	2.53	0.88	0.50	1.53
Good/Fair/Poor	1.00			1.00		
<b>Parent/ Guardian Highest Education Level</b>						
High School or less	1.00			1.00		
Some college	0.75	0.48	1.17	1.08	0.74	1.60

**Mother's General Health**

Excellent/Very Good	0.85	0.57	1.27	0.97	0.66	1.42
Good/Fair/Poor	1.00			1.00		

**Father's General Health**

Excellent/Very Good	0.97	0.63	1.48	0.98	0.66	1.44
Good/Fair/Poor	1.00			1.00		

**Someone Smokes in Household**

No one Smokes in Household	0.81	0.55	1.18	1.10	0.80	1.51
Someone Smokes in Household	1.00			1.00		

\* Adjusted for: age, gender, race, BMI, child's general health, parent's highest education level, mother's health, father's health, and smoking in the household

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## Appendix

/\* Create Formats\*/

**PROC FORMAT;**

**VALUE DAYS**

/\*0 - 7 = "RANGE 0 - 7"\*/

96 = "96 - DONT KNOW"

97 = "97 - REFUSED"

.L = ".L - LEGITIMATE SKIP"

.P = ".P - PARTIAL INTERVIEW"

.M = ".M - MISSING"

.N = ".N - NOT IN UNIVERSE"

;

**VALUE EVGFPDR 1 = "1 - EXCELLENT"**

2 = "2 - VERY GOOD"

3 = "3 - GOOD"

4 = "4 - FAIR"

5 = "5 - POOR"

6 = "6 - DONT KNOW"

7 = "7 - REFUSED"

.L = ".L - LEGITIMATE SKIP"

.M = ".M - MISSING"

.P = ".P - PARTIAL INTERVIEW"

.N = ".N - NOT IN UNIVERSE"

;

**VALUE FEET**

/\* 0 - 77 = "RANGE 0 - 77" \*/

96 = "96 - DONT KNOW"

97 = "97 - REFUSED"

.L = ".L - LEGITIMATE SKIP"

.P = ".P - PARTIAL INTERVIEW"

.M = ".M - MISSING"

.N = ".N - NOT IN UNIVERSE"

;

**VALUE ID**

2000000 - 29999999 = "UNIQUE HH ID"

;

**VALUE MARK 0 = "0 - NOT MARKED"**

1 = "1 - MARKED"

6 = "6 - DONT KNOW"

7 = "7 - REFUSED"

.L = ".L - LEGITIMATE SKIP"

.M = ".M - MISSING"

.P = ".P - PARTIAL INTERVIEW"

.N = ".N - NOT IN UNIVERSE"

;

**VALUE NRSUADR**

1 = "1 - NEVER"

2 = "2 - RARELY"

3 = "3 - SOMETIMES"

4 = "4 - USUALLY"

5 = "5 - ALWAYS"

6 = "6 - DONT KNOW"

7 = "7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

VALUE POUNDS

/\* 1 - 280 = "RANGE 1 - 280" \*/  
996 = "996 - DONT KNOW"  
997 = "997 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

VALUE POVLVLR

.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
1 = "1 - LESS THAN 100% POVERTY LEVEL"  
2 = "2 - 100% TO BELOW 133% POVERTY LEVEL"  
3 = "3 - 133% TO BELOW 150% POVERTY LEVEL"  
4 = "4 - 150% TO BELOW 185% POVERTY LEVEL"  
5 = "5 - 185% TO BELOW 200% POVERTY LEVEL"  
6 = "6 - 200% TO BELOW 300% POVERTY LEVEL"  
7 = "7 - 300% TO BELOW 400% POVERTY LEVEL"  
8 = "8 - AT OR ABOVE 400% POVERTY LEVEL"

VALUE STATE

1 = "1-AK"  
2 = "2-AL"  
3 = "3-AR"  
4 = "4-AZ"  
5 = "5-CA"  
6 = "6-CO"  
7 = "7-CT"  
8 = "8-DC"  
9 = "9-DE"  
10 = "10-FL"  
11 = "11-GA"  
12 = "12-HI"  
13 = "13-IA"  
14 = "14-ID"  
15 = "15-IL"  
16 = "16-IN"  
17 = "17-KS"  
18 = "18-KY"  
19 = "19-LA"  
20 = "20-MA"  
21 = "21-MD"  
22 = "22-ME"  
23 = "23-MI"  
24 = "24-MN"  
25 = "25-MO"  
26 = "26-MS"  
27 = "27-MT"  
28 = "28-NC"  
29 = "29-ND"  
30 = "30-NE"  
31 = "31-NH"

32 = "32-NJ"  
33 = "33-NM"  
34 = "34-NV"  
35 = "35-NY"  
36 = "36-OH"  
37 = "37-OK"  
38 = "38-OR"  
39 = "39-PA"  
40 = "40-RI"  
41 = "41-SC"  
42 = "42-SD"  
43 = "43-TN"  
44 = "44-TX"  
45 = "45-UT"  
46 = "46-VA"  
47 = "47-VT"  
48 = "48-WA"  
49 = "49-WI"  
50 = "50-WV"  
51 = "51-WY"  
;

VALUE S10Q01C 1 = " 1 - DEFINITELY AGREE"

2 = " 2 - SOMEWHAT AGREE"  
3 = " 3 - SOMEWHAT DISAGREE"  
4 = " 4 - DEFINITELY DISAGREE"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S1Q01C 1 = " 1 - MALE"

