Childhood Obesity: How Do Children in Eastern North Carolina Measure Up?

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May 2006
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2006
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EXECUTIVE SUMMARY

- The epidemic of childhood obesity is on the rise in eastern North Carolina as it is in the state and the nation. Obesity has become the most common chronic disease among children today. Nationally, more than one third of children are at risk for overweight and 17.1 percent are overweight. Some researchers now conclude we may be raising the first generation of children in history to have a shorter life expectancy than their parents due to obesity-related co-morbidities.

- Eastern North Carolina is a region in the eastern portion of the state comprised of 41 coastal plain counties. It contains 2.4 million people, approximately 30 percent of North Carolina’s more than 8 million people. The region is largely rural, with a population that is predominately poor and non-white, with low educational attainment.

- Adults in ENC have 13 percent higher rates of general mortality than adults in the rest of NC. In 1999-2000, 36.5 percent of adults in ENC were overweight and 24.6 percent were obese. Less than one quarter of adults eats the daily recommended amounts of fruits and vegetables and only 40 percent meet the current recommendation for physical activity.

- Regional studies in ENC reveal 40 to 50 percent of children are at risk for or overweight. Although there has not been a statewide system to monitor child weight status in NC, a growing number of regional studies reveal strikingly similar findings. Many ENC youth are significantly heavier than their counterparts in other parts of the state and nation, with some studies reporting that 30 percent of ENC children and adolescents are overweight compared to 17 percent nationally.

- ENC children are not as physically active as they should be. While about half of ENC youth are active for 60 minutes or more on 5 to 7 days of the week, close to a quarter of them get little or no physical activity. About half also report watching three or more hours of television per day on an average school day; one fifth reported watching five or more hours a day.

- ENC children are not eating health-promoting diets. A majority of youth are not meeting the 2005 Dietary Guidelines for Americans. They do not eat at least five fruit and vegetables a day, or consume a sufficient amount of calcium on a daily basis. Many children and adolescents are also taking in more calories than their bodies need through sugar-sweetened beverages and high fat, low-nutrient foods.

- While most ENC residents are aware of obesity as a heath issue that leads to serious health problems, fewer believe childhood obesity is as serious a concern for their children. Most attribute obesity to a sedentary lifestyle and believe it would be easier to increase the amount of physical activity they get than to make dietary changes. The majority of parents in one survey were supportive of public health efforts and policy changes to address the obesity epidemic.
• Overall, eastern North Carolina counties have lower breastfeeding rates than the rest of NC. Thirty-one of the 41 ENC counties (76 percent) have rates lower than the state rate of 47 percent. According to Pitt County Memorial Hospital data, about half of mothers are exclusively breast feeding their babies at discharge.

• Public school systems across ENC are in varying stages of making improvements to their Child Nutrition Programs. While many schools still have a long way to go to improve food offerings for students, all are in the process of complying with the Child Nutrition and WIC Reauthorization Act of 2004, in which schools have to submit new wellness policies for nutrition and physical activity by summer of 2006. In addition, NC House Bill 855 and NC Senate Bill 961 are strengthening standards for foods served in the cafeteria and sold in vending machines. Many ENC schools participate in Winner’s Circle programs and a number of them have received grant funding to implement nutrition programs.

• The North Carolina Healthy Active Children Policy has been strengthened to require K-8 grade students to get at least 30 minutes of physical activity each day. All elementary and middle schools will have to provide at least 30 minutes of activity, either through physical education classes, recess, or other physical activity programs or curricula beginning fall of 2006. High schools students have to complete one unit of Physical Education to graduate. A number of schools in ENC, either through grant funding or their own initiatives, are also implementing programs such as Take 10!™ Energizers or the Be Active North Carolina “Active Steps Youth Program.”

• Many studies are currently underway at East Carolina University to address childhood obesity. The studies range from basic science to clinical and behavioral to prevention and treatment studies. Preliminary results from many of the studies are promising but more research is necessary to better understand how to prevent, identify, and treat obesity.

• Regional institutions such as East Carolina University (ECU) and the University Health Systems (UHS) of Eastern Carolina are taking steps to address the childhood obesity epidemic. ECU has created the Pediatric Healthy Weight Research and Treatment Center to conduct research, collaborate with community partners and provide clinical care for overweight youth in the region. Other departments at ECU also have strong research and service programs aimed at reducing obesity. UHS has funded many initiatives to address obesity, including a year-long public awareness campaign with a local television station.

• Many community-based programs are being developed to address the obesity epidemic. A number of local school systems and community agencies, such as health departments, have forged partnerships to create innovative programs to improve nutrition and increase physical activity. Initiatives such as “Fit Together” and the Kate B. Reynolds “SELF Improvement” have provided funding for many communities and are showing some preliminary success.
• While many corporate, community and academic resources, programs and organizations exist to address childhood obesity in portions of eastern North Carolina, other areas have little access to such resources. Although a growing number of at-risk and overweight children have access to programs and services to improve their dietary and physical activity habits and provide treatment for obesity co-morbidities, others have limited access to such programs and services and are likely to continue to gain weight and suffer health complications due to their weight.
INTRODUCTION

Over the last few years, childhood obesity* has rapidly gained national attention as an epidemic in the U.S. population. Obesity has become the most common chronic medical problem in children today.1 Nationally, approximately one third of children and adolescents are at risk of overweight and 17 percent are overweight.2, 3 Many people perceive obesity to be an appearance issue and not a health concern, especially as it relates to children; however, studies show that obesity has profound health implications. Heavy children often suffer from depression and low self-esteem as well as medical conditions such as type 2 diabetes, hypertension, elevated cholesterol, asthma, orthopedic problems, and sleep apnea.1, 4 It is particularly alarming that the prevalence of type 2 diabetes among children in the U.S. has been increasing and parallels the rise in obesity.5 Historically, type 2 diabetes has been known as a disease of adults; however, it is now being identified with greater frequency among adolescents.6 The Centers for Disease Control and Prevention warns that one in three U.S. children born in 2000 (and one in two Latino children) will become diabetic unless people start eating less and exercising more. Approximately 2 million adolescents in the US have impaired fasting glucose, a pre-diabetic condition associated with obesity, which puts them at risk for developing type 2 diabetes and cardiovascular disease.7 Impaired fasting glucose along with other metabolism-related disorders such as obesity, hypertension and high cholesterol often occur together in a condition called the Metabolic Syndrome.8 This condition has also been rising among adolescents, increasing from 4.2% in NHANES III (1988 to 1992) data to 6.4% in NHANES 1999-2000 data. One study found that approximately one-third of overweight adolescents had the metabolic syndrome, placing them at increased risk for diabetes and cardiovascular disease. Current data suggests life expectancy for obese young adults may be reduced by as much as twenty years.9 The true magnitude of the health consequences of obesity are unknown since youth have never been as overweight as they are today.

From a fiscal viewpoint, annual obesity-associated hospital costs among youths between the ages of 6 and 17 have increased from $35 million during 1979-1981 to $127 million during 1997-1999, and these costs can be expected to increase at an accelerated rate in the future if current dietary and physical activity patterns do not improve.10 A recent study by Be Active North Carolina found that obesity-related costs for youth in NC were estimated to be at least $38.16 million dollars in 2003.11 The Be Active NC study also estimated an overweight young adult will incur over $200,000 in direct medical care expenses due to their excess weight by retirement age. These costs are also expected to rise due to population growth in the state, increasing medical costs and the expectation that many youth will continue to be inactive and consume unhealthy diets in the future.

The national trend of increasing overweight among children is even more pronounced in eastern North Carolina, a 41 county area that has a large disadvantaged and culturally diverse population. The area is one of the poorest health areas in the nation, with among the highest rates of adult diabetes, hypertension, and obesity.12 Similar to the rest of the nation, more than 60

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* When referring to the epidemic, the term “childhood obesity” is used to convey the magnitude and seriousness of the condition. However, the terms “at-risk for overweight” and “overweight” are used when referring to children to avoid labeling and stigmatization.
percent of adults in eastern North Carolina are either overweight or obese; however, a greater percentage of these adults are obese compared to others in the rest of the state. It is widely accepted that parents influence the development of behavioral habits among their children. Thus, parents who engage in unhealthy lifestyle habits, model these habits for their children. Studies have also shown that children with one obese parent have a 40 percent chance of developing obesity over their lifetime; this risk increases to 80 percent with two obese parents.

A number of local studies and programs have found that youth in eastern North Carolina are more overweight than their counterparts in other parts of the state. A cohort study conducted for the NC Health and Wellness Trust Fund “Fit Together” initiative found 54 percent of youth in eastern NC are at risk for overweight or overweight compared to 44 percent in the piedmont and 42 percent in western NC. Over a third of these youth are overweight compared to only about a quarter of youth in other parts of the state. A study conducted by Borre found that 28 percent of children were overweight compared to 17 percent nationally. Another study found that one third of overweight children referred for a dietary intervention and lifestyle research program had the metabolic complications that lead to type 2 diabetes. These studies highlight the serious nature of the epidemic in eastern North Carolina.

This paper describes what is known about the prevalence of childhood obesity in ENC and reviews the dietary and physical activity habits of the region’s youth. Factors that influence childhood weight status such as breastfeeding, and nutrition and physical activity within the schools are explored. The report also provides brief summaries of ongoing obesity-related research within the region and notes key public and community efforts that are underway to prevent and treat childhood obesity.
THE EASTERN NORTH CAROLINA CONTEXT

To provide a context in which to understand the relevant data and information on childhood obesity in eastern North Carolina, this section presents basic demographic characteristics for the region and describes general mortality and prevalence of obesity for adults. It also provides behavioral data from the North Carolina Behavioral Risk Factor Surveillance System (BRFSS) conducted in Pitt County and the North Carolina Six-County Cardiovascular Health Survey to illustrate the dietary and physical activity practices of adults in the region.

Eastern North Carolina Demographics
Eastern North Carolina (ENC) is a region in the eastern portion of the state comprised of 41 coastal plain counties (see Appendix A). The region contains 2.4 million people, approximately 30 percent of North Carolina’s more than 8 million people. The region’s population has been growing in absolute terms but its proportion relative to the state has been declining over the last two centuries. Cumberland County is the most populated county in the region with 303,000 people; Hyde and Tyrrell are the least populated counties, with 5,826 and 4,149 people, respectively. There are several mid-sized cities in the region including Fayetteville, Goldsboro, Greenville, Jacksonville, Rocky Mount, Wilmington and Wilson.

Several demographic characteristics distinguish ENC from other regions in the state:

**Rural:** ENC is largely rural. Seventeen counties have less than 25 percent of their population categorized as urban.

**Low educational attainment:** The percentage of people who have less than a ninth grade education in ENC is 8.4 percent compared to 7.8 percent for the state overall. In Pitt County, approximately 60 percent of high school seniors took the SAT compared to 68 percent for NC as a whole. In 2002, the Hertford County high school drop out rate was 6.8 percent compared to 5.2 percent for the state. Other counties in eastern N.C. have similar rates to those of Pitt and Hertford Counties.

**Elderly:** Although the percentage of elderly is 11.8 percent, slightly lower than the state percentage (12.0 percent), several rural counties have experienced the “aging in place” phenomena as a result of out migration of younger people. This is especially true in the region’s least populated counties in the extreme northeast portion of the state. Some counties on the coast also have higher percentages of elderly due to an increasing number of retirement communities.

**Poor:** ENC is predominately poor. Slightly more than 15 percent of the region’s population lives in poverty compared to 12.3 percent for the state as a whole. In counties such as Bertie, approximately 30 percent of children ages 0 to 17 receive food stamps compared to 14.3 percent for the rest of NC. The average median family income for Tyrell and Duplin counties is $35,900 and $38,700, respectively, in contrast to $53,000 for the state.

**Non-white population:** ENC has a large nonwhite population, 37.6 percent, compared to 24.2 percent for the state. This population is largely African American, but includes Native Americans and a growing number of Hispanics. ENC also has a greater percentage of nonwhite children ages 0 to 17; for example, in Bertie County, 73 percent of children are non-white (mostly African American) while in Columbus County, approximately 38 percent are non-white.
To find specific data for other eastern NC counties for the indicators discussed above, readers can visit the Action for Children North Carolina web site at [http://www.ncchild.org/](http://www.ncchild.org/). The demographic characteristics discussed above provide the context for the health problems, including obesity, that confront ENC. Lower educational attainment, poverty and the rural nature of the region all contribute to the population’s lack of adequate access to health care resources in many counties of ENC. In addition, cultural factors, such as diet, sedentary lifestyle, and attitudes toward health and illness, impact the health of individuals in the region.

**General Mortality**

The major causes of death in ENC and the nation are similar; however, ENC is distinguished by a higher rate of general mortality. ENC’s rate is 12 percent higher than the U.S. rate and 13 percent greater than the rate for the rest of NC. The top five causes of death are heart disease, stroke, cancer of the trachea, lung and bronchus (TBL), chronic respiratory disease and diabetes mellitus. While general mortality in ENC has been declining, the disparity between mortality in ENC and the rest of NC, has grown from 10 percent greater mortality in 1979 to 13 percent in 2001. Table 1 provides death rates for ENC for selected diseases associated with obesity.

<table>
<thead>
<tr>
<th>Disease</th>
<th>ENC Death Rate per 100,000</th>
<th>Death Rate for Rest of NC per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Disease</td>
<td>279.5</td>
<td>236</td>
</tr>
<tr>
<td>Stroke</td>
<td>78.8</td>
<td>70.6</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>33.1</td>
<td>24.1</td>
</tr>
</tbody>
</table>


There are also major racial and ethnic disparities in ENC’s mortality rates. Unless significant interventions change the current trends, the nonwhite mortality rate will be 35 percent higher than the rate for whites in 2010. ENC’s rate for premature mortality is also 13 percent higher than for the rest of NC. The premature mortality rates for heart disease and diabetes mellitus, two diseases associated with obesity, are 23 and 27 percent higher than for the rest of the state.

According to a special report issued by the State Center for Health Statistics, ENC ranked higher than the state on 11 out of 12 health indicators (all except for binge drinking), including diabetes, obesity and no leisure-time physical activity. ENC age-adjusted rates for three of the four health care access indicators (no health insurance, no dental insurance, cost as a barrier to health care access and no usual place of care) were also significantly higher than the state rates.

**Prevalence of Adult Overweight and Obesity**

In 1999-2002, 36.5 percent of the adult population in ENC was [overweight](#). This rate is not significantly different than the rate for the remaining counties in NC (36.1) or for the nation (37.2). Adults in ENC, however, are [significantly more obese](#) (24.6 percent of the population) compared to adults in the remaining North Carolina counties (21.6 percent) and the U.S. as a whole. When compared by race and gender, there are no statistical differences based on region alone for the adult population considered overweight. Males are significantly more overweight
than females both in ENC and for the rest of the state. Table 2 provides a summary of these rates by race and gender for ENC.