2 = " 2 - FEMALE"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q01C 1 = " 1 - EXCELLENT"

2 = " 2 - VERY GOOD"  
3 = " 3 - GOOD"  
4 = " 4 - FAIR"  
5 = " 5 - POOR"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q47C 1 = " 1 - MINOR"

2 = " 2 - MODERATE"  
3 = " 3 - SEVERE"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"



.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q50C 1 = " 1 - MINOR DIFFICULTIES"  
2 = " 2 - MODERATE DIFFICULTIES"  
3 = " 3 - SEVERE DIFFICULTIES"  
6 = " 6 - DON'T KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q51C 1 = " 1 - A GREAT DEAL"  
2 = " 2 - A MEDIUM AMOUNT"  
3 = " 3 - A LITTLE"  
4 = " 4 - NOT AT ALL"  
6 = " 6 - DON'T KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q52C  
1 = "01 - LESS THAN ONE DAY AGO"  
2 = "02 - 1-6 DAYS AGO"  
3 = "03 - 1 WEEK TO LESS THAN 3 MONTHS AGO"  
4 = "04 - 3 MONTHS TO LESS THAN 1 YEAR AGO"  
5 = "05 - 1 YEAR TO LESS THAN 3 YEARS AGO"  
6 = "06 - 3 YEARS TO 5 YEARS AGO"  
7 = "07 - MORE THAN 5 YEARS AGO"  
8 = "08 - HAS NEVER USED MEDICATION"  
96 = "96 - DON'T KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q54C 1 = "1 - EXCELLENT"  
2 = "2 - VERY GOOD"  
3 = "3 - GOOD"  
4 = "4 - FAIR"  
5 = "5 - POOR"  
6 = "6 - HAS NO NATURAL TEETH"  
96 = "96 - DON'T KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S2Q56C  
1 = "1 - NEVER"

2 = "2 - 6 MONTHS OR LESS"  
3 = "3 - MORE THAN 6 MONTHS, BUT NOT MORE THAN 1 YEAR AGO"  
4 = "4 - MORE THAN 1 YEAR, BUT NOT MORE THAN 2 YEARS AGO"  
5 = "5 - MORE THAN 2 YEARS, BUT NOT MORE THAN 5 YEARS AGO"  
6 = "6 - MORE THAN 5 YEARS AGO"  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S4Q03C

0 - 995 = "RANGE 0 - 995"  
996 = "996 - DONT KNOW"  
997 = "997 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S4Q03CR

/\*0 - 20 = "RANGE 0 - 20"\*/  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S4Q03CRR

/\*0 - 12 = "RANGE 0 - 12"\*/  
12 = "12 - 12 OR MORE"  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S4Q04CR

/\*0 - 5 = "RANGE 0 - 5"\*/  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S4Q05CR

/\*0 - 5 = "RANGE 0 - 6"\*/  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

;  
VALUE S4Q28C  
1 = " 1 - ONE"  
2 = " 2 - TWO"  
3 = " 3 - THREE OR MORE"  
4 = " 4 - ALL THAT ARE RECOMMENDED"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S4Q29C  
1 = "1 - DOCTOR'S OFFICE"  
2 = "2 - SCHOOL CLINIC"  
3 = "3 - COMMUNITY CLINIC"  
4 = "4 - HEAD START PROGRAM OR DAYCARE"  
5 = "5 - HEALTH DEPARTMENT"  
6 = "6 - PHARMACY"  
7 = "7 - SOME OTHER PLACE"  
8 = "8 - OTHER HOSPITAL/MEDICAL CENTER"  
9 = "9 - MILITARY HOSPITAL/MILITARY BASE/MILITARY CLINIC"  
10 = "10 - WIC"  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S5Q09A  
1 = " 1 - A BIG PROBLEM"  
2 = " 2 - A MODERATE PROBLEM"  
3 = " 3 - A SMALL PROBLEM"  
4 = " 4 - NO PROBLEM AT ALL"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S5Q09C  
1 = " 1 - NEVER"  
2 = " 2 - SOMETIMES"  
3 = " 3 - USUALLY"  
4 = " 4 - ALWAYS"  
5 = " 5 - NO VISITS TO THE SPECIALIST DOCTOR"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S5Q10C  
1 = " 1 - NEVER"

;

2 = " 2 - SOMETIMES"  
 3 = " 3 - USUALLY"  
 4 = " 4 - ALWAYS"  
 5 = " 5 - NO SPECIAL CARE OR EQUIPMENT RECEIVED"  
 6 = " 6 - DON'T KNOW"  
 7 = " 7 - REFUSED"  
 .L = ".L - LEGITIMATE SKIP"  
 .M = ".M - MISSING"  
 .P = ".P - PARTIAL INTERVIEW"  
 .N = ".N - NOT IN UNIVERSE"  
 ;

VALUE S6Q60AC 1 = " 1 - DAYS"  
 2 = " 2 - WEEKS"  
 3 = " 3 - MONTHS"  
 4 = " 4 - YEARS"  
 6 = " 6 - DONT KNOW"  
 7 = " 7 - REFUSED"  
 .L = ".L - LEGITIMATE SKIP"  
 .M = ".M - MISSING"  
 .P = ".P - PARTIAL INTERVIEW"  
 .N = ".N - NOT IN UNIVERSE"  
 ;

VALUE S6Q60C  
 0 - 994 = "RANGE 0 - 994"  
 995 = "9995 - STILL BREASTFEEDING"  
 996 = "9996 - DONT KNOW"  
 997 = "9997 - REFUSED"  
 .L = ".L - LEGITIMATE SKIP"  
 .P = ".P - PARTIAL INTERVIEW"  
 .M = ".M - MISSING"  
 .N = ".N - NOT IN UNIVERSE"  
 ;

VALUE S6Q60CR  
 /\*0 - 1095 = "RANGE 0 - 1095"\*/  
 1095 = "1095 - 1095 DAYS OR MORE"  
 9995 = "9995 - STILL BREASTFEEDING"  
 9996 = "9996 - DONT KNOW"  
 9997 = "9997 - REFUSED"  
 .L = ".L - LEGITIMATE SKIP"  
 .P = ".P - PARTIAL INTERVIEW"  
 .M = ".M - MISSING"  
 .N = ".N - NOT IN UNIVERSE"  
 ;

VALUE S6Q9N 1 = " 1 - A LOT"  
 2 = " 2 - A LITTLE"  
 3 = " 3 - NOT AT ALL "  
 6 = " 6 - DONT KNOW"  
 7 = " 7 - REFUSED"  
 .L = ".L - LEGITIMATE SKIP"  
 .M = ".M - MISSING"  
 .P = ".P - PARTIAL INTERVIEW"  
 .N = ".N - NOT IN UNIVERSE"  
 ;

VALUE S7Q01C 1 = " 1 - PUBLIC"  
 2 = " 2 - PRIVATE"  
 3 = " 3 - HOME-SCHOOLED"

4 = " 4 - [S.C.] IS NOT ENROLLED IN SCHOOL."  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q02CR

0 = "0 - NONE"  
/\*1 - 40 = "RANGE 1 - 40"\*/  
40 = "40 - 40 OR MORE DAYS"  
240 = "240 - ENTIRE SCHOOL YEAR"  
994 = "994 - HOME SCHOOLED"  
995 = "995 - DID NOT GO TO SCHOOL"  
996 = "996 - DONT KNOW"  
997 = "997 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q04C 0 = " 0 - NEVER"

1 = " 1 - ONCE"  
2 = " 2 - MORE THAN ONCE"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q14C 1 = " 1 - ALL OF [HIS/HER] FRIENDS"

2 = " 2 - MOST OF [HIS/HER] FRIENDS"  
3 = " 3 - SOME OF [HIS/HER] FRIENDS"  
4 = " 4 - NONE OF [HIS/HER] FRIENDS"  
5 = " 5 - CHILD HAS NO FRIENDS"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW AFTER S2Q02"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q16C

1 - 168 = "RANGE 1 - 168"  
995 = "995 - MORE THAN ZERO, LESS THAN 1 HOUR"  
996 = "996 - DONT KNOW"  
997 = "997 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q19C

0 - 168 = "RANGE 0 - 168"  
995 = "995 - MORE THAN ZERO, LESS THAN 1 HOUR"

996 = "996 - DONT KNOW"  
997 = "997 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q23C 1 = " 1 - NEVER"  
2 = " 2 - SOMETIMES"  
3 = " 3 - USUALLY"  
4 = " 4 - ALWAYS"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q26A  
1 = " 1 - HOURS"  
2 = " 2 - MINUTES"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q26C  
0 - 994 = "RANGE 0 - 994"  
995 = "995 - CHILD CANT READ"  
996 = "996 - DONT KNOW"  
997 = "997 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q27C  
0 - 24 = "RANGE 0 - 24"  
25 = "25 - MORE THAN 0,LESS THAN 1 HOUR"  
26 = "26 - DONT OWN COMPUTER"  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S7Q28C  
0 - 24 = "RANGE 0 - 24"  
25 = "25 - MORE THAN 0,LESS THAN 1 HOUR"  
26 = "26 - DONT OWN TELEVISION"  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"

.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S8Q01C

0 - 95 = "RANGE 0 - 95"  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S8Q01CR

/\*0 - 20 = "RANGE 0 - 20"\*/  
96 = "96 - DONT KNOW"  
97 = "97 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.P = ".P - PARTIAL INTERVIEW"  
.M = ".M - MISSING"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S8Q04C 1 = " 1 - VERY CLOSE"

2 = " 2 - SOMEWHAT CLOSE"  
3 = " 3 - NOT VERY CLOSE"  
4 = " 4 - NOT CLOSE AT ALL"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S8Q06C 1 = " 1 - VERY WELL"

2 = " 2 - SOMEWHAT WELL"  
3 = " 3 - NOT VERY WELL"  
4 = " 4 - NOT WELL AT ALL"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

VALUE S9Q05C 1 = " 1 - MORE THAN ONCE A WEEK"

2 = " 2 - ABOUT ONCE A WEEK"  
3 = " 3 - 1 TO 3 TIMES A MONTH"  
4 = " 4 - 1 TO 11 TIMES A YEAR"  
5 = " 5 - NOT AT ALL"  
6 = " 6 - DONT KNOW"  
7 = " 7 - REFUSED"  
.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
.N = ".N - NOT IN UNIVERSE"