Table 2: Percent Overweight by Race and Gender for Eastern North Carolina Adults

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whites</td>
<td>48.2</td>
<td>27.7</td>
</tr>
<tr>
<td>African Americans</td>
<td>41.6</td>
<td>28.4</td>
</tr>
</tbody>
</table>

Source: Center for Health Services Research and Development, East Carolina University. A summary of adult overweight and obesity in eastern North Carolina. 2003. Available at www.chsrd.med.ecu.edu/RegionalHlthRiskAnalysis/OverweightAndObesityInENC.pdf

There were also no statistically significant differences by region by race and gender for adults who are obese. However, when examined by race alone, African Americans in ENC, and for the rest of NC, are significantly more obese when compared with their white counterparts. Figure 1 provides the percent obese for ENC by race and gender.

Figure 1: Percent Obese by Race and Gender for Eastern North Carolina Adults

As described in the demographic section of this paper, the eastern region of NC has a greater proportion of African Americans than the state as a whole. Thus, the larger African American population in ENC accounts, in part, for the higher obesity rates in the region. Other factors that may contribute to the higher rates include income (poverty) and educational attainment. Obesity is associated with low socioeconomic status. Given that ENC is predominately poor and generally less well educated, it makes sense that these factors may also contribute to the higher rates of obesity in the region. These high rates of obesity in adults are important because it is known that children with at least one overweight parent are at risk for obesity due to genetics and environment.

Dietary and Physical Activity Practices of Adults

Each year, the Centers for Disease Control and Prevention (CDC) conducts a random national telephone survey of state residents aged 18 and older in households with telephones as part of their Behavioral Risk Factor Surveillance System (BRFSS). County specific data are produced for 10 counties in North Carolina, including Pitt County. The remaining NC counties are
stratified into three regions: western, piedmont and eastern. Standard core questions are asked every year; other questions are added depending on the year or state. 2002 BRFSS data (which includes a more complete set of questions related to diet and physical activity), and 2004 BRFSS data from North Carolina reveal that:\textsuperscript{31, 32}

- Almost half (49 percent) of adults in Pitt County and 41 percent of adults in ENC are now trying to lose weight.
- Fewer than one-quarter of Pitt County or ENC residents (23 percent) are eating the recommended five fruits and vegetables a day; approximately one third consume only one to three fruits and vegetables daily.
- Only 42.6 percent of adults in Pitt County and 39.7 percent of adults in ENC meet the current recommendations for physical activity.
- About one fifth (21.5 percent) of people in Pitt County and almost a third (31.4 percent) in ENC are not engaging in any leisure-time physical activity at all. In addition, 16.3 percent of people in Pitt County and 18.3 percent of those in ENC are considered physically inactive.

The North Carolina Six-County Cardiovascular Health Survey,\textsuperscript{33} a survey designed to collect county-level data on physical activity, nutrition and other cardiovascular risk factors for the development of a cardiovascular health program, included two eastern North Carolina counties: Pitt and Robeson. In 2000, approximately 300 adults were surveyed from each county from June to November. The survey revealed:

- Nearly 60 percent of respondents in Pitt County, and almost 50 percent in Robeson ate meals away from home one to three times per week. In both counties, approximately 22 percent ate away from home more than four times a week.
- Approximately three quarters of Pitt and Robeson county respondents (73.6 and 78.7 percent, respectively) did not report eating five or more fruits and vegetables a day.
- Over 80 percent of respondents (85.1 and 81.3 percent, for Pitt and Robeson counties, respectively) consumed diets considered to be high in fat.
- Only 17.8 percent of Pitt County respondents and 11.4 percent of Robeson County respondents reported engaging in regular and sustained physical activity.

These habits, described above, play a large role in the formation of the eating and physical habits of the children in ENC.
PREVALENCE OF CHILDHOOD OBESITY

National Prevalence of Childhood Obesity

Body mass index (BMI) is the measurement used to define weight status. While BMI for adults and children are calculated in the same manner, they are interpreted differently. The Centers for Disease Control and Prevention (CDC), which provides national statistical data on the status of American youth, defines children and adolescents as being at risk for overweight if they are at or above the 85th percentile for BMI; children and adolescents are considered overweight if they are at or above the 95th percentile for BMI.\(^3\),\(^4\)

According to these standards, approximately 30 percent of children (ages 6 to 11), and adolescents (ages 12 to 19) nationally are at-risk for overweight and 17.1 percent are overweight.\(^2\),\(^3\) The prevalence of at-risk for overweight is higher in boys than girls (32.7 percent compared to 27.8 percent), but is about the same among adolescents (approximately 30 percent).

Prevalence of Childhood Obesity in ENC

North Carolina has not had a statewide surveillance system to collect data and monitor the prevalence of obesity among its youth. A number of studies and projects conducted in the state and in some of the eastern region’s counties since the late 1990s, however, demonstrate the pervasiveness of overweight in eastern NC. Although many of the studies are somewhat limited because they do not use a representative sampling design, they provide the best estimates of prevalence that currently exist. When the data from these studies are viewed collectively, they reveal approximately half of school-age children in eastern North Carolina are either at-risk for overweight or overweight. Several of the studies document that more than twice as many children are overweight compared to their national counterparts.

NC Nutrition and Physical Activity Surveillance System (NC-NPASS)

The only statewide source of data for childhood weight is the North Carolina Nutrition and Physical Activity Surveillance System (NC-NPASS). NC-NPASS compiles data submitted by local health departments and WIC programs on a variety of health indicators. The data are not representative of all children in the state since they are primarily gathered from children seen in public health settings. These data, however, provide the only county-level data for BMI status. For the state as a whole, the overweight prevalence for each age category has increased from 2002 to 2004 (see Figure 2).

**Figure 2: Change in Prevalence of Overweight by Age Category in NC, 2002 to 2004**

![Figure 2: Change in Prevalence of Overweight by Age Category in NC, 2002 to 2004](www.eatsmartmovemorenc.com)

Seventeen percent of all 2 to 18 year olds measured in the 2004 NPASS were considered overweight compared to 15.6 percent in 2002. More than a quarter (27.2 percent) of the 12 to 18 year olds were overweight compared to 17.1 percent nationally. When broken down by age and county, the percentages in some eastern counties are alarmingly high. Table 3 presents prevalence of overweight by age category for selected eastern counties who report data on at least 100 cases. Few counties report at least 100 cases in the older age groups and thus, the rates for these counties are less reliable. For this reason, only a handful of counties with high percentages for older children are shown in the table.

### Table 3: Prevalence of Overweight for Selected ENC Counties

<table>
<thead>
<tr>
<th>ENC COUNTIES BY AGE CATEGORY</th>
<th>PERCENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-4 Year Olds – State Percentage</td>
<td>14.9</td>
</tr>
<tr>
<td>Carteret</td>
<td>18.8</td>
</tr>
<tr>
<td>Duplin</td>
<td>17.8</td>
</tr>
<tr>
<td>Hoke</td>
<td>17.9</td>
</tr>
<tr>
<td>Lee</td>
<td>17.4</td>
</tr>
<tr>
<td>Johnston</td>
<td>17.2</td>
</tr>
<tr>
<td>Wilson</td>
<td>19.5</td>
</tr>
<tr>
<td>5-11 Year Olds – State Percentage</td>
<td>23.8</td>
</tr>
<tr>
<td>Craven</td>
<td>31.3</td>
</tr>
<tr>
<td>Johnston</td>
<td>33.9</td>
</tr>
<tr>
<td>12-18 Year Olds – State Percentage</td>
<td>27.2</td>
</tr>
<tr>
<td>Craven</td>
<td>29.7</td>
</tr>
<tr>
<td>Halifax</td>
<td>29.6</td>
</tr>
</tbody>
</table>

Source: 2004 NC-NPASS data. Available at [www.eatsmartmovemorenc.com](http://www.eatsmartmovemorenc.com)

**Bethel Elementary School Study**

As early as 1990, physicians and researchers at East Carolina University were concerned about the apparent increase in childhood obesity they were seeing in the region. A study conducted with 295 Kindergarten through fifth grade students at Bethel Elementary School in Pitt County examined available data in school records and revealed that 28 percent of the children were over the 75 percentile of weight for height measurements. Another fourteen percent of children were considered overweight, with their weight for height measurements being greater than the 90th percentile.

**Nutrition Partners**

In the mid 1990s, Pitt Partners for Health, a community partnership with representatives from local churches, businesses, community and human service agencies in Pitt County determined that nutrition was a major health concern in the community. To help address this issue, Pitt Partners for Health created a Nutrition Partners subcommittee in 1995. In 1998 Dr. Kristen Borre, Co-Chair of Nutrition Partners, measured 560 sixth grade students from a representative sample of Pitt County schools with the assistance of community volunteers. She found 45 percent of students had a BMI above the 85th percentile and 30 percent of these children were above the 95th percentile.
Childhood Obesity: How do children in eastern North Carolina measure up?

Youth Risk Behavior Survey
The Youth Risk Behavior Survey (YRBS), administered by the Research Division of the Department of Family Medicine at East Carolina University, in Pitt, Martin, Hertford and Duplin counties is one of the main sources of ongoing data on health behaviors and indicators among eastern North Carolina children. The survey was first administered to middle school students (grades 6-8) in the four selected counties in 1997. In 2001, the survey began assessing self-reported height and weight of the students. In 2003, the survey collected actual measurements from a representative sample of eighth grade students to validate the self-reported measures. The average BMI for the measured sample was 24.0 with a standard deviation of ±5.7. \(^{40}\) BMI ranged from 11.7 to 47.3. Table 4 provides a summary of the students who were normal weight, at-risk and overweight by self-report as well as data for the subset of students who provided height and weight measurements.

Table 4: Percent Normal Weight, At Risk for Overweight, and Overweight by Self Report and Actual Measurement

<table>
<thead>
<tr>
<th></th>
<th>% Normal Weight</th>
<th>% At Risk for Overweight (85(^{th}) – 94(^{th}) percentile)</th>
<th>% Overweight (≥95(^{th}) percentile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Reported</td>
<td>65.6</td>
<td>18.0</td>
<td>16.4</td>
</tr>
<tr>
<td>Measured (N=579)</td>
<td>53.0</td>
<td>20.8</td>
<td>26.2</td>
</tr>
</tbody>
</table>


According to this survey, 47 percent, almost half, of the measured eighth graders were at-risk or overweight according to CDC standards. This study also shows that over a quarter of students (26.2 percent) are already overweight compared to about 17 percent nationally.

In the spring of 2005, the Research Division of Family Medicine administered the YRBS to youth in the same four counties again. This survey collected self-reported data only. Of the 4,599 children who took part in the survey, about half (2,214) reported their height and weight measurements, enabling calculation of their BMI. For this sample, 18.3 percent were at risk for overweight and 18.8 percent were overweight. \(^{41}\) It is interesting to note the percentage of students at risk for overweight was essentially the same as in 2003; however, the percentage of students who are considered overweight increased from 16.4 percent to 18.8 percent.

The 2003 survey did not show statistically significant differences in prevalence by gender or race by BMI category (at-risk or overweight). However, the 2005 survey showed that a statistically significant percentage of boys were at risk or overweight (40.1 percent) than girls (34.1 percent), and 43.5 percent of African Americans and 44.5 percent Other Races were at risk or overweight compared to Whites (28.7 percent).

Growing Up FIT!
In July 2000, Growing Up FIT! (GUF), a multi-level intervention program designed to improve dietary and physical activity habits of school-age children, began in Pitt County as an outgrowth of Dr. Kristen Borre’s work with the Pitt Partners for Health Nutrition Partners subcommittee. In 2001, it received funding from the Kate B. Reynolds Charitable Trust SELF Improvement
Program and continued its work in the school system. In its first year, GUF staff began collecting ongoing, longitudinal data to monitor the growth of students participating in the program. Analysis of these initial data revealed that 42 percent of a representative sample of 3rd through 5th graders in two Pitt County schools were at-risk for or overweight; 28 percent of the students were overweight. These data indicate ENC children are significantly more overweight than children nationally.  

**NC Health and Wellness Trust Fund “Fit Together” Grantees**

In 2003, the NC Health and Wellness Trust Fund (HWTF) partnered with Blue Cross and Blue Shield of NC to launch “Fit Together,” a statewide initiative to address obesity. The partnership funded 21 community-based and statewide obesity prevention grants (see Appendix B for the ENC grantees). The Research Division of East Carolina University is conducting an evaluation of the Fit Together grantees, which includes the collection of data on a cohort of youth. The purpose of the cohort study is to measure the overall impact of the 21 projects on health behaviors related to obesity. While the cohort is not a representative sample, each project is contributing data from children representing their target population. The number of children from each project has varied, ranging from 34 children to approximately 350. Changes in BMI status and health behaviors are being monitored for three years. BMI is being assessed through self-report. Although their evaluation is not complete, the Research Division has shared preliminary results from their 2005 Mid-Year Report to the HWTF.

As of June 2005, baseline data were submitted by 18 of the 21 grantees and included 1,640 children. Approximately half of the children are male (51.1 percent) and 41 percent are non-white. Forty percent of the sample is from eastern North Carolina, including the following counties: Beaufort, Bertie, Chowan, Columbus, Cumberland, Halifax, Martin, Pender, Perquims, Pitt, Robeson, Sampson, and Washington. The data show that for the cohort as a whole, 2 percent of the children are underweight, 50 percent are normal weight, 18.6 percent are at risk for overweight, and 29 percent are overweight. Table 5 shows the BMI status by region of state residence.

<table>
<thead>
<tr>
<th>BMI Status</th>
<th>Eastern</th>
<th>Piedmont</th>
<th>Western</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>2.1%</td>
<td>2.2%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Normal Weight</td>
<td>43.9%</td>
<td>53.4%</td>
<td>55.7%</td>
</tr>
<tr>
<td>At Risk for Overweight</td>
<td>16.3%</td>
<td>20.2%</td>
<td>19.9%</td>
</tr>
<tr>
<td>Overweight</td>
<td>37.7%</td>
<td>24.2%</td>
<td>22.4%</td>
</tr>
</tbody>
</table>

Source: Fit Together Mid-Year Report to the North Carolina Health and Wellness Trust Fund Commission. Prepared by Department of Family Medicine, Brody School of Medicine, East Carolina University, August 2005.