;

```

VALUE S9Q34C 1 = " 1 - YES"
2 = " 2 - NO"
3 = " 3 - NEVER HEARD OF WIC"
6 = " 6 - DONT KNOW"
7 = " 7 - REFUSED"
.L = ".L - LEGITIMATE SKIP"
.M = ".M - MISSING"
.P = ".P - PARTIAL INTERVIEW"
.N = ".N - NOT IN UNIVERSE"
;

VALUE YN 1 = " 1 - YES"
0 = " 0 - NO"
6 = " 6 - DONT KNOW"
7 = " 7 - REFUSED"
.L = ".L - LEGITIMATE SKIP"
.P = ".P - PARTIAL INTERVIEW"
.M = ".M - MISSING"
.N = ".N - NOT IN UNIVERSE"
;

VALUE YNX 1 = " 1 - YES"
0 = " 0 - NO"
6 = " 6 - DONT KNOW"
7 = " 7 - REFUSED"
.L = ".L - LEGITIMATE SKIP"
.P = ".P - PARTIAL INTERVIEW"
.M = ".M - MISSING"
.N = ".N - NOT IN UNIVERSE"
.A = ".A - INTERVIEW COMPLETED PRIOR TO ADDITION OF QUESTION"
;

```

/\* SPECIAL FORMATS \*/

/\* NEW FORMATS \*/

```

value racem
.M = ".M - MISSING"
1 = "1 - WHITE ONLY"
2 = "2 - BLACK ONLY"
3 = "3 - MULTIPLE RACE"
4 = "4 - OTHER"
;
value racenaan
.M = ".M - MISSING"
1 = "1 - WHITE ONLY"
2 = "2 - BLACK ONLY"
3 = "3 - MULTIPLE RACE"
4 = "4 - AI/AN ONLY"
5 = "5 - OTHER"
;
value raceasia
.M = ".M - MISSING"
1 = "1 - WHITE ONLY"
2 = "2 - BLACK ONLY"
3 = "3 - MULTIPLE RACE"
4 = "4 - ASIAN ONLY"
5 = "5 - OTHER"
;
value racehi
.M = ".M - MISSING"

```



1 = "1 - WHITE ONLY"  
2 = "2 - BLACK ONLY"  
3 = "3 - MULTIPLE RACE"  
4 = "4 - ASIAN ONLY"  
5 = "5 - NH/PI ONLY"  
6 = "6 - OTHER"

;

value religion

.M = ".M - MISSING"  
.P = ".P - PARTIAL INTERVIEW"  
0 = "0 - NONE"  
1 = "1 - AT LEAST ONCE PER YEAR, BUT LESS THAN ONCE PER MONTH"  
2 = "2 - AT LEAST ONCE PER MONTH, BUT LESS THAN ONCE PER WEEK"  
3 = "3 - AT LEAST ONCE PER WEEK, BUT LESS THAN DAILY"  
4 = "4 - DAILY"  
6 = "6 - DON'T KNOW"  
7 = "7 - REFUSED"

;

value edr

.M = ".M - MISSING"  
1 = "1 - LESS THAN HIGH SCHOOL"  
2 = "2 - 12 YEARS, HIGH SCHOOL GRADUATE"  
3 = "3 - MORE THAN HIGH SCHOOL"  
96 = "96 - DON'T KNOW"  
97 = "97 - REFUSED"

;

value msastat

.L = ".L - LEGITIMATE SKIP"  
.M = ".M - MISSING"  
0 = "0 - NOT IN AN MSA"  
1 = "1 - IN AN MSA"

;

value povt

.M = ".M - MISSING"  
1 = "1 - POOR"  
2 = "2 - NEAR POOR"  
3 = "3 - NOT POOR"

;

value birthp

1 = "1 - ONLY CHILD"  
2 = "2 - OLDEST CHILD"  
3 = "3 - 2ND OLDEST CHILD"  
4 = "4 - 3RD OLDEST CHILD"  
5 = "5 - 4TH OLDEST CHILD"

;

value ageyrg

1 = "1 - AGES 0-5 "  
2 = "2 - AGES 6-11 "  
3 = "3 - AGES 12-17"

;

value plang

.M = ".M - MISSING"  
1 = "1 - ENGLISH"  
2 = "2 - ANY OTHER LANGUAGE"  
6 = "3 - DONT KNOW"

```

7 = "4 - REFUSED"
;

value totkids
1 = "1 - 1 CHILD"
2 = "2 - 2 CHILDREN"
3 = "3 - 3 CHILDREN"
4 = "4 - 4 OR MORE CHILDREN"
;
value totadult
.M = ".M - MISSING"
1 = "1 - 1 ADULT"
2 = "2 - 2 ADULTS"
3 = "3 - 3 OR MORE ADULTS"
6 = "6 - DONT KNOW"
7 = "7 - REFUSED"
;
value fams
.M = ".M - MISSING"
.P = ".P - PARTIAL INTERVIEW"
1 = "1 - TWO PARENT BIOLOGICAL/ADOPTED"
2 = "2 - TWO PARENT STEPFAMILY"
3 = "3 - SINGLE MOTHER, NO FATHER PRESENT"
4 = "4 - OTHER"
;
value relation
.M = ".M - MISSING"
1 = "1 - MOTHER (BIOLOGICAL,STEP,FOSTER,ADOPTIVE)"
2 = "2 - FATHER (BIOLOGICAL,STEP,FOSTER,ADOPTIVE)"
3 = "3 - OTHER"
6 = "6 - DONT KNOW"
7 = "7 - REFUSED"
;
value BMI
.M = ".M - MISSING"
1 = "1-UNDERWEIGHT"
2 = "2-NORMAL WEIGHT"
3 = "3-AT RISK OF OVERWEIGHT"
4 = "4-OVERWEIGHT"
;
VALUE topcda
/*0 - 20 = "RANGE 0 - 20"*/
20 = "20 - 20 OR MORE"
96 = "96 - DONT KNOW"
97 = "97 - REFUSED"
.L = ".L - LEGITIMATE SKIP"
.P = ".P - PARTIAL INTERVIEW"
.M = ".M - MISSING"
.N = ".N - NOT IN UNIVERSE"
;
VALUE topcdb
/*0 - 20 = "RANGE 0 - 20"*/
5 = "5 - 5 OR MORE"
96 = "96 - DONT KNOW"
97 = "97 - REFUSED"
.L = ".L - LEGITIMATE SKIP"
.P = ".P - PARTIAL INTERVIEW"
.M = ".M - MISSING"
.N = ".N - NOT IN UNIVERSE"
;
run;