While a smaller percentage of ENC youth are at risk for overweight compared to the Piedmont and Western regions, more than one third (37.7 percent) are overweight; this is in comparison to about a quarter of youth in the central and western part of the state. When the at risk and overweight categories are considered together, more than half of children in ENC (54 percent) are either at risk for overweight or overweight.
**Jones County School Study**

Faculty from the ECU School of Nursing and staff from the Jones County Health Department conducted a study in spring 2004 of all children in the Jones County Public School System to determine the prevalence and pattern of overweight and hypertension. Over 1,100 K-11th grade students (approximately 87 percent of all students) participated in the study. The prevalence of students who were overweight was 29.1 percent. Close to half (46.5 percent) of the students were at risk of overweight or overweight. King et al. also reported the prevalence of elevated blood pressure was 21.6 percent, occurring most frequently in older children.

**Pamlico County School Data**

At the prompting of a local physician, school nurses in the Pamlico School System measured all K-5th grade students in the county’s two elementary schools starting in 2003. According to 2005-2006 data, 44.1 percent of the elementary school students are at risk for overweight or overweight; 26 percent are overweight.

**Craven County School Data**

In 2003, Craven County was awarded a grant from the Kate B. Reynolds Charitable Trust to employ school nurses in the public school system. As part of the grant, the school nurses agreed to implement nutrition-oriented activities, including the measurement of BMI among the school children. In spring 2004, the school nurses, assisted by P.E. teachers, conducted height and weight screening and calculated BMI for all third, fourth and sixth grade students. The students were measured again the following year (while in fourth, fifth and seventh grades). Results are provided in the table below.

<table>
<thead>
<tr>
<th>Grade in School</th>
<th>2004 (N=2,901)</th>
<th>2005 (N=2,845)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent ≥ 85th %</td>
<td>Percent &gt;95th %</td>
</tr>
<tr>
<td>3rd &amp; 4th graders</td>
<td>43</td>
<td>23</td>
</tr>
<tr>
<td>6th graders</td>
<td>36</td>
<td>22</td>
</tr>
</tbody>
</table>


As seen in many of the previous school measurements, approximately 40 percent of children are at risk for overweight or overweight and over 20 percent are already over the 95th percentile for BMI.

**East Carolina University Physicians’ Medical Chart Review**

In 2003, researchers at the East Carolina University Brody School of Medicine conducted a retrospective chart review of 552 two year olds from an outpatient pediatric clinic in eastern North Carolina. Using available data on height and weight in the charts, BMI values were calculated. This study revealed that 9.4 percent of two year olds were considered overweight (above the 95th percentile for BMI). They also examined data from 134 of the same patients at their five-year well visit. Approximately 22 percent were overweight at this visit. These findings
indicate patients at the outpatient clinic had a higher overweight prevalence than the 2 to 5 year olds in the 1999-2000 National Health and Nutrition Examination Survey (21.6 percent compared to 10.4 percent), and the prevalence dramatically increased from two to five years of age. The Latino population had the highest rate of overweight (25 percent) at two years of age, followed by Caucasians (8.5 percent) and African Americans (7.3 percent). This small study indicates even in very young populations, there are high percentages of overweight children in ENC.

In 2005, Aravapalli and Collier extended the chart review to patients at two other university-based clinics, including two family practice clinics.\(^47\) In addition to determining the prevalence of obesity, they looked at elevated blood pressure and dyslipidemia among a cohort of 5 year olds (n=602). Aravapalli and Collier found the prevalence in this cohort for at risk of overweight was 16 percent; the prevalence of overweight was 17.3 percent. These rates are higher than national rates (10.2 percent for 2-5 year olds at risk of overweight and 10.4 percent for those already overweight), and support findings from the 2003 study.

**Kate B. Reynolds SELF Improvement Programs**

In 1999, the Kate B. Reynolds Charitable Trust created its Chronic Disease Initiative Program called the SELF (Smoking, Education, Lifestyle, Fitness) Improvement Program. In July 2001, the SELF Improvement Program funded 15 projects for up to five years. Seven of the 15 projects were awarded to eastern NC counties, including Bladen, Pitt, Dare, Hertford, Craven and Onslow counties and the Martin-Tyrrell-Washington Health District. All of the projects except for one have a component for children and youth. Aggregate data from these projects are not available yet but should be forthcoming soon. Personal communication with two project coordinators reveal that similar rates to those already discussed exist in the SELF Improvement project counties as well.\(^48\), \(^49\)

**Child Health Assessment and Monitoring Program**

The lack of systematic statewide data to track BMI among children in NC will soon be addressed. In 2004, the Child Health Assessment and Monitoring Program (CHAMP) was developed; it was first implemented in January 2005.\(^50\) It is the first survey in NC to measure health characteristics of children from birth to age 17. Eligible children are drawn each month from CDC Behavioral Risk Factor Surveillance System households in the state. All adult respondents with children living in their household are invited to participate in the survey. One child in the house is randomly selected for data collection. Questions on the CHAMP survey cover a wide-variety of health topics, such as breastfeeding, child development, access to health care, nutrition, physical activity, mental health and parent opinions about childhood obesity. The survey will be administered annually and will help monitor health status and identify health problems. Data from 2005 are not yet available online but should be in the near future.

**Summary**

All of the studies and projects reviewed in this section were conducted with children of different age groups over a period of several years, yet they all yield similar and troubling results: **40 to 50 percent of children in eastern North Carolina are either at-risk for overweight or are already overweight.** Several studies also document considerably more ENC children are overweight when compared to children nationally. For example, the Jones County School study
found 29 percent of students were overweight; the Health and Wellness Trust Fund Evaluation cohort found an astounding 37.7 percent of ENC youth were already overweight. These figures should serve as a call to action for leaders in the region and at the state level to continue to advocate for policies and programs that promote healthy lifestyles in our communities and schools and to provide funding for initiatives to help address the obesity epidemic. To provide a fuller picture of childhood obesity in the region, the next sections examine lifestyle habits of eastern NC youth and other factors that contribute to obesity.
PHYSICAL ACTIVITY AMONG EASTERN NORTH CAROLINA CHILDREN

There are few data collected systematically at the state level that describe the physical activity habits of eastern NC youth. The Centers for Disease Control (CDC) conducts the Youth Risk Behavior Survey among a random, representative sample of middle and high school youth every two years. These data, while helpful for the state as a whole, do not provide information about the specific behaviors of ENC children and adolescents. In the last two years, however, several local studies have been conducted in selected counties that reveal ENC youth are not as active or fit as they could be.

Bethel Elementary School Study
As early as the 1990s, the Bethel Elementary School Study tested children annually to assess their physical fitness. The measurements included a mile run, sit-ups and sit-to-reach exercises. Passing was defined as performance at or above the 50th percentile. The study revealed:
• An average of 40 percent of students failed the mile run;
• 24 percent failed the sit ups;
• 30 percent failed the sit to reach exercises; and
• Significantly higher failure rates were recorded for girls than boys.

Youth Risk Behavior Survey
As part of its Youth Risk Behavior Survey (YRBS), the Research Division of Family Medicine assesses self-reported physical activity among middle school students in four eastern North Carolina counties (Martin, Duplin, Pitt and Hertford). Main findings from the 2005 YRBS are summarized below.

• Almost one quarter of students (23.7 percent) reported they were physically active on only one or zero days during the past seven days. Alternatively, close to half of students (45 percent) reported they were active for 60 minutes or more on 5 to 7 days of the past week.
• Nearly half of students (46 percent) reported watching three or more hours of television per day on an average school day; one fifth (19.7 percent) reported watching five or more hours per day.
• On an average weekend day, a majority of students (58.2 percent) watched television for 3 or more hours per day; about one third watched for five hours.
• Approximately 40 percent of students spent two or more hours in other screen time activities (computer, video games, etc.).

Earlier data from the 2001 YRBS revealed some differences in physical activity by race and gender. African American females reported engaging in the fewest days per week of hard physical activity and the most hours spent per day in sedentary activities. Tables 7 and Figure 3 provide a breakdown of these physical activity indicators by race and gender.
Table 7: Mean Days per Week of Physical Activity by Race and Gender

<table>
<thead>
<tr>
<th></th>
<th>African American</th>
<th>Caucasian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>4.3</td>
<td>4.8</td>
</tr>
<tr>
<td>Females</td>
<td>3.5</td>
<td>4.2</td>
</tr>
</tbody>
</table>


Figure 3: Four or More Hours of Television Watching per Day by Race and Gender


NC Health and Wellness Trust Fund “Fit Together” Grantees
As part of the NC HWTF Fit Together cohort study (described earlier), each grantee had parents or students (depending on the age of the student in the each grantee’s target population) complete surveys assessing dietary and physical activity behaviors. Mid-year results from the cohort study include both baseline (Time 1) and follow up (Time 2) data. Grantees implemented interventions between Time 1 and Time 2, so differences may indicate improvements based on programming. The table below shows selected findings from the cohort survey.

Table 8: Physical Activity Habits of Fit Together Cohort Respondents

<table>
<thead>
<tr>
<th>Percent of respondents reporting they…</th>
<th>Time 1</th>
<th>Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are a little or a lot more active than others their same age and sex</td>
<td>40.6</td>
<td>46.4</td>
</tr>
<tr>
<td>Are active about the same amount as others their same age and sex</td>
<td>48.9</td>
<td>45.5</td>
</tr>
<tr>
<td>Are moderately active for at least 20 minutes on 5 to 7 days during the past week</td>
<td>49.8</td>
<td>61.6</td>
</tr>
<tr>
<td>Watch three or more hours of television on the typical school day</td>
<td>31.4</td>
<td>29</td>
</tr>
<tr>
<td>Watch three or more hours of television per weekend day</td>
<td>74.7</td>
<td>69.8</td>
</tr>
</tbody>
</table>

One of the NC HWTF grantees is the Physical Activity and Nutrition (PAN) Branch of the NC Division of Public Health, NC Department of Health and Human Services. As part of their grant,
they are conducting a statewide social marketing campaign to address childhood obesity. In fall of 2005, the PAN Branch contracted with a marketing company to conduct a telephone survey with parents in four North Carolina counties: Lee, Johnston, Swain and Vance. The survey included only African American, Hispanic and Native American parents (n=400) with children aged 5-11 years old living in the household. While this survey included only one eastern NC county, three of the counties are in the eastern half of the state. Key findings related to physical activity for this survey include:

- Almost one third (30 percent) of children watch television or play video games more than three hours per day. Hispanic children watch significantly less television than African American or Native American children.
- Approximately half of the children (49 percent) are active three or more hours per day. A majority of parents (64 percent) state their children are most active at home after school or on the weekends.
- Close to 80 percent of parents/guardians believe their children are at or above the recommended physical activity for a healthy life.
- Depending on the county, 60 to 70 percent of respondents report not having a recreational facility or playground nearby.
- Over half of respondents (53 percent) want more organized activities for their children.

Summary
The results of these studies indicate about half of children in eastern NC are at least moderately active on a majority of the days of the week. However, a significant portion of youth spends three or more hours a day engaged in sedentary activities, such as watching television or playing video games. Although some parents surveyed believed their children were at or above the recommended amount of physical activity for a healthy life, others desire additional facilities and programs, so their children can be more active.
NUTRITION AMONG EASTERN NORTH CAROLINA CHILDREN

Similar to the data describing physical activity habits of ENC youth, nutritional data for the region are somewhat limited. The section below, however, describes several local studies that have assessed dietary habits of school-age children in the region.

Bethel Elementary School Study
In the 1990s, the Bethel Elementary School study assessed dietary intake of participating students. The study revealed:

- Only 4 percent of children met the daily recommended guidelines for a healthy diet;
- Approximately one third of the children consumed the recommended number of fruits and vegetables daily; and,
- Only one out of five consumed enough dairy products.

Youth Risk Behavior Survey
The 2005 YRBS conducted among Pitt, Martin, Duplin, and Hertford County middle school students also assessed nutritional habits. Selected results from the survey reveal:

- Almost half of youth (45.5 percent) eat fruits two to three times on a typical day. More than one third (34.7 percent), however, do not eat any fruit or eat it only once daily.
- Forty-three percent of students eat vegetables two to three times on a typical day. About an equal percentage (41.9 percent) of students do not eat any vegetables or eat only one serving a day.
- On a typical day, a majority of students (58.1 percent) drink sugar-sweetened beverages three or more times.
- Almost one quarter of students (23 percent) ate French fries four or more times during the past seven days.
- Over three quarters of students (78.4 percent) reported drinking one glass of milk per day or less during the past seven days.
- Over one third of students (36.2 percent) ate breakfast all seven days during the past week. Approximately 39 percent, however, did not eat breakfast at all during the time period or only ate breakfast one or two mornings during the week.
- A majority of students (63.6 percent) reported eating dinner at home with their families 5 to 7 days during the past week. Over 15 percent, however, ate dinner at home with their families only once or not at all during the past seven days.

Data from the 2003 YRBS revealed some differences in fruit and vegetable and milk consumption by race and gender:

- Slightly more males (70 percent) than females (65 percent) reported eating less than one serving per day of vegetables.
- More females (64 percent) than males (57 percent) reported drinking less than one serving per day of milk.
- African Americans were more likely to report eating less than one serving per day of fruits and vegetables and drinking one serving of milk than other racial or ethnic groups.
NC Health and Wellness Trust Fund “Fit Together” Grantees

The NC HWTF Fit Together health behavior survey, conducted as part of its cohort study (described earlier), assessed dietary habits of children in the cohort. Parents or children completed the surveys. Approximately 1,600 surveys were completed at baseline (Time 1) and approximately 1,000 at follow up (Time 2). Survey results for consumption of specific foods and beverages are summarized in the table below.

Table 9: Consumption of Foods and Beverages by Fit Together Grantees

<table>
<thead>
<tr>
<th>Question Topics</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount of Milk</td>
<td>Close to half the children (46 percent) drink one glass of milk or less on a typical day.</td>
</tr>
<tr>
<td>Type of Milk</td>
<td>About 40 percent at both baseline and follow up report drinking whole milk. Only 8 to 9 percent report regularly drinking skim or nonfat milk.</td>
</tr>
<tr>
<td>Consumption of Water</td>
<td>Over one third of children (37.6 percent and 35.4 percent for baseline and follow up, respectively) report drinking one glass or less of water on a typical day. Only about 15 percent (at both time periods) report drinking four or more glasses of water per day.</td>
</tr>
<tr>
<td>When thirsty….</td>
<td>Most youth report drinking water (35 percent), sweetened beverages (25 percent), or juice (18-19 percent).</td>
</tr>
<tr>
<td>Beverages on a typical day…</td>
<td>About one third of children at both baseline and follow up report drinking sugar-sweetened beverages (not including soda) three or more times per day. Another one third report drinking at least one soda per day.</td>
</tr>
<tr>
<td>Amount of Vegetables</td>
<td>On a typical day, about 36 percent of youth. Alternatively, 22 percent reported eating three or more servings of vegetables per day.</td>
</tr>
<tr>
<td>Amount of Fruits</td>
<td>Approximately 46 percent of children do not eat any fruit or eat only one serving on a typical day. About 17 percent eat 3 or more fruits daily.</td>
</tr>
<tr>
<td>Consumption of chips or French fries</td>
<td>More than half of children (54.7 percent and 57.7 percent at baseline and follow up, respectively) eat French fries or chips at least once a day. About 35 percent report eating at fast food restaurants at least twice a week, with about 10 percent eating at fast food restaurants three or more times a week.</td>
</tr>
<tr>
<td>When hungry and wanting a snack…</td>
<td>About 22 percent report eating chips. Another 15 percent snack on cookies, cake or pop tarts.</td>
</tr>
<tr>
<td>Breakfast</td>
<td>About three-quarters of children (74.3 percent and 76.5 percent at baseline and follow up) eat the school breakfast five days a week.</td>
</tr>
</tbody>
</table>
Summary
These findings highlight that while some children are eating a healthy diet, many are not. A majority of students are not meeting the 2005 Dietary Guidelines for Americans or the 2005 American Heart Association dietary guidelines for children. They are not eating at least five fruit and vegetables a day, or consuming enough calcium on a daily basis. In addition, many are taking in more calories than their bodies need through sugar-sweetened beverages and high fat, low-nutrient foods.
KNOWLEDGE AND ATTITUDES ABOUT CHILDHOOD OBESITY

In 2005, two studies were conducted in ENC to assess knowledge and attitudes towards childhood obesity. The first study included a telephone survey conducted by Alan Newman Research in April 2005 on behalf of the Pitt County Memorial Hospital’s Pediatric Healthy Weight Case Management program. The purpose of the survey was to measure parental awareness of and attitudes towards childhood obesity in Pitt County. The Pediatric Healthy Weight Case Management program also requested several knowledge and attitude questions be added to the Pitt County version of the 2005 YRBS conducted by the Research Division of Family Medicine at ECU. The second study was a telephone survey conducted by the Physical Activity and Nutrition (PAN) Branch of the NC Division of Public Health, NC Department of Health and Human Services as part of their statewide social marketing campaign to address childhood obesity.

Pediatric Healthy Weight Case Management Parental Survey

In April 2005, Alan Newman Research conducted a random-digit dial telephone survey with 500 Pitt County parents (children ages 2 to 17). Twenty-one percent of respondents had incomes less than $50,000 per year, 11 percent were African American and 47 percent were female. Results from the survey reveal most of the respondents were aware of childhood overweight as a health issue. 53

- Although most respondents believe overweight is a serious problem among adults and children in Pitt County, almost a quarter (23 percent) do not believe so.
- The majority of respondents said overweight is more of a health concern than an appearance issue for adults; Caucasians were more likely to believe this than African Americans.
- Most also thought being overweight was a health concern for children; however, over a quarter (28 percent) thought it was more of an appearance issue.
- Most respondents agreed the number of overweight children and adults is higher than it was 20 years ago, and believe those who are overweight are at increased risk for cardiovascular disease and diabetes.

Respondent beliefs about the reasons for increasing childhood obesity include:

- About half (about 48 percent) attribute increasing overweight among children and adults to a lack of exercise. Other contributors to obesity include eating out and liking junk food.
- Almost two-thirds of parents (62 percent) believe the easier way for children to maintain a healthy weight is to increase their physical activity rather than change the way they eat.
- The top reasons why children are not eating as healthy as they could are time pressures keep parents from preparing healthy meals (28 percent), parents do not provide healthy meals (21 percent) and children prefer unhealthy foods (20 percent).
- More than half of parents (53 percent) noted a sedentary lifestyle as the main reason their children are not as active as they could be.
Parents were also surveyed about their attitudes and beliefs about community involvement to address obesity.53

- A majority (58 percent) believe being overweight or obese is a public health issue that society needs to help solve. Those with higher incomes or who were female were more likely to believe weight is a public health issue than those with lower incomes or who were male.
- About 80 percent of respondents were in favor of policy changes to help children eat healthy and stay active. Females (90 percent) were more likely to be supportive of policy changes than males (69 percent).

Youth Risk Behavior Survey
The 2005 YRBS survey (described earlier) also asked over 2,000 Pitt County middle school students about childhood obesity. Results from the YRBS are similar to those found in the Pediatric Healthy Weight Case Management parent survey.54

- One third of students (32.8 percent) think overweight is more of an appearance concern than a health issue.
- Three-quarters of students believe being overweight is a serious or very serious problem among others their age in Pitt County.
- Close to 60 percent of respondents believe being overweight increases a person’s chance of later developing diabetes and heart disease.
- When asked about losing weight, the majority (60.4 percent) thought it would be easier to increase the amount of physical activity they get than to change the way they eat.

PAN Branch Social Marketing Survey
The Physical Activity and Nutrition (PAN) Branch of the NC Division of Public Health, NC Department of Health and Human Services contracted with a marketing company to conduct a telephone survey with parents in four North Carolina Counties (described earlier). The survey included a number of questions that assessed beliefs about obesity.

Key findings from the survey include:52

- Approximately 80 percent of parents/guardians believe their child meets or exceeds the recommended amount of physical activity for a healthy life.
- About half of all respondents think they are at a healthy weight; African Americans and Native Americans were less likely to believe so than Hispanics. African American respondents were also less likely to report doing something about their weight compared to overweight Native Americans.
- The vast majority of respondents (79 percent) believe their children are at a healthy weight. Close to 95 percent of parents/guardians feel somewhat or very confident that they know what a healthy weight is for their child.
- Twenty percent of respondents do not believe their child’s weight and the amount of physical activity they get will have an impact on their current health. Almost 15 percent do not believe their child’s weight or activity level will impact their health in the future when they become adults.
Overall, a quarter of respondents were concerned about the safety of playgrounds in their area. Residents from the ENC county, Johnston County, were less likely to have this concern than other respondents (only 14 percent believed their playground were unsafe).

More than half of the respondents (57 percent) let their children play outside with a trusted adult supervisor.

About half of all respondents (53 percent), especially African Americans (63 percent) wanted more organized activities for their children.

Summary

These surveys reveal the majority of residents in the region are aware of obesity as a health issue that leads to serious health problems. However, fewer people believe childhood obesity is a serious concern or that their children are overweight. Most attribute obesity to a sedentary lifestyle and believe it would be easier to increase the amount of physical activity they get than to make dietary changes.
BREASTFEEDING AND CHILDHOOD OBESITY

While the evidence that breast feeding reduces the risk of obesity is still conflicting, the American Academy of Pediatrics, the American Academy of Family Physicians, the American Dietetic Association, the Surgeon General and the World Health Organization all endorse human breast milk as being the optimal form of nutrition for newborn infants. In addition, the 2001 Surgeon General’s Call to Action to Prevent and Decrease Obesity recommends strategies be developed and implemented that “[e]ducate expectant parents and community members about the potentially protective effect of breastfeeding against the development of obesity.” Potential weight-related benefits of breastfeeding include:

- Breastfed infants may be less likely to become overweight as they grow older; and
- Mothers who breastfeed may return to pre-pregnancy weight more quickly.

Given the potential benefits for the prevention of childhood obesity, data on breastfeeding rates in eastern NC are included in this section.

Pregnancy Risk Assessment Monitoring System (PRAMS)
The Pregnancy Risk Assessment Monitoring System (PRAMS) is an ongoing mail/telephone survey of women who have recently given birth in North Carolina. Each month approximately 200 women are randomly selected from the birth certificate file to be included in the survey. The survey collects information on a variety of health behaviors and indicators related to pregnancy and birth. Findings from 2003 reveal that:

- Seventy percent of all women surveyed initiated breastfeeding.
- Older women with more than a high school education and with annual incomes of $40,000 or more were considerably more likely to breastfeed than younger women with a high school education or less, and who earned less than $25,000 per year.
- White and Hispanic women (75.2 and 86 percent, respectively) were more likely than African American women (53.9 percent) to breastfeed.
- Only 42.1 percent of the women surveyed exclusively breastfed their baby for 8 or more weeks.

The North Carolina Pregnancy Nutrition Surveillance System (NC-PNSS) also provides statewide data on breastfeeding rates. The data are primarily from low-income women, most of whom participated in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC); thus, they are not representative for all women. According to the 2003 NC-PNSS data, 55.2 percent of women reported ever breast feeding. The breastfeeding rates differed significantly by race/ethnicity, with 54.4 percent of whites, 41.5 percent of blacks and 82.7 percent of Hispanic women breastfeeding.

Breastfeeding in Eastern North Carolina
NC-PNSS data also reveal significant differences in breastfeeding percentages by county, ranging from as low as 14.6 (in Northampton County) to 99.3 percent (in Martin County). Some of these differences may be due to small numbers of women being included in the dataset. Overall, however, eastern North Carolina counties have lower breastfeeding rates than the rest of...
NC, especially western North Carolina. According to 1999 NC-PNSS data, 31 of the 41 ENC counties (76 percent) have rates lower than the state rate. The 2003 breastfeeding rate for Pitt County was 43.4 percent, significantly lower than the rate of 55.2 percent for NC overall. Interestingly, several ENC counties, such as Martin and Dare counties, have rates higher than the state (99.3 percent and 94.9 percent respectively).

2005 data from Pitt County Memorial Hospital indicate 63 percent of mothers breastfed their babies at least some of the time prior to their discharge from the hospital, and 49.2 percent exclusively breastfed their babies prior to discharge.
IMPACT OF SCHOOL ENVIRONMENT ON CHILDHOOD OBESITY

As childhood obesity has become increasingly prevalent, nutrition professionals, health providers, and parents have looked to our nation’s schools, often viewing them both to be part of the problem and part of the solution. Some believe the schools are partially responsible for the obesity epidemic by serving foods with poor nutritional value and decreasing or eliminating physical education (P.E.) classes and recess; others see schools as integral to the solution for obesity since they have the potential to reach many children and provide healthy meals and regular physical activity for students.

The provision of meals within the nation’s public school system has become increasingly complicated over the years. What began as an effort to provide a square meal for children who were not getting enough to eat at home, has evolved into a complex program that impacts school budgets and staffing as well as the students themselves. The availability and consumption of high-calorie foods and beverages outside of the national school breakfast and lunch programs has become a concern for many in eastern North Carolina and across the state. There is also growing concern about the amount of physical activity that children are able to engage in during the school day. Because schools are increasingly under pressure to meet specific academic standards for reading, writing and mathematics, many have devoted time previously earmarked for physical education and recess to additional study of basic subjects. The sections below describe some of the history of policies and programs related to nutrition and physical activity in North Carolina as well as recent legislation aimed at improving the health of our state’s children through the public school system.

Nutrition Policies and Programs
The next few sections describe both federal and state nutrition policies as well as local programs within schools in ENC.

Background Information about Food Served and Sold in Schools
In 1946, President Harry Truman signed the National School Lunch Act, establishing the National School Lunch Program (NSLP), a federally-assisted meal program that offers nutritionally balanced, low cost or free lunches to children each school day. In 1966, the National School Breakfast Program (NSBP) was established as a pilot project and then permanently authorized in 1975. There have been many changes to these programs over the years. In 1995, the U.S. Department of Agriculture established standards requiring schools to provide National School Lunch Program (NSLP) and National School Breakfast Program (NSBP) meals that meet dietary guidelines and contribute toward a healthy diet. These meals are available to all children, including those who are eligible for free or reduced-price meals. The percentage of children receiving free or reduced-price meals in ENC counties varies from as low as 24.5 percent in Dare County to 84.3 percent in Bertie County. About half of children in Pitt County (48.4 percent) receive free or reduced-price meals compared to 44.3 percent for the state overall.

The U.S.D.A. standards do not apply to foods sold “a la carte” or in school snack bars, vending machines or at other school functions or events. These foods, sold after the last lunch period, do not have to meet nutrition standards as long as monies earned from their sale go back into school budgets. Given this fact, many schools have expanded their a la carte offerings as well as
vending machines and other foods (considered “competitive foods”) over the years, and their sales have now become important contributors towards the schools’ general operating budgets. Some schools also receive compensation for “pouring rights” contracts with beverage companies to exclusively sell the company’s sweetened beverage products.

Thus, while schools participating in the NSLP and NSBP are required to offer nutritious meals to children, many other food and beverage choices (often of minimal nutritional value but which appeal to children) are also available. And, as noted earlier, these “competitive foods” are often fiscally important to the schools as sources of revenue. These issues make changing the nutritional environment of schools complicated in North Carolina and across the U.S.

New Federal Legislation
Many of these issues, however, may soon be addressed as public school systems comply with new legislation at the federal level. On June 30, 2004, President Bush signed the Child Nutrition and WIC Reauthorization Act of 2004 into law (Public Law 108-265). The Act expands the availability of nutritious meals and snacks to a greater number of children in school, such as migrant, homeless and runaway children, and expands its programs outside of school hours. It also streamlines paperwork related to eligibility for free or reduced prices meals and requires school districts to adopt wellness policies that address physical activity and healthy eating. These policies must be in place by the start of the 2006-2007 school year. Schools across North Carolina are in the process of completing their school wellness policies and should have them in place by the summer of 2006. These policies are intended to provide the basis for improvements in the school systems throughout the state, including eastern North Carolina.

In addition, in April 2006, a bipartisan group in Congress introduced legislation to prohibit the sale of low nutrition foods in schools. The bill, called the Child Nutrition Promotion and School Lunch Protection Act, would amend the National School Lunch Act. It calls on the U.S.D.A. to update its nutrition standards for foods sold outside of the school meal program, such as foods sold through vending machines, school stores and a la carte items in the cafeteria. At the writing of this document, this bill has not been signed into law.

North Carolina Nutrition Policies
Several legislative and policy changes have also taken place in North Carolina in the last two years. Two bills, House Bill 855 and Senate Bill 961, were passed in 2005 to establish amended Child Nutrition Standards and regulate the sale of food and beverages to students through vending machines (See Appendix C).

House Bill 855 is an act directing the State Board of Education to establish statewide nutrition standards for school meals, a la carte foods and beverages and the after school snack program administered by the Department of Public Instruction and child nutrition programs in local school districts. The new standards will gradually decrease foods high in fat and sugar, and increase foods containing fruits, vegetables and whole grain products. These changes will be implemented first in the elementary schools, followed by the middle and then high schools.

Senate Bill 961 amends NCGS 115C-264 and establishes a new section (115C-264.2) to regulate the sale of food and drink during the day. The bill prevents schools from selling soft drinks
during breakfast or lunch and provides other specific requirements for elementary, middle and high schools. Elementary schools cannot sell soft drinks at all and middle schools can only sell diet soft drinks or bottled water. Public high schools may, with local school board approval, sell beverages in vending machines if no more than 50 percent of the offerings are sugar-sweetened sodas. Diet soft drinks are not considered to be sugar-sweetened beverages and may be offered. Bottled water must also be offered at all high schools that have beverage vending machines. In addition, by the 2006-2007 school year, all middle and high school snack vending machines will have to meet the Proficient Level of the North Carolina Eat Smart Nutrition Standards. The proficient level states that 75 percent of snack vending products should not have more than 200 calories per portion or snack vending package.