```

/\* Assign Formats\*/

```
Data tmp1.kat1; set tmp1.nschfile;
format
MSA_STAT    MSASTAT.
TOTKIDS4    TOTKIDS.
/*AGEYR_CHILD*/
AGEPOS4     BIRTHP.
TOTADULT3   TOTADULT.
EDUCATIONR  EDR.
POVERTY_LEVELR POVLVLR.
RELATION    RELATION.
S10Q01     S10Q01C.
S10Q02     S10Q01C.
S10Q03     S10Q01C.
S10Q04     S10Q01C.
S10Q05     S10Q01C.
S10Q06     S7Q23C.
S10Q07     S7Q23C.
S10Q08     S7Q23C.
S11Q06R    S4Q03CRR.
S11Q08     YN.
S1Q01      S1Q01C.
PLANGUAGE  PLANG.
S2Q01     S2Q01C.
S2Q02R    FEET.
S2Q03R    POUNDS.
S2Q04     YN.
S2Q05     YN.
S2Q06     YN.
S2Q07     YN.
S2Q08     YN.
S2Q09     YN.
S2Q10     YN.
S2Q11     YN.
S2Q12     YN.
S2Q13     YN.
S2Q14     YN.
S2Q15     YN.
S2Q16     YN.
S2Q17     YN.
S2Q18     YN.
S2Q19     YN.
S2Q20     YN.
S2Q21     YN.
S2Q22     YN.
S2Q23     YN.
S2Q24     YN.
S2Q26     YN.
S2Q35     YN.
S2Q37     YN.
S2Q38     YN.
S2Q39     YN.
S2Q40     YN.
S2Q41     YN.
S2Q42     YN.
S2Q44     YN.
S2Q47     S2Q47C.
S2Q49     YN.
S2Q50     S2Q50C.
S2Q51     S2Q51C.
S2Q52     S2Q52C.
```

S2Q52A YN.  
S2Q53 YN.  
S2Q54 S2Q54C.  
S2Q55X01 MARK.  
S2Q55X02 MARK.  
S2Q55X03 MARK.  
S2Q55X04 MARK.  
S2Q55X05 MARK.  
S2Q55X06 MARK.  
S2Q55X07 MARK.  
S2Q55X08 MARK.  
S2Q55X09 MARK.  
S2Q55X10 MARK.  
S2Q55X11 MARK.  
S2Q55X12 MARK.  
S2Q56 S2Q56C.  
S2Q59 YN.  
S2Q60 S2Q47C.  
S2Q61 S2Q51C.  
S2Q62 YN.  
S3Q01 YN.  
S3Q02 YN.  
S3Q03 YN.  
S3Q04 YN.  
S3Q05 YN.  
S4Q01 YN.  
S4Q02 YN.  
S4Q03R TOPCDA.  
S4Q04R TOPCDB.  
S4Q04A YN.  
S4Q05R TOPCDB.  
S4Q06R TOPCDA.  
S4Q07 YN.  
S4Q08X01 MARK.  
S4Q08X02 MARK.  
S4Q08X03 MARK.  
S4Q08X04 MARK.  
S4Q08X05 MARK.  
S4Q08X06 MARK.  
S4Q08X07 MARK.  
S4Q08X08 MARK.  
S4Q08X09 MARK.  
S4Q08X10 MARK.  
S4Q08X11 MARK.  
S4Q08X12 MARK.  
S4Q08X13 MARK.  
S4Q08X14 MARK.  
S4Q08X15 MARK.  
S4Q08X16 MARK.  
S4Q09 YN.  
S4Q10 YN.  
S4Q13 YN.  
S4Q14X01 MARK.  
S4Q14X02 MARK.  
S4Q14X03 MARK.  
S4Q14X04 MARK.  
S4Q14X05 MARK.  
S4Q14X06 MARK.  
S4Q14X07 MARK.  
S4Q14X08 MARK.  
S4Q14X09 MARK.  
S4Q14X10 MARK.