**Participation in Statewide Winner’s Circle Program**

Winner’s Circle is a statewide healthy dining program created through the partnership of the NC Prevention Partners and various state agencies. The initiative is designed to create and promote healthy eating environments through free and voluntary partnerships between local eating establishments and health agencies. The Winner's Circle Healthy Dining Program allows consumers to recognize and choose healthy food options through item labeling. Foods that meet certain nutritional criteria can be labeled with the Winner’s Circle star and fork logo. Several national chains, such as Subway, Golden Corral and McDonald’s, as well as local restaurants, businesses and schools participate in the program by allowing their menu or vending machine items to be analyzed and labeled with the Winner’s Circle logo. The label enables consumers and students to choose healthier foods when eating at these restaurants, schools or businesses.

Thirty-five of the 41 eastern NC counties (85 percent) take part in Winner’s Circle through their public school systems. Meals that qualify as meeting the Winner’s Circle nutritional criteria are labeled with the Winner’s Circle logo. These items are also identified as such on the school menu. This labeling enables parents to encourage their children to select the healthier options and also allows students to make healthier choices when selecting food each day in the cafeteria. Schools can also label snack vending items with the logo if items qualify. There are six counties in eastern NC that do not currently participate in the Winner’s Circle program in the school system. To view the latest map with participating counties, visit the NC Winner’s Circle web site at [http://www.ncwinnerscircle.com/](http://www.ncwinnerscircle.com/).

**Other School-based Nutrition Programs**

Many school systems in the region are implementing nutrition-related programs and activities for students as part of grants or other health promotion initiatives. For example, in Nash County, the schools have developed a program called F.U.N. (Friends Unraveling Nutrition) for 4th and 5th graders who are overweight. The program is scheduled as needed once a number of children have been referred by physicians or teachers. F.U.N. typically has 12 to 13 sessions; students bring their school breakfast to a separate classroom and receive nutrition instruction. Instructors are drawn from a number of sources including the local health department, P.E. teachers, cafeteria manager, and the local NC Cooperative Extension agent.  

The Pamlico County school nurse has assessed BMI in all the county schools and is working with the local School Health Advisory Council (SHAC) to develop a 13-week program called “Kids in Motion,” modeled after some other local programs. Halifax County has developed a program called “Way to Go Kids!” which provides nutrition instruction as part of an after-school program.
**North Carolina Physical Activity Policies**

Legislative changes have also occurred in the arena of physical activity. In January 2003, the North Carolina State Board of Education passed the *Healthy Active Children* policy (Appendix D). The 2003 policy stated schools should:

- Establish local School Health Advisory Councils;
- Conduct needs assessments on health services and programs;
- Provide an action plan to the NC Department of Public Instruction in July 2004;
- Provide annual progress reports for subsequent years;
- Consider the benefits of physical activity (150 minutes for elementary and 225 minutes for middle schools that will include a minimum of every other day Physical Education throughout the 180-day school year);
- Provide physical education classes that have the same class size as other courses;
- Provide appropriate amounts of recess and physical activity of sufficient duration for significant health benefit; and
- Not take structured recess and physical activity away as a form of punishment.

In April 2005, this policy was amended by the State Board of Education to include a 30-minute daily physical activity **requirement** for Kindergarten through eighth grade students (as opposed to the 2003 language in which school were encouraged to “consider the benefits of physical activity). North Carolina is the first state in the nation to pass a 30-minute requirement at the State Board level. The physical activity requirement does not have to be met through formal Physical Education (P.E.) classes, but rather can be met through the provision of active recess, dance, or other curriculum-based physical activity programs such as “Energizers” or *Take 10!* The physical activity time is intended to complement P.E. classes, not serve as a substitute for them. The physical activity also must be of “sufficient intensity to provide significant health benefits.” This policy is to be fully implemented in the 2006-2007 school year.

High school students are required to take one unit (180 days) of physical education to graduate. State Youth Risk Behavior Survey data reveal there is a steady decline in student enrollment in P.E. courses each year after the ninth grade. For example, in 2001, 73 percent of ninth graders were enrolled in P.E. classes, yet only 29 percent of twelfth graders were.

**Other School-Based Physical Activity Programs**

A number of school systems are now implementing supplemental programs to help students become more active. These include programs such as Energizers, *Take 10!* or Be Active North Carolina’s *Active Steps Youth Program*. Other schools are obtaining grant funds to build walking trails or promote special fitness events. For example, as part of their Fit Together grant, schools in Bertie, Chowan and Perquimans counties are developing walking clubs and building 10 walking trails. They are also participating in the *Active Steps Youth Program* in which students receive pedometers to help them track their steps throughout the day. In Halifax County, as part of their Fit Together grant, they are piloting Energizers, a physical activity-based curriculum in four of their elementary schools. Craven County has also implemented *Take 10!* into their schools.
Nutritional and Physical Activity Habits of Private and Home Schooled Children
Little is documented about the nutritional and physical activity habits of children who attend private schools or who are home schooled in the state or in ENC. In NC, approximately 58,780 students were home schooled during the 2004-2005 school year;\textsuperscript{80} approximately 91,084 children attended private schools in 2004-2005.\textsuperscript{81} Although private and home schools must follow certain state regulations related to health, such as those regarding annual attendance, disease immunizations, fire, safety and sanitation, they are not required to follow specific dietary guidelines for meals or foods offered on their premises or to offer physical education classes to children on a regular basis.\textsuperscript{82, 83}

Summary
Public schools clearly have a role to play in addressing childhood obesity. There are a number of legislative efforts underway both nationally and at the state level to improve the quality of the nutrition programs within the schools as well as to increase the amount of physical activity children receive during the school day. Many local school districts are also implementing their own programs and activities to help children eat healthier and be more active.
OBESITY-RELATED STUDIES AMONG EASTERN NORTH CAROLINA CHILDREN

Many researchers at East Carolina University are conducting clinical, basic science or behavioral studies related to obesity. Faculty associated with the ECU Diabetes and Obesity Center are nationally known for their basic science research, primarily among adults. In addition, faculty in the ECU Department of Surgery have received international recognition for their work in surgical treatment of obesity with gastric-bypass surgery in adults. Although fewer faculty members are conducting research among children, a number of studies have included ENC youth who are at-risk or already overweight. Highlights of some of these studies are provided in the section that follows. Although an effort has been made to include many of the studies going on at ECU, it is not possible to provide an exhaustive list.

KIDPOWER: In 2002, the Pitt Memorial Hospital Foundation (PMHF) funded the KIDPOWER project to recruit at risk for overweight youth (greater than 85th percentile for BMI) in Pitt County into a structured dietary intervention. Data collected from this first round of KIDPOWER participants were examined to explore the relationship between overweight and type 2 diabetes. Results from several studies using KIDPOWER data are described below.

- **Hyperinsulinemia in overweight children appears to result from both increased insulin secretion in response to increased insulin resistance, and decreased insulin clearance in the liver.** Cummings and colleagues compared estimates of insulin secretion, clearance and resistance in overweight children and found that both mean insulin resistance and mean insulin secretion significantly increased as BMI increased.\(^8^4\) A strong and significant correlation existed between the degree of insulin resistance and increasing insulin secretion. These findings suggest that additional insulin is secreted in response to insulin resistance. They also found a significant decrease in insulin clearance as the BMI increased, suggesting decreased hepatic insulin extraction.

- **A significant percentage of overweight children may be hyperinsulinemic.** Sullivan and colleagues found that almost 30 percent of 171 at-risk or overweight children were hyperinsulinemic. These children and teens were over the 85th percentile BMI for age and referred by their physicians for possible study participation. Although not a representative, random sample, the study revealed BMI is an independent risk factor for hyperinsulinemia and the strongest independent predictor of increased cardiovascular risk. Children with hyperinsulinemia had higher BMIs, total cholesterol, LDL cholesterol, C-peptide, serum glucose and insulin to glucose ratios than children who were not hyperinsulinemic.

- **Insulin resistance is associated with important cardiovascular risk factors in children.** Cummings and others explored the relationship between two separate measures of insulin resistance and cardiovascular risk factors.\(^8^5\) They found that insulin resistance, measured by the homeostatic model and quantitative insulin sensitivity check index, was highly correlated with important cardiovascular risk factors in children, including blood pressure, total cholesterol, LDL cholesterol, HDL cholesterol, triglycerides, and BMI.
In 2004 and 2005, the PMHF funded a community dietitian to continue the KIDPOWER project in local physician practices in Pitt County. The community dietitian provides free medical nutrition therapy (MNT) services to at risk for overweight and overweight youth in eight practices. The KIDPOWER dietitian follows a MNT protocol developed in Pitt County under the direction of ECU faculty. The protocol incorporates evidence-based guidelines and clinical experience into a series of seven nutrition counseling visits.

In a retrospective chart review of patients seen by the KIDPOWER dietitian, Kolasa, Henes and Balkman documented 582 patients were referred for services from August 2004 to December 2005. Close to one-quarter of the patients (N=129) had more than one MNT visit through March 2006. More than half the sample was African American (52 percent) and 70 percent were female. At baseline, the means for all lab values were in the normal range except for LDL cholesterol, which was elevated. They found children who participated in the standardized protocol had a decline in BMI over time (average BMI decreased from 132.4 ± 2.2 to 129.1 ± 3.2) and that on average, after four MNT visits, some patients made small but significant lifestyle changes, such as decreasing sugar-sweetened beverage intake, eating out and consumption of fried foods. Some patients also increased fruit and vegetable consumption and physical activity levels.

**Youth Risk Behavior**

The Youth Risk Behavior Survey (YRBS), described earlier, is a survey administered by the Research Division of the Department of Family Medicine at East Carolina University (ECU) every other year to middle school students in Pitt, Martin, Hertford and Duplin counties. The 2003 sample included 4,708 participants. Researchers at ECU have explored a variety of weight-related issues using data collected from YRBS participants. Findings from some of these studies are described below.

- **Students who consider themselves overweight have higher depression scores.** Whetstone and colleagues explored the relationship between weight perception and depressive symptoms, focusing on potential race and gender differences. They found students who perceived themselves to be overweight (regardless of actual weight) had higher depression scores than those who perceived themselves to be of normal weight. They did not find significant racial or gender differences.

- **Obese students are more likely to think their health is poor and to have high scores on depression indexes.** Garry and others evaluated the relationship between obesity, physical activity, sedentary activity and depressive symptoms in middle school students. They found that recent physical activity levels, sports participation, and hours/day of sedentary activity were not associated with obesity. Obese students, however, were more likely to perceive their health to be poor, and to have higher scores on a depression index than children of normal weight.

- **Substance use and selected dieting techniques are associated in children as young as middle school age.** Morrissey and others explored whether use of diet pills, laxatives, or vomiting as weight loss tactics were associated with alcohol and cigarette use in middle
school students as they are in older adolescents.\textsuperscript{89} They found that substance use is associated with both use of diet pills and vomiting as early as middle-school age.

- **When providing self-reported data on height and weight, children tend to significantly underestimate their weight but provide reliable estimates of their height.** Morrissey and colleagues used data from two counties in eastern North Carolina to evaluate the relationship between self-reported and measured height and weight in a sample of eighth grade students.\textsuperscript{90} Three hundred and fifty one students provided both self-reported and actual measurements for height and weight. Morrissey and associates used the measurements to calculate BMI. The results indicated that the students significantly underestimated their weight, but on average, provided reliable estimates of their height. Race, self-reported BMI category (at-risk for or overweight) and measured BMI category influenced the underestimation of weight. They concluded primary care researchers who plan to assess the prevalence of obesity in adolescents may want to use measured height and weight when feasible.

- **Middle-school aged children categorized as overweight and who engaged in unhealthy weight control behaviors are more likely to think about suicide than children who are not overweight.** Whetstone used data from 2003 YRBS to examine weight perception as a predictor of suicidal thoughts and behavior.\textsuperscript{91} Her sample included 4,078 middle school age students. She found more females than males reporting thinking about, planning, or trying suicide, and using vomiting or laxatives to control weight. The girls and boys differed on weight perceptions as well, with girls being more likely to believe they were overweight (overweight 27.2\% v. 21.9\%, \textit{p}<.001). Both weight perception and unhealthy weight control practices were significant predictors of thinking about suicide. Only unhealthy weight control significantly predicted for planning or trying suicide. This study highlights the importance of understanding the relationship between weight status and suicide, especially as more children become overweight and are labeled as such by others. In addition, unhealthy weight control practices place children at increased risk for suicide regardless of weight status.

Brief summaries of other research studies being conducted by ECU faculty, graduate or medical students are provided below.

- **Obstructive sleep apnea syndrome (OSAS) appears to be one of the mechanisms why some obese children are hypertensive and others are not.** Reade and colleagues reviewed the records of 90 children ages 4 to 18 who had a BMI of 95\textsuperscript{th} percentile or higher and who were referred by their primary care physicians for sleep study because of their clinical presentation.\textsuperscript{92} They found that the incidence of hypertension (68\%) and overweight (75\%) was higher in OSAS patients when compared to those without OSAS.

- **Responses of salivary cortisol and lypolysis are not necessarily linked but may be altered in obese children.** Hershberger and colleagues conducted a study with a sample of fourteen lean and eleven obese children to determine whether there were differences in lipolytic responses to feeding and physical activity and if the responses were related to
the glucocorticoid cortisol. Their data suggest the responses of salivary cortisol and lipolysis are not necessarily linked but are altered in obesity. Prior exercise may improve the antilipolytic response to a meal in obese children.

- **Although carbohydrates may play a role in the development of overweight in children, they are not a major factor.** In an analysis of 450 students from Growing Up FIT! in which 24-hour dietary recall records were reviewed, Dawson found that the intake of carbohydrates and calcium was not significantly different in normal and overweight children. Thus, while carbohydrates may play a role in the development of overweight, they are not a major factor. In addition, the data did not support a correlation between increased calcium consumption and better weight management among the students.

- **A study exploring energy expenditure among prepubescent girls indicates obese girls are less active than non-obese girls.** Mahar and colleagues conducted a small study (N=60) of obese and non-obese 12 to 14 year old girls who performed exercise bouts on a treadmill and wore RT3 activity monitors and pedometers. They found the obese girls took nearly 1,000 steps fewer per day than the non-obese girls.

- **Physical activity may decrease sympathetic nervous system activity and increase parasympathetic activity in obese children.** A pilot study with 10 obese children ages 8 to 11 years old conducted by Russoniello and others supported previous studies that reported decreases in sympathetic activity and increases in parasympathetic activity after participation in a physical exercise program. These changes are important since the autonomic nervous system function is chronically altered in obese individuals, with the sympathetic system being dominant in a supposedly balanced system.

A few studies have been conducted by ECU faculty looking at attitudes, behaviors or perceptions related to childhood obesity. Several are highlighted below.

- **There is a need for bilingual community health professionals to promote greater engagement in moderate-intensity physical activity and more frequent consumption of lower-calorie foods among immigrant Hispanic families.** A descriptive, exploratory study by McArthur and associates identified potential risk factors for childhood obesity at the household level among 128 immigrant Hispanic families with school-age children living in eastern North Carolina. Activities undertaken by families four to seven times per week included watching television, listening to music and reading (70, 69 and 61 percent, respectively). Cookies, cold cereal, crackers, whole milk, ice cream, cheese, hotdogs, peanut butter, soft drinks, fruit drinks, chips and pudding were regularly available in the majority of homes. Regression analysis indicated household income, parental education and rural versus urban residence had no significant impact on the frequency of family participation in physical activity or household availability of higher-calorie foods.

- **Primary care physicians should question parents and children about the child’s perceived weight status and goals, and educate both regarding weight management**
objectives. Owens and colleagues wanted to determine whether parents correctly assess their child’s weight status (underweight, about the right weight or overweight) and if a parent’s perception of their child’s weight management intentions (lose weight, gain weight, stay about the same weight) match expert recommendations based on the child’s actual BMI-for-age. Using a cross sectional survey of 660 parents in 14 NC counties, they determined 48.5 percent of parents correctly assessed their child’s weight status. Two hundred and thirty-nine parents perceived their child had an intention to manage weight. Of those, 13 percent reported the child trying to gain weight, 49 percent the child trying to stay the same weight and 38.1 percent the child trying to lose weight. According to expert recommendations based on the child’s actual BMI-for-age, 50.6 percent should be practicing weight maintenance and 47.7 percent should be trying to lose weight. Owen et al. concluded there was moderate correlation between parent perception of weight management goals and expert guidelines (r=.601, p<.01).

- Satisfaction with physical appearance is an essential part of global self-worth and is constructed differently by males and females. Sira conducted a study to examine variables related to and influenced by satisfaction with physical appearance. Over 500 college students (195 male, 340 female) participated in the study. Each student self-reported height and weight, and completed scales to assess self-perception, parental and peer attachment, and peer and media influence. Sira found significant differences in perceptions of physical appearance in relationship to BMI. For females, a high BMI was negatively associated with satisfaction with physical appearance and global self-worth. This relationship did not exist among males in the study. Both males and females, satisfaction with physical appearance was significantly and negatively influenced by the media. More research is needed to understand the complexity of influences on satisfaction with physical appearance.

Prevention and Treatment Studies and Programs
Several ECU faculty members have or are conducting prevention and treatment programs designed to help children increase physical activity, decrease percent body fat and improve nutritional habits. Although many of these programs have enrolled a limited number of children and have few outcome measures available for review, they exemplify many of the ongoing efforts underway to address childhood obesity in the area. These programs are summarized below:

- Growing Up FIT!: Established by Dr. Kris Borre with the NC Agromedicine Institute and supported by funds from the Kate B. Reynolds Charitable Trust, Growing Up Fit! (GUF) is an ongoing collaborative community partnership committed to boosting physical activity and healthy eating habits among students at several Pitt County elementary schools. It provides growth assessment for K-5 and physical fitness and dietary assessment of children in grades 3-5. It also provides nutrition education and support for physical activity during the school day. For children who are overweight or at risk for overweight, GUF offers nine sessions with a registered dietitian and an after-school program. GUF also collaborates with local schools to initiate and support environmental and policy change in schools to assure that all children have access to
opportunities to be physically active and eat healthy. Preliminary data from GUF has been promising.

- **Circuit training among prepubescent girls can improve aerobic capacity, muscular endurance, level of physical activity, and psychological constructs related to physical activity choices.** Mahar and others conducted an 8-week circuit training intervention among 14 overweight girls (8 intervention, 6 controls). The purpose of the study was to assess the impact of the intervention on physical activity, body composition, aerobic capacity, body image and physical self efficacy. Circuit training sessions were held two days a week for 60 minutes and included strength training and aerobic activities. Pre- and post-test measurements of fitness and psychological variables were assessed. Although the circuit training did not improve body composition as measured through BMI, it did improve aerobic capacity, muscular endurance, level of physical activity and psychological variables related to physical activity, warranting further study of the intervention.

- **Take 10!™ Curriculum:** Mahar and colleagues pilot tested the Take 10!™ curriculum in one elementary school in Pitt County. Teachers used Take 10!™ materials to lead their class in 10 minutes of age-appropriate physical activity each day for 15 weeks. Over 80 percent of teachers agreed that the Take 10!™ activities were easy to implement and three quarters reported planning to implement the program during the next term. Although all teachers agreed that students actively participated and enjoyed the activities, there were no significant differences between the intervention and control classes on the Children’s Attraction to Physical Activity scale, and Perceived Physical Competence was not increased. In addition, there was only a small difference in the number of steps that students in intervention classes took compared to controls as measured by pedometers. These findings suggest that some teachers may have substituted Take 10!™ for recess so that the overall effect of the program did not significantly increase energy expenditure during the school day.

- **Intensive exercise training can result in substantial improvements in cardiovascular disease markers and satiety hormones in overweight adolescent children.** Jones and others investigated the effect of a 34-week vigorous aerobic exercise training program on cardiovascular disease risk markers and satiety hormones in sedentary overweight adolescents. Under the supervision of undergraduate exercise mentors, 15 adolescents (9 females, 6 males; 13 to 18 years), exercised at approximately 60-85 percent VO$_2$peak three times a week for one-hour sessions for 34 weeks. They found significant changes in cardiovascular disease markers including body composition by skinfolds, waist circumference, serum triglycerides, HDL, and treadmill time to exhaustion. There was also an increase in PPY as well as a decrease in leptin.

- **Weight loss camp can be successful in helping overweight children lose weight, decrease BMI, reduce body inches and improve fitness during the time at camp, but is only moderately successful in helping children maintain improvements long term.** Cooper, Pories and colleagues examined data collected from an 8-week residential summer weight loss camp to determine its effectiveness. They reviewed data from 262
children from three summers (2003-2005). The majority of campers were female (68 percent), with a mean age of 12 years. The camp provided a restricted diet, daily aerobic and resistance weight training, nutrition classes and weekly sessions with a psychologist. Each summer, the campers had a significant loss in body weight percent, with a peak reduction of 8.66 percent (±3.41) in summer 2004. The physical fitness tests showed significant improvements in 2004 for the half mile walk test (p=0.00) and in 2005 for all fitness tests (p<0.011). Of children who attended camp all three summers, 31 percent reduced their BMI from the end of the first summer to the beginning of the second summer, while only 4.35 percent of campers staying two summers maintained their initial post-camp BMI. Future studies need to be conducted to better determine long-term efficacy of the camp.

- **While physical education teachers believe incorporating physical activity into instruction is a high priority, they are often limited by factors they cannot control.** Senne and colleagues conducted a study in which they examined teacher-related factors that influence the activity level of students during middle school physical education classes. Through a complex observational system, they examined students’ actual time spent in physical activity in class as well as teacher perceptions of time spent in physical activity during class. They also explored teachers’ beliefs about the importance of physical activity, strategies to increase use of physical activity and barriers to spending time in activity versus class instruction or management. They found that although teachers believe it is important to maintain a high level of activity, many factors make this difficult. Schools often have limited resources to help them overcome these barriers.

- **Resistance Training Program for Prepubescent Girls.** DiNallo and Mahar conducted a pilot study to test the effectiveness of a resistance training program on physical activity, body composition, muscular strength and endurance and selected psychological variables among 18 girls ages 8 to 11 years. Training group participants (n=15) trained three days per week, one hour per day. Control group participants maintained their normal activities. The training group showed large improvements in muscular strength and endurance measures while the control group tended to show decreases. The training group also demonstrated a 32 mm decrease in the sum of seven skin folds and a 5.9 percent fat decrease after the 8-week training period. The control group had a two percent increase in body fat. In addition, the training group reported improvements in body image, which were not seen in the control group.

- **ASAP (After-School Activity Program).** Mahar and colleagues piloted a physical activity program for overweight children (ASAP) that incorporated concepts of autonomy, modeling, enjoyment, and perceived competence in physical skills as well as social cognitive theory. Participants were assessed at the beginning and end of the program for spontaneous physical activity, aerobic capacity, body composition, HDL cholesterol and blood glucose, perceived physical competence and body image. The study found improvements in aerobic capacity, body composition and physical activity.
EFFORTS TO ADDRESS CHILDHOOD OBESITY IN EASTERN NORTH CAROLINA

A number of groups and organizations are working diligently to address the epidemic of childhood obesity in eastern North Carolina. This section highlights some of the organizations and programs in the region. While an effort has been made to include many of the organizations and programs involved in addressing the obesity epidemic, it is not possible to provide an exhaustive description given the growing and dynamic interest in this issue.

East Carolina University and University Health Systems
Organizations such as East Carolina University (ECU) and the University Health Systems (UHS) of Eastern Carolina have the potential to reach residents across the region with obesity-related programs and services. These two organizations have historically collaborated on many initiatives and have a unique and strong partnership in which they are committed to addressing the health needs of eastern NC citizens.

Pediatric Healthy Weight Research and Treatment Center
In response to the growing epidemic of childhood obesity, the Department of Pediatrics at the ECU Brody School of Medicine and UHS formed the Pediatric Healthy Weight Research and Treatment Center (PHWRTC) in 2003. Its mission is to reduce childhood obesity in ENC in collaboration with local health care providers and community agencies, through the development, application, and dissemination of translational basic science and clinical research in both community and academic settings. The PHWRTC carries out its mission through conducting research, collaborating with the community, and providing clinical care to overweight youth in the region.

Pediatric Healthy Weight Clinics
The PHWRTC has developed two multidisciplinary clinics that provide comprehensive medical, dietary and fitness evaluations and treatment for overweight and morbidly-obese children. The clinics offer ongoing nutrition counseling and multiple follow-up visits with an exercise professional to help patients set and achieve lifestyle and weight-related goals. Preliminary clinical outcomes for the clinic are positive with about half of children seen for more than one office visit maintaining or decreasing BMI. The clinics currently have waiting lists but expect to increase capacity soon to accommodate the demand for services.

Pediatric Obesity Camp
The PHWRTC is serving as the catalyst to develop a pediatric obesity camp called “Take Off to Health” at ECU. Faculty and administrators from across the campus have committed support for the camp providing use of ECU facilities during the summers. The 6-week camp, slated to open in the summer of 2007, will provide youth in eastern NC with a residential option to help “jump start” them in their weight loss. Campers will follow a modified diet under the guidance of a dietitian and participate in structured physical activity. They will have access to a number of university services and programs. Plans are underway to develop and test a family component of the camp in a selected county in the region. Parents/guardians will participate in a 6 to 8 week program while their child is at camp to help prepare them to support their child upon return to the home environment. There are also plans to develop enhanced follow up to assist the campers in maintaining weight loss achieved at camp. The enhanced follow up will include monthly booster
sessions with some parental involvement. A grant application has been submitted to fund a portion of the camp and another grant application will be submitted in fall 2006.

Network of Professionals
The PHWRTC has built a network of childhood obesity researchers and social service and health professionals, largely in Pitt County but also in other areas of ENC, to share research and collaborate on studies and projects that may benefit children in the region, and ultimately, across the nation. These “Associates” of the center receive notification through an e-mail distribution list of news, events and funding opportunities related to childhood obesity. The PHWRTC also sponsors a bi-monthly Pediatric Healthy Weight Forum. Speakers present on obesity-related research or community-based programs. The PHWRTC also sponsors an annual summit on a childhood obesity topic. This provides the opportunity for Associates and health professionals across the state to meet and learn more about ways to address the obesity epidemic. For more information about the PHWRTC summits or other programs, visit the PHWRTC web site at www.ecu.edu/pedsweightcenter.

ECU College of Health and Human Performance
The ECU College of Health and Human Performance has a number of activities and programs to address childhood obesity. The Department of Exercise and Sport Science (EXSS) has five laboratories, two of which offer programs for overweight youth. The Activity Promotion Laboratory conducts research projects on physical activity, fitness, and obesity in children. The Human Performance Lab aims to discover and disseminate knowledge in the area of exercise physiology through research, service and education. Many grant-funded projects have come out of these labs and offer services to local youth, such as ASAP and PHASE (after school programs for overweight children) and several mentor projects, in which overweight children are paired with an EXSS student to serve as a “personal trainer” to help them achieve weight-related goals. Individual faculty in the EXSS department and the other departments of the College of Health and Human Performance also conduct research in the area of childhood obesity.

ECU College of Human Ecology
The Department of Nutrition and Hospitality Management offers both a Bachelor and Master of Science degree in nutrition and dietetics in addition to a post-baccalaureate dietetic internship. The dietetic internship program is a supervised, practice program that qualifies graduates for the Registration Examination for Dietitians administered by the Commission on Dietetic Registration of the American Dietetic Association. Successful completion of the exam qualifies students to be licensed as dietitians in North Carolina and other states. Many of the dietetic interns are placed in the eastern NC region. Faculty members in the department are also engaged in conducting nutrition research involving children and youth.

In addition, several faculty in the Department of Child Development and Family Relations have an interest in childhood obesity and are beginning to develop research and service projects related to the issue.

There are a number of faculty in other departments campus-wide who have an interest in or are currently conducting research related to childhood obesity. Over 15 departments from both the Brody School of Medicine and the ECU main campus, such as Biochemistry, Recreation and
Leisure Studies, Internal Medicine, Surgery, Family Medicine, Social Work, and Communications, have faculty engaged in childhood obesity-related work.

**University Health Systems of Eastern Carolina**
The University Health Systems (UHS) of Eastern Carolina has also shown its commitment to reducing childhood obesity in the region. To help guide these efforts, UHS has hired a UHS Nutrition Initiative consultant to advise them on the development of services and programs related to nutrition in Pitt County Memorial Hospital (PCMH) and throughout the UHS system. One area this guidance has been especially evident in the menus and labeling of healthy food options at the PCMH cafeteria and in changes to foods served at the hospital’s child care center, A Child’s Place.

In 2005, UHS also collaborated with a local television station, WNCT Channel 9, to develop and implement a year-long campaign to increase awareness of obesity in the region. This campaign, called “Move It for Your Health” included the airing of 259 30-second vignettes, 32 news stories (aired three times daily), and several weekly features on nutrition and physical activity. The weekly features included 46 Move It! Mondays, in which scripts encouraged viewers to set a nutrition or fitness goal, 48 Smart Choices scripts promoting good decisions related to diet and exercise, and 47 Snack Shack scripts, providing nutrition information such as healthy recipes. It is estimated the campaign reached over 80 percent of 274,500 viewers in the WNCT Greenville/New Bern/Washington market.