S4Q14X11 MARK.  
S4Q14X13 MARK.  
S4Q14X14 MARK.  
S4Q14X15 MARK.  
S4Q14X16 MARK.  
S4Q15 YN.  
S4Q16 YN.  
S4Q17 YN.  
S4Q18X01 MARK.  
S4Q18X02 MARK.  
S4Q18X03 MARK.  
S4Q18X04 MARK.  
S4Q18X05 MARK.  
S4Q18X06 MARK.  
S4Q18X07 MARK.  
S4Q18X08 MARK.  
S4Q18X09 MARK.  
S4Q18X10 MARK.  
S4Q18X11 MARK.  
S4Q18X13 MARK.  
S4Q18X14 MARK.  
S4Q18X15 MARK.  
S4Q18X16 MARK.  
S4Q23 YN.  
S4Q27 YN.  
S4Q28 S4Q28C.  
S4Q29 S4Q29C.  
S4Q30 YN.  
S5Q01 YN.  
S5Q02 S7Q23C.  
S5Q04 S7Q23C.  
S5Q06 YN.  
S5Q06A S7Q23C.  
S5Q07 YN.  
S5Q07A S7Q23C.  
S5Q08A YN.  
S5Q08B YN.  
S5Q09 YN.  
S5Q09A S5Q09A.  
S5Q09B YN.  
S5Q09C S5Q09C.  
S5Q10 YN.  
S5Q10A S5Q09A.  
S5Q10B YN.  
S5Q10C S5Q10C.  
S5Q13 YN.  
S5Q13A S7Q23C.  
S6Q08 YN.  
S6Q09 S6Q9N.  
S6Q10 S6Q9N.  
S6Q11 S6Q9N.  
S6Q12 S6Q9N.  
S6Q13 S6Q9N.  
S6Q14 S6Q9N.  
S6Q15 S6Q9N.  
S6Q16 S6Q9N.  
S6Q17 S6Q9N.  
S6Q18 S6Q9N.  
S6Q19 S6Q9N.  
S6Q20 S6Q9N.  
S6Q21 S6Q9N.  
S6Q22 S6Q9N.

S6Q23 S6Q9N.  
S6Q24 S6Q9N.  
S6Q25 S6Q9N.  
S6Q26 S6Q9N.  
S6Q27 S6Q9N.  
S6Q28 YN.  
S6Q29 YN.  
S6Q48 YN.  
S6Q49 YN.  
S6Q50 YN.  
S6Q51 YN.  
S6Q52 YN.  
S6Q53 S4Q03C.  
S6Q54 YN.  
S6Q55 YN.  
S6Q56X01 MARK.  
S6Q56X02 MARK.  
S6Q56X03 MARK.  
S6Q57 YN.  
S6Q58X01 MARK.  
S6Q58X02 MARK.  
S6Q58X03 MARK.  
S6Q59 YN.  
S6Q60R S6Q60CR.  
S6Q62 DAYS.  
S7Q01 S7Q01C.  
S7Q01F YN.  
S7Q02R S7Q02CR.  
S7Q04 S7Q04C.  
S7Q09 YN.  
S7Q10 YN.  
S7Q11 YN.  
S7Q11A YN.  
S7Q12 DAYS.  
S7Q13 S7Q23C.  
S7Q14 S7Q14C.  
S7Q15 YN.  
S7Q16 S7Q16C.  
S7Q17 YN.  
S7Q19 S7Q19C.  
S7Q20 DAYS.  
S7Q21 DAYS.  
S7Q22 YN.  
S7Q23 S7Q23C.  
S7Q26 S7Q26C.  
S7Q26A S7Q26A.  
S7Q27 S7Q27C.  
S7Q28 S7Q28C.  
S7Q29 YN.  
S7Q30 S6Q9N.  
S7Q31 S6Q9N.  
S7Q32 S6Q9N.  
S7Q33 S6Q9N.  
S7Q34 S6Q9N.  
S7Q35 S6Q9N.  
S7Q36 S6Q9N.  
S7Q37 S6Q9N.  
S7Q38 S6Q9N.  
S7Q39 S6Q9N.  
S7Q40 S6Q9N.  
S7Q41 S7Q23C.  
S7Q44 S7Q23C.

```

S7Q45    S7Q23C.
S7Q48    S7Q23C.
S7Q52    S7Q23C.
S7Q53    S7Q23C.
S7Q54    S7Q23C.
S7Q56    S7Q23C.
S7Q59    S7Q23C.
S7Q62    S7Q23C.
S7Q63    S7Q23C.
S8Q02R   RELIGION.
S8Q01R   TOPCDA.
S8Q03    DAYS.
S8Q04    S8Q04C.
S8Q05    S8Q06C.
S8Q06    S8Q06C.
S8Q07    S7Q23C.
S8Q08    S7Q23C.
S8Q09    S7Q23C.
S8Q10    S7Q23C.
S8Q11    YN.
S8Q12    NRSUADR.
S8Q13    NRSUADR.
S8Q14    NRSUADR.
S8Q15    NRSUADR.
FAMSTRUCT FAMS.
S9Q05R   S9Q05C.
S9Q08    EVGFPDR.
S9Q09    EVGFPDR.
S9Q10    EVGFPDR.
S9Q11B   YNX.
S9Q15    YN.
S9Q15A   YN.
S9Q15B   YN.
S9Q15C   YN.
S9Q15D   YN.
S9Q15E   YN.
S9Q18    EVGFPDR.
S9Q19    EVGFPDR.
S9Q20    EVGFPDR.
STATE    STATE.
S11Q01   YN.
RACER    RACEM.
RACEAIAN RACENAAN.
RACEASIA RACEASIA.
RACE_HI  RACEHI.
S11Q03   YN.
S11Q04   YN.
S11Q05   YN.
C11Q11   YN.
C11Q11A  YN.
C11Q11B  YN.
S9Q34    S9Q34C.
BMICLASS BMI.