**Community Health Programs**

*Pediatric Healthy Weight Case Management Program*: In Summer 2004, the PCMH Community Health Program received three years of funding from the Duke Endowment to create the Pediatric Healthy Weight Case Management Program. The goals of the program are to provide case management for children over the 95th percentile for BMI, to standardize physician practices related to the identification and treatment of overweight among children, and to increase awareness of childhood obesity in the local community. As of January 2006, the Pediatric Healthy Weight Case Management Program has received over 120 referrals for their services, and they are actively case managing over 70 patients. The Case Management Program is in the midst of conducting formative research, including interviews and focus groups with providers and parents, to inform the development of their social marketing campaign. The focus of the campaign will be to increase awareness and use of BMI as a way to identify children who are overweight or at risk for becoming overweight. Proper and timely identification of at risk and overweight children should lead to more effective treatment. The social marketing efforts will be tied to their work on the standardization of the identification and treatment of obesity in Pitt County.

*Eat Smart Move More Fair*: The PCMH Community Health Program has also sponsored the annual Eat Smart Move More Health Fair at the Colonial Mall in Greenville, NC in 2005 and 2006. This fair provides the opportunity for approximately 20 local vendors to promote healthy eating and increased physical activity to the community.
ViQuest Centers
ViQuest, a UHS wellness and disease management provider for citizens in eastern North Carolina, has two wellness centers in the region, one in Greenville and one in Ahoskie. These centers both provide a range of fitness and wellness programming to the general community, including children. For example, the ViQuest Center in Greenville offers three 13-week weight management programs for children, including Partners in FUN (for 2-7 year olds), FUN for Kids (8-15 year olds) and Gettin’ Started (16-18 year olds). The Ahoskie site also offers the FUN for Kids program. Plans for 2006 include expanding the programs to various schools and community centers. The Greenville ViQuest Center also offers school-aged children an opportunity to learn about physical activity, nutrition, safety, sports and the human body during a summer-long day camp. In addition, during the school year, they offer a health conscious after-school program for children ages 5 to 15. They also sponsor special short-term programs such as Spring Break Blowout, Overnight Kids Jam, and Santa’s Workshop, all of which provide active, healthy fun for kids.

The Ahoskie ViQuest has been participating in a Physical Activity Challenge program in which children complete activities such as sit ups, push ups, the mile run and a sit-to-reach test. P.E. teachers at all Hertford County schools are providing data from their students to the ViQuest Center to compile and analyze. Results are not yet available but are promising.

Breast Feeding Services
Lactation consultants at PCMH, Ronoake-Chowan Hospital, Heritage Hospital, and nutritionists at the ECU Brody School of Medicine are educating new mothers about the importance of breastfeeding to prevent obesity. PCMH has created a steering committee to consider the steps needed for the hospital to obtain the Baby Friendly Hospital Status granted through the World Health Organization and UNICEF. Only 52 hospitals in the US have currently achieved this status.

Other UHS Hospitals in Eastern NC
The UHS System of Eastern Carolina is comprised of five hospitals in addition to Pitt County Memorial Hospital. The other UHS hospitals are doing their part to reduce obesity. At the Ronoake-Chowan Hospital, a full-time maternal child coordinator in the obstetrics department provides resources and referrals for medical nutritional therapy to women and children. The hospital also offers Project Choice, a cancer prevention program for grades K-4 that provides sessions on nutrition and obesity prevention as a way to prevent cancer. Other area hospitals also offer nutritional therapy services to their patient populations. At Heritage Hospital, a Kate B. Reynolds grant-funded nurse provides classes on healthy lifestyles in schools in four surrounding counties as part of a diabetes prevention program. In the summer, these programs are offered through local community agencies such as the Department of Parks and Recreation and 4-H clubs. The Outer Banks Hospital has hired a Director for Nutrition and Volunteer Services who is developing several obesity related initiatives.

Pitt Memorial Hospital Foundation
Pitt Memorial Hospital Foundation is the custodian for all financial gifts to PCMH and serves as its fund-raising arm. Part of its mission is to promote community outreach. In 1998, PCMH made a substantial donation to the Foundation to establish the Community Benefits and Health
Initiatives Grants program with the goal of improving the health of citizens in Pitt County. Nutrition and physical activity are one of the priority areas of the Community Benefits program. During the past several years, the Foundation has funded a number of community-based physical activity and nutrition programs. In 2005-2006, the Foundations supported 11 such projects with over $300,000. Table 10 provides a list of the funded projects.

**Table 10: PMHF 2005-2006 Grantees**

<table>
<thead>
<tr>
<th>Organization/Program</th>
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</thead>
<tbody>
<tr>
<td>East Carolina University (ECU), L.T. Walker – Adapted Sports Program</td>
</tr>
<tr>
<td>ECU School of Nursing – Camp Timber Creek (for Overweight Adolescents)</td>
</tr>
<tr>
<td>ECU Department of Child Development and Family Relations – Children’s Heart Camp</td>
</tr>
<tr>
<td>Food Bank – Fresh Produce Initiative</td>
</tr>
<tr>
<td>ECU Department of Family Medicine – Food Literacy Partners Program</td>
</tr>
<tr>
<td>Greenville Community Shelter – Nutritious Breakfast Program, Summer Activity Programs for Children, Transportation</td>
</tr>
<tr>
<td>ECU Department of Pediatrics – KIDPOWER (Medical Nutrition Counseling for Children)</td>
</tr>
<tr>
<td>PCMH Community Health – 2006 Nutrition and Physical Activity Fair</td>
</tr>
<tr>
<td>Pitt County Schools – Nutrition and Physical Activity Programs</td>
</tr>
<tr>
<td>Straightway Family Life Center – Dare 2B Different Program</td>
</tr>
<tr>
<td>ViQuest – Weight Management Programs for Children</td>
</tr>
</tbody>
</table>

**Local Health Departments**

Local health departments are key players in addressing childhood obesity in ENC. The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) offers supplemental food and nutrition counseling to pregnant and post-partum women, infants and children up to age 5. In addition, all NC health departments with the capacity to bill Medicaid and that have a dietitian on staff can provide free medical nutrition therapy counseling to overweight children; many also offer affordable nutrition counseling on a sliding scale for families with low incomes.

Many local health departments are also offering their own community-based programs for children and families, either through grants or through regular health promotion programming. Some of these programs, especially if they are grant funded, are required to collect BMI data. Others, through the instigation of concerned health professionals such as local pediatricians or school nurses, have also begun collecting BMI data on their own. Many of these county-specific programs or studies were reviewed in the *Prevalence of Childhood Obesity in ENC* section of this document. In addition to collecting and monitoring BMI, these grant-funded or health promotion projects typically have community-based programming aimed at preventing or reducing childhood obesity. Some support local nutrition and physical activity health fairs and screenings, provide nutrition education in their communities and collaborate with schools to provide guidance as they develop programs.
Many county health departments also sponsor Winner’s Circle programs among schools, businesses and restaurants in their communities. In addition, they are partnering with other community organizations to increase awareness of childhood overweight and obesity and to implement local policy changes that improve nutrition and physical activity opportunities for children. For example, the Pitt County Health Department has led the local Healthy Schools Task Force and has been an active participant of the Nutrition subcommittee of Pitt Partners for Health for a number of years.

**Schools**

As described earlier, local school districts are also important vehicles for improving nutrition and increasing physical activity among children. Pitt County and Cumberland County schools both have funding from the NC Health and Wellness Trust Fund Fit Together project and offer nutrition and physical activity programs to students within their school systems. They are also actively implementing environmental and policy changes within their schools. Albemarle Regional Health Services (serving Bertie, Chowan and Perquimans counties), Be Active NC (in Perquimans, Pender and Beaufort counties), FirstHealth of the Carolinas (serving Hoke County and others not in ENC), Halifax County Health Department and Southeastern Regional Medical Center (serving Columbus and Robeson counties) have also been awarded Fit Together funds to partner with local schools to address childhood obesity. Many schools in ENC have also implemented Winner’s Circle among their cafeterias and vending machines (see Participation in Statewide Winner’s Circle Program for more complete information). In Hertford County, a nutritionist from the local health department provides education and counseling to promote healthy weight at one of the county middle schools.

**Daycares**

Hundreds of local daycare workers in the region have participated in Color Me Healthy, a NC Cooperative Extension program that provides free training and kits on healthy foods to daycares and family home care providers. At another similar event in November 2005, Pitt Partners for Health (Pitt County) sponsored “Healthy Harvest,” a program that provided training to local day care providers, especially home day care providers, on healthy eating. Over 40 providers attended and received a take-home kit with nutrition information, a set of measuring cups and spoons, ingredients for a healthy snack and recipes.

**Local Community Coalitions**

Local community coalitions and task forces, such as Pitt Partners for Health, Healthy Carolinians of the Albemarle, the Living Well Partnership of Johnston County, Healthy Carolinians of Pender, Halifax-Northampton Healthy Carolinians, and the Pitt County Healthy Schools Task Force have named physical activity and nutrition as a priority area in their initiatives. Many have developed awareness campaigns, advocated for policy changes and partnered with other community groups to implement programs for children. For example, the Nutrition and Physical Activity Partners committee of Pitt Partners for Health has conducted several surveys over the last eight years, to assess behavioral data on weight management, nutrition and physical activity among adults in the county. The Healthy Schools Task Force of Pitt County has obtained a grant to provide more physical activity opportunities to children during the school day. They have provided approximately 50 schools with Take 10!™ curricula and an additional 50 schools with physical activity equipment for use by all teachers. The Robeson County Partnership for Health
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is collaborating with Southeastern Regional Medical Center and the local school district to implement Project H.E.A.L.T.H., a project funded by the Fit Together initiative.

Grant-Funded Community Programs
As mentioned in earlier sections of this report, two statewide initiatives, “Fit Together,” and the Kate B. Reynolds “SELF Improvement” Program, have provided funding to a number of eastern NC counties in the last few years to address childhood obesity.

Fit Together Initiative
In 2003, the NC Health and Wellness Trust Fund partnered with Blue Cross and Blue Shield of NC to launch “Fit Together.” It is a three-year statewide initiative funded at $15 million and consists of four components:

- A public service announcement campaign;
- 21 youth obesity prevention projects;
- Fit Families NC (a Study Committee for the Prevention and Treatment of Childhood Overweight/Obesity); and
- Fit Communities designation.

The 21 community-based youth programs have been implemented in counties across the state and are led by six school systems, four community non-profits, four health departments, four statewide agencies, two hospitals/hospital systems and one university. Two of the primary goals for the prevention projects are to 1) reduce barriers in children’s homes/communities to healthy eating and physical activity; and 2) significantly increase the number of school and child care settings that promote healthy eating and physical activity.

These goals are being met through a number of activities, with the intent that the activities will result in lasting environmental and policy changes in settings where children live and go to school. Appendix B provides a list of the eastern NC counties that have “Fit Together” funding, with brief descriptions of their programs.

Kate B. Reynolds SELF Improvement Projects
In 1999, the SELF Improvement program was approved by the Kate B. Reynolds Charitable Trust and funded at $10 million. In 2001, 15 community-based projects across the state were funded for five years. These projects were charged with developing community-based programs to address physical inactivity, poor nutrition and smoking in minority and low income populations. Seven of the 15 counties are in eastern NC. Appendix E provides a brief summary of the seven programs.

Summary
The efforts of these organizations and others have been, and will continue to be, instrumental in preventing and treating childhood overweight and obesity in eastern North Carolina and keeping our children healthy. These corporate, community and academic resources, however, are available in some parts of eastern North Carolina but not in others. This means that some at-risk and overweight children have access to programs and services that will help them improve their dietary and physical activity habits and provide treatment for any weight-related health
complications. Other children, however, have limited access to such programs and services and are likely to continue to gain weight and suffer future health complications.
CONCLUSIONS

Several conclusions can be reached after reviewing the available data and information about childhood obesity, nutrition and physical activity in eastern North Carolina.

- **There has not been a statewide system to monitor childhood obesity in ENC children.** Thus, while it is evident that childhood obesity is a serious concern in the region, it has been difficult to know how many children are affected and whether interventions to prevent or treat obesity are having an effect. A new survey, however, the Child Health Assessment and Monitoring Program (CHAMP), was first implemented in 2005. It will provide data on a number of health characteristics of NC youth, including data on childhood overweight/obesity, nutrition and physical activity. 2005 data are not yet available but will be soon.

- **Regional studies in ENC reveal 40 to 50 percent of children are at risk for or overweight.** Unless there is significant intervention, these children are at risk for the many health conditions associated with childhood obesity as well as the long-term health consequences of the disease, such as cardiovascular disease, hypertension, diabetes and stroke. One local study found close to 30 percent of children over the 85th percentile for BMI were hyperinsulinemic, and had higher BMIs, total cholesterol, LDL cholesterol, C-peptide, serum glucose and insulin to glucose ratios than children who were not hyperinsulinemic.

- **ENC children are not as physically active as they should be.** While about half of ENC youth are active for 60 minutes or more on 5 to 7 days of the week, close to a quarter of them get little or no physical activity. About half also report watching three or more hours of television per day on an average school day; one fifth reported watching five or more hours per day.

- **ENC children are not eating health-promoting diets.** A majority of youth are not meeting the 2005 Dietary Guidelines for Americans. They do not eat at least five fruit and vegetables a day or consume a sufficient amount of calcium on a daily basis. Many children and adolescents are also taking in more calories than their bodies need through sugar-sweetened beverages and high fat, low-nutrient foods.

- **While most ENC residents are aware of obesity as a health issue that leads to serious health problems, fewer believe childhood obesity is as serious a concern for their children.** Most attribute obesity to a sedentary lifestyle and believe it would be easier to increase the amount of physical activity they get than to make dietary changes. The majority of parents in one survey were supportive of public health efforts and policy changes to address the obesity epidemic.

- **Overall, eastern North Carolina counties have lower breastfeeding rates than the rest of NC.** Thirty-one of the 41 ENC counties (76 percent) have rates lower than the state rate of 47 percent. According to Pitt County Memorial Hospital data, about half of mothers are exclusively breast feeding their babies at discharge.
Childhood Obesity: How do children in eastern North Carolina measure up?