```

```

;
run;

```

```

proc format;
value age
1="0-3 yrs old"
2="4-7 yrs old"
3="8-11 yrs old"
4="12-14 yrs old"

```

```

5="15-17 yrs old";

value gender
1=" Male"
2="Female";

value race
1="White, Non-hispanic"
2="Hispanic"
3="Black, Non-Hispanic"
4="Multiracial or Other, Non-hispanic";

value bmic
1="Overweight/At risk overweight"
0=" Under/Normal weight";

value chldex_r
2=" 1-0-3 days"
1 ="4+ days";

value all
1 = "0 days"
2 = " 1-3 days"
3 = "4-6 days"
4 = "everyday";

value childgh
1=" Excellent or Very Good"
2=" Good/Fair/Poor"; /*collapse due to small sample size*/

value education
1="High school graduate or less"
2="At least some college";

value motherh
1=" Excellent/Very Good"
2=" Good/Fair/Poor";

value fatherh
1=" Excellent/Very Good"
2=" Good/Fair/Poor";

value smoke
1="Someone in household smokes tobacco"
2=" No one in household smokes tobacco";

value motherex
0=" No regular exercise"
1="Yes regular exercise";

value fatherex
0=" No regular exercise"
1="Yes regular exercise";

RUN;

data tmp1.kat2formatted; set tmp1.kat1;

if AGEYR_CHILD ge 0 and AGEYR_CHILD le 3 then age = 1;
else if AGEYR_CHILD ge 4 and AGEYR_CHILD le 7 then age = 2;
else if AGEYR_CHILD ge 8 and AGEYR_CHILD le 11 then age = 3;
else if AGEYR_CHILD ge 12 and AGEYR_CHILD le 14 then age = 4;

```



```

else if AGEYR_CHILD ge 15 and AGEYR_CHILD le 17 then age = 5;

if S1Q01 = 1 then gender = 1; *male;
else if S1Q01 = 2 then gender = 2; *female;
else if S1Q01 = 6 or S1Q01 = 7 then gender = .;

if racer = 1 and S11q01 = 0 then race = 1; *white, nh;
else if racer eq 2 and s11q01 = 0 then race = 3; *black, nh;
else if racer in (3,4) and s11q01 = 0 then race = 4; *multiracial nh/other/nh;
else if S11Q01 = 1 THEN race = 2; *Hispanic;
else if racer = 6 or racer = 7 then race = .;

if BMICLASS in (1,2) then BMI = 0; *normal/under weight;
else if BMICLASS in (3,4) then BMI = 1; *overweight/at risk;

if S7Q21 = 0 then childex = 1; *0 days;
else if S7Q21 ge 1 and S7Q21 le 3 then childex = 2; *1-3days;
else if S7Q21 ge 4 and S7Q21 le 6 then childex = 3; *4-6days;
else if S7Q21 = 7 then childex = 4; *everyday;
else if S7Q21 = 96 OR s7q21 = 97 then childex = .;

childex_r = .;
if childex in (1,2,3) then childex_r=1;
else if childex in (4,5,6,7) then childex_r = 2;

if S2Q01 = 1 OR S2Q01 = 2 then childgh = 1; *excellent/v.good;
else if S2Q01 in (3,4,5) then childgh = 2; *good/fair/poor;
else if S2Q01 = 6 OR S2Q01 = 7 then childgh = .;

*parent's education level;
IF educationr in (1,2) then education = 1; *H.S> or Less.;
else if educationr = 3 then education = 2; *>H.S.;
else if educationr = 96 or educationr = 97 then education = .;

if S9Q08 = 1 OR S9Q08 = 2 THEN motherh = 1; *excellent/v.good;
else if S9Q08 in (3,4,5) THEN motherh = 2; *good/fair/poor;
else if S9Q08 = 6 OR S9Q08 = 7 THEN motherh = .;

if S9Q09 = 1 OR S9Q09 = 2 THEN fatherh = 1; *excellent/v.good;
else if S9Q09 in (3,4,5) THEN fatherh = 2; *good/fair/poor;
else if S9Q09 = 6 OR S9Q09 = 7 THEN fatherh = .;

*if S9Q10 = 1 OR S9Q10 = 2 THEN guardianh = 1;
*else if S9Q10 = 3 THEN guardianh = 2;
*else if S9Q10 = 4 OR S9Q10 = 5 THEN guardianh = 3;
*else if S9Q10 = 6 OR S9Q10 = 7 THEN guardianh = .;

*parent's smoking status;
if S9Q11B = 0 THEN smoke = 2; *no;
else if S9Q11B = 1 THEN smoke = 1; *yes;
else if S9Q11B = 6 OR S9Q11B = 7 THEN smoke = .;

if S9Q15 = 0 THEN motherex = 0; *no regular exercise;
else if S9Q15 = 1 THEN motherex = 1; *regular exercise;
else if S9Q15 = 6 OR S9Q15 = 7 THEN motherex = .;

if S9Q15A = 0 THEN fatherex = 0; *no regular exercise;
else if S9Q15A = 1 THEN fatherex = 1; *regular exercise;
else if S9Q15A = 6 OR S9Q15A = 7 THEN fatherex = .;

bothex=.;
if motherex=0 and fatherex=0 then bothex=4; * both slugs;

```

```

if motherex=1 and fatherex=1 then bothex=1; * both;
if motherex=1 and fatherex=0 then bothex=2; * mom not dad;
if motherex=0 and fatherex=1 then bothex=3; * dad not mom;

anyparent=0;
if motherex=1 or fatherex=1 then anyparent=1;

format age age. gender gender. race race. BMI BMIc. childex_r childex_r. childgh childgh.
education education. motherh motherh. fatherh fatherh. smoke smoke. motherex motherex. fatherex fatherex.;

/* eligibility*/
elig = 0;
if age in (2,3,4,5) and relation in (1,2) and gender NE . and race NE . and BMI NE . and childex_r NE .
and childgh NE . and education NE . and motherh NE . and fatherh NE .
and smoke NE . and motherex NE . and fatherex ne . then elig = 1;

/* new weight */
nweight_I = weight_I;
if elig = 0 then nweight_I = 0.0000000000001;

RUN;

PROC FREQ data = tmp1.kat2formatted;
TABLES AGEYR_CHILD*age S1Q01*gender racer*race BMICLASS*BMI S7Q21*childex S2Q01*childgh S2Q49*asthma
EDUCATIONR*education S9Q08*motherh S9Q09*fatherh S9Q11B*smoke S9Q15*motherex S9Q15A*fatherex/ missing;
where elig = 1;
RUN;

*****Table 1*****;
proc freq;
tables age gender race BMI childex_r childgh education motherh fatherh smoke motherex fatherex/missing;
where elig =1;
run;

PROC SURVEYFREQ data = tmp1.kat2formatted order = formatted;
Tables (age gender race BMI childex_r childgh education motherh fatherh smoke motherex fatherex)*elig/ cl;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
RUN;
/* table - frequencies by outcome variable childex*/
*****Table 2*****;
Proc Surveyfreq data = tmp1.kat2formatted order = formatted;
Tables (age gender race bmi childgh education motherh fatherh smoke motherex fatherex)*childex_r/col;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
RUN;

/*Confounding and unadjusted and adjusted odds ratios - step wise*/
* step 1 - create 2x2 -- with crude weighted numbers and estimate the odds ratio based on 2x2 table;
* use calculator;

Proc Surveyfreq data = tmp1.kat2formatted order = formatted;
Tables motherex*childex_r;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
RUN;

Proc Surveyfreq data = tmp1.kat2formatted order = formatted;
Tables fatherex*childex_r;

```

```
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
RUN;
```

**\*\* step 2: estimate an unadjusted odds ratio - based on the model;**

```
Proc SurveyLogistic data = tmp1.kat2formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex;  
Model CHILDEX_r= motherex;  
RUN;
```

**\*\*\* create a grid: - to understand confounding;**

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex age;  
Model CHILDEX_R= motherex age;  
RUN;  
Proc SurveyLogistic data = tmp1.kat2formatted ;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex gender/order = formatted;  
Model CHILDEX_r= motherex gender;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex race;  
Model CHILDEX_r= motherex race;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex BMI;  
Model CHILDEX_r= motherex BMI;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex CHILDGH;  
Model CHILDEX_r= motherex CHILDGH;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherex education;  
Model CHILDEX_r= motherex education;  
RUN;
```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class motherex motherh;
Model CHILDEX_r= motherex motherh;
RUN;

```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class motherex fatherh;
Model CHILDEX_r= motherex fatherh;
RUN;

```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class motherex smoke;
Model CHILDEX_r= motherex smoke;
RUN;

```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class motherex fatherex;
Model CHILDEX_r= motherex fatherex;
RUN;

```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class motherex age gender race BMI childgh education motherh fatherh smoke fatherex;
Model CHILDEX= motherex age gender race BMI childgh education motherh fatherh
smoke fatherex ;
RUN;

```

```

/* 2*2 table OR = 0.86*/
/* SAS to estimate crude*/

```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class fatherex;
Model CHILDEX_r= fatherex;
RUN;

```

```

/* Find confounders childex = fatherex + all variables*/

```

```

Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;
Strata state;
Cluster IDNUMR;
Weight nweight_I;
class fatherex age;
Model CHILDEX_r= fatherex age;
RUN;

```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex gender;  
Model CHILDEX_r= fatherex gender;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex race;  
Model CHILDEX_r= fatherex race;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex BMI;  
Model CHILDEX_r = fatherex BMI;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex CHILDGH;  
Model CHILDEX_r= fatherex CHILDGH;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex education;  
Model CHILDEX_r= fatherex education;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex motherh;  
Model CHILDEX_r= fatherex motherh;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex fatherh;  
Model CHILDEX_r= fatherex fatherh;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex smoke;  
Model CHILDEX_r= fatherex smoke;
```

**RUN;**

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex motherex;  
Model CHILDEX_r= fatherex motherex;  
RUN;
```

*/\*Full model - adjusted - childex = fatherex + all variables\*/*

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherex age gender race BMI childgh education motherh fatherh smoke motherex;  
Model CHILDEX_r= fatherex age gender race BMI childgh education motherh fatherh  
smoke motherex ;  
RUN;
```

*/\* Table 4 - Correlates of children's exercise Crude and Adjusted ODDS RATIOS\*/*

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class age;  
Model CHILDEX_r = AGE;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class gender;  
Model CHILDEX_r=GENDER;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class race;  
Model CHILDEX_r=race;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class BMI;  
Model CHILDEX_r=BMI;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class childgh;  
Model CHILDEX_r=childgh;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class education;  
Model CHILDEX_r=education;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class motherh;  
Model CHILDEX_r=motherh;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class fatherh;  
Model CHILDEX_r=fatherh;  
RUN;
```

```
Proc SurveyLogistic data = tmp1.kat2formatted order = formatted;  
Strata state;  
Cluster IDNUMR;  
Weight nweight_I;  
class smoke;  
Model CHILDEX_r=smoke;  
RUN;
```