- **Public school systems across ENC are in varying stages of making improvements to their Child Nutrition Programs.** While many schools still have a long way to go to improve food offerings for students, all are in the process of complying with the *Child Nutrition and WIC Reauthorization Act of 2004*, in which schools have to submit new wellness policies for nutrition and physical activity by summer of 2006. In addition, NC House Bill 855 and NC Senate Bill 961 are strengthening standards for foods served in the cafeteria and sold in vending machines. Many ENC schools participate in Winner’s Circle programs and a number of them have received grant funding to implement nutrition programs.

- **The North Carolina Healthy Active Children Policy has been strengthened to require K-8 grader students to get at least 30 minutes of physical activity each day.** All elementary and middle schools will have to provide at least 30 minutes of activity, either through physical education (P.E.), recess, or other physical activity programs or curricula, beginning fall of 2006. High schools students have to complete only one unit of physical education to graduate. A number of schools in ENC, either through grant funding or their own initiatives, are also implementing programs such as *Take 10!*, *Energizers* or the Be Active North Carolina “Active Steps Youth Program.”

- **Many studies are currently underway at East Carolina University to address childhood obesity.** The studies range from basic science to clinical and behavioral to prevention and treatment studies. While preliminary results from many of the studies are promising, more research is necessary to better understand how to prevent, identify, and treat obesity.

- **Many community-based programs are being developed to address the obesity epidemic.** A number of local school systems and community agencies, such as local health departments, have forged partnerships to create innovative programs to improve nutrition and increase physical activity. Initiatives such as “Fit Together” and the Kate B. Reynolds “SELF Improvement” projects have been positively received by communities, and are showing some preliminary success. These programs and others need to be carefully evaluated to determine their efficacy. They also need to be implemented in a variety of settings to determine their replicability.

- **While many corporate, community and academic resources, programs and organizations exist to address childhood obesity in portions of eastern North Carolina, other areas have little access to such resources.** This means that some at-risk and overweight children have access to programs and services to improve their dietary and physical activity habits and provide treatment for any weight-related health complications. Other children, however, have limited access to such programs and services and are likely to continue to gain weight and suffer health complications due to their weight.
REFERENCES

15. Department of Family Medicine and ECU-UHS Pediatric Healthy Weight Research and Treatment Center, Brody School of Medicine, East Carolina University. Fit Together Mid-Year Report to the NC Health and Wellness Trust Fund Commission: January – June 2005.
Childhood Obesity: How do children in eastern North Carolina measure up?


Childhood Obesity: How do children in eastern North Carolina measure up?


46 Howell, A, Collier, DN. Prevalence and identification of pediatric obesity in a medical school based outpatient population. Abstract and poster presentation for East Carolina University’s Brody School of Medicine, Summer Scholars Research Program Medical Student Research Day. August 18, 2003.


48 Parker, Danielle. Dare County Health Department, Peer Power Program. Personal communication, December 21, 2005.


Alan Newman Research Marketing Research Consultants. Pitt County Childhood Obesity Awareness Study. Power Point presentation provided to Pitt County Memorial Hospital’s Pediatric Healthy Weight Case Management Program. May 2006.


Ramsey, Karen. Nash County Health Department. Personal communication, October 24, 2005.
Reardon, Katherine. Pamlico County Schools. Personal communication, October 24, 2005.
Odom, EB. Halifax County Health Department. Personal Communication, November 17, 2005.
Kolasa KM, Henes ST, Balkman ED. Outcomes from a seven visit Medical Nutrition Therapy protocol with overweight youth. Presentation at Experimental Biology, San Francisco, CA, April 2006.


Whetstone LM, Morrissey SL, Cummings DM. Weight perception, disordered eating, and suicidal thoughts and behaviors in middle school youth. Presentation at the 33rd Annual Meeting of the North American Primary Care Research Group, Quebec City, October 2005.


Owen L, Whetstone L, Morrissey SL. Do parents’ perceptions of their child’s weight management intentions match expert recommendations? Presentation at the 33rd Annual Meeting of the North American Primary Care Research Group, Quebec City, Canada, October 2005.


Childhood Obesity: How do children in eastern North Carolina measure up?

103 JM DiNallo, Mahar, MT. Effects of a resistance training program on physical activity, body composition, muscular strength and endurance and selected psychological variables in prepubescent girls. Presentation at the University of North Carolina, Institute of Nutrition Annual Research Symposium, October 2000.


106 Cox, James. Pediatric Healthy Weight Case Management Data Report. Presentation made to Steering Committee, February 15, 2006, Greenville, NC.


109 Seil Davenport, Outpatient Clinic Manager, Heritage Hospital, Tarboro, NC. Personal Communication. April 12, 2006.
**APPENDIX A**

**List of Counties that Comprise Eastern North Carolina**

1. Beaufort  
2. Bertie  
3. Bladen  
4. Brunswick  
5. Camden  
6. Carteret  
7. Chowan  
8. Columbus  
9. Craven  
10. Cumberland  
11. Currituck  
12. Dare  
13. Duplin  
14. Edgecombe  
15. Gates  
16. Greene  
17. Halifax  
18. Harnett  
19. Hertford  
20. Hoke  
21. Hyde  
22. Johnston  
23. Jones  
24. Lenoir  
25. Martin  
26. Nash  
27. New Hanover  
28. Northampton  
29. Onslow  
30. Pamlico  
31. Pasquotank  
32. Pender  
33. Perquimans  
34. Pitt  
35. Robeson  
36. Sampson  
37. Scotland  
38. Tyrrell  
39. Washington  
40. Wayne  
41. Wilson
## APPENDIX B
### Eastern North Carolina Fit Together Grantees

<table>
<thead>
<tr>
<th>Lead Agency &amp; Impacted Counties</th>
<th>Description of Program</th>
</tr>
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<tbody>
<tr>
<td>Albemarle Regional Health Services – Impacts Bertie, Chowan &amp; Perquimans</td>
<td>ARHS is partnering with NC Cooperative Extension and county schools to implement physical activity &amp; nutrition programs in 10 elementary schools. Specific activities include Winner’s Circle program, kiosks in cafeterias, walking/fitness clubs, and nutrition classes.</td>
</tr>
<tr>
<td>Be Active NC – Impacts Perquimans, Pender &amp; Beaufort</td>
<td>Be Active NC is implementing their “Active Steps Youth Program” (ASYP) in elementary schools in 7 counties. The ASYP uses pedometers to help students set &amp; achieve physical activity goals.</td>
</tr>
<tr>
<td>Cumberland County Schools – Impacts Cumberland</td>
<td>CCS is partnering with the Health Department, Mental Health Department and Cape Fear Valley Health Foundation to implement “Project Move.” Teachers use Active Based Learning, a curriculum that incorporates physical activity into the regular class curriculum. They also offer after school classes, such as yoga and kickboxing for the school community.</td>
</tr>
<tr>
<td>FirstHealth of the Carolinas – Impacts Hoke</td>
<td>“Operation Healthy Kids” incorporates nutrition &amp; physical activity messages into classroom instruction in elementary schools. The program is using a tracking form to monitor students’ healthy behaviors and provide incentives. They also partner with a pediatric practice to disseminate messages to families.</td>
</tr>
<tr>
<td>Goldsboro Family YMCA – Impacts Wayne</td>
<td>C.H.A.N.G.E. (Commitment to Healthy Attitudes in Nutrition, Growth &amp; Education) is a weight management program for overweight youth ages 6-17 with support for families with low incomes.</td>
</tr>
<tr>
<td>Halifax County Health Department – Impacts Halifax</td>
<td>The Health Department is partnering with 4 elementary schools to implement “Energizers,” classroom based physical activities that integrate with academic concepts. They are also teaching nutrition classes for students &amp; families &amp; implementing “Way to Go Kids,” an established 16-week curriculum on physical activity and healthy eating.</td>
</tr>
<tr>
<td>NC Academy of Family Physicians – Impacts Duplin, Hertford, Hoke, Sampson, New Hanover, Nash &amp; Craven</td>
<td>NCAFP is partnering with NC Cooperative Extension to build a referral system for overweight patients ages 12-18 to receive services. They have developed a resource kit for physicians to provide an initial assessment, distribute materials and refer patients to a Cooperative Extension agent for follow up counseling &amp; support.</td>
</tr>
<tr>
<td>NC Division of Public Health – Impacts Johnston</td>
<td>The NCDPH is working in 4 counties to develop obesity prevention interventions. They will implement a social marketing campaign to increase physical activity &amp; decrease TV time. Target populations are racial/ethnic minorities, ages 5-11 and their families.</td>
</tr>
<tr>
<td>Pitt County Schools – Impacts Pitt</td>
<td>PCS is partnering with the NC Agro-Medicine Institute, the Health Department, Pitt Partners for Health to implement school-base activities including Active Recess, Nutrition Nugget, cafeteria games &amp; Taste Explorers. They are also facilitating formal change in school policies to support healthy eating &amp; physical activity in the school system.</td>
</tr>
<tr>
<td>Southeastern Regional Medical Center – Impacts Columbus, Robeson</td>
<td>Project H.E.A.L.T.H. a program to empower youth &amp; community members to make healthy lifestyle choices. School interventions include incorporating physical activity &amp; nutrition into the curriculum. Community interventions include the development of walking trails, health screenings, the “Fit in Five” campaign.</td>
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APPENEDIX C

GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 2005

HOUSE BILL 855
RATIFIED BILL

AN ACT DIRECTING THE STATE BOARD OF EDUCATION TO ESTABLISH STATEWIDE NUTRITION STANDARDS FOR SCHOOL MEALS, A LA CARTE FOODS AND BEVERAGES, AND THE AFTER SCHOOL SNACK PROGRAM ADMINISTERED BY THE DEPARTMENT OF PUBLIC INSTRUCTION AND CHILD NUTRITION PROGRAMS OF LOCAL SCHOOL ADMINISTRATIVE UNITS, AS RECOMMENDED BY THE STUDY COMMITTEE FOR CHILDHOOD OVERWEIGHT/OBESITY OF THE HEALTH AND WELLNESS TRUST FUND.

The General Assembly of North Carolina enacts:

SECTION 1. Part of Article 17 of Chapter 115C of the General Statutes is amended by adding the following new section to read:

“§ 115C-264.3. Child Nutrition Program standards.

The State Board of Education, in direct consultation with a cross section of local directors of child nutrition services, shall establish statewide nutrition standards for school meals, a la carte foods and beverages, and items served in the After School Snack Program administered by the Department of Public Instruction and Child Nutrition Programs of local school administrative units. The nutrition standards will promote gradual changes to increase fruits and vegetables, increase whole grain products, and decrease foods high in total fat, trans fat, saturated fat, and sugar. The nutrition standards adopted by the State Board of Education shall be implemented initially in elementary schools. All elementary schools shall achieve a basic level by the end of the 2007-2008 school year, followed by middle schools and then high schools.”

SECTION 2. The State Board of Education may use “Eat Smart: North Carolina’s Recommended Standards for All Foods Available in School” and the “United States Dietary Guidelines” as references for establishing the nutrition standards under Section 1 of this act. In addition to the elementary school pilots established by Section 7.17 of S.L. 2004-124, the nutrition standards will also be piloted prior to statewide implementation in a minimum of eight middle schools and eight high schools at a time to be determined by the State Board of Education. The pilots shall be conducted in a manner that will hold the child nutrition program of a participating local school administrative unit financially harmless for its participation in the pilot project. It shall be the responsibility of the Child Nutrition Services Section of the Department of Public Instruction to oversee the pilot project, collect data from the pilots, interpret the data, and develop written guidance based on the outcomes of the pilots. The Child Nutrition Services Section of the Department of Public Instruction shall modify the nutrition standards as needed based on several criteria, including, but not limited to, the results of the pilot projects, current science, best practices in the food and beverage industry, and the availability
and affordability of new foods and beverages. The Child Nutrition Services Section of the Department of Public Instruction shall monitor the progress of each local school administrative unit toward achieving the nutrition standards and shall provide technical assistance and training as needed to assist local school administrative units in implementing the nutrition standards. The Child Nutrition Services Section of the Department of Public Instruction shall report annually on the progress of each local school administrative unit to the State Board of Education and to the Joint Legislative Education Oversight Committee.

SECTION 3. This act is effective when it becomes law.

In the General Assembly read three times and ratified this the 23rd day of August 2005.
AN ACT TO ESTABLISH STATEWIDE NUTRITION STANDARDS FOR VENDING PRODUCTS SOLD DURING THE SCHOOL DAY, as recommended by the study committee for childhood overweight/obesity of the health and wellness trust fund.

The General Assembly of North Carolina enacts:

SECTION 1. G.S. 115C-264 reads as rewritten:

“§ 115C-264. (Effective August 1, 2005) Operation.

(a) In the operation of their public school food nutrition programs, the public schools shall participate in the National School Lunch Program established by the federal government. The program shall be under the jurisdiction of the Division of School Food Support, Child Nutrition Services of the Department of Public Instruction and in accordance with federal guidelines as established by the Child Nutrition Division Food and Nutrition Service of the United States Department of Agriculture.

(b) For nutritional purposes, the public schools shall not (i) use cooking oils in their school food programs that contain trans-fatty acids or (ii) sell processed foods containing trans-fatty acids that were formed during the commercial processing of the foods.

Each school may, with the approval of the local board of education, sell soft drinks to students so long as soft drinks are not sold (i) during the lunch period, (ii) at elementary schools, or (iii) contrary to the requirements of the National School Lunch Program.

(c) All school food services shall be operated on a nonprofit basis, and any earnings there from over and above the cost of operation as defined herein shall be used to reduce the cost of food, to serve better food, or to provide free or reduced-price lunches to indigent children and for no other purpose. The term “cost of operation” shall be defined as means the actual cost incurred in the purchase and preparation of food, the salaries of all personnel directly engaged in providing food services, and the cost of nonfood supplies as outlined under standards adopted by the State Board of Education. “Personnel” shall be defined as food service means child nutrition supervisors or directors, bookkeepers directly engaged in food service record keeping and those persons directly involved in preparing and serving food. Child nutrition personnel shall be paid from the funds of food services only for services rendered in behalf of lunchroom services, the child nutrition program. Any cost incurred in the provisions and maintenance of school food services over and beyond the cost of operation shall be included in the budget request filed annually by local boards of education with boards of
SECTION 2. Part 2 of Article 17 of Chapter 115C of the General Statutes is amended by adding the following new section to read:

“§ 115C-264.2. Vending machine sales.

(a) Each school may, with the approval of the local board of education, sell to students beverages in vending machines during the school day so long as:

(1) Soft drinks are not sold (i) during the breakfast and lunch periods, (ii) at elementary schools, or (iii) contrary to the requirements of the National School Lunch Program;

(2) Sugared carbonated soft drinks, including mid calorie carbonated soft drinks, are not offered for sale in middle schools;

(3) Not more than fifty percent (50%) of the offerings for sale to students in high schools are sugared carbonated soft drinks;

(4) Diet carbonated soft drinks are not considered in the same category as sugared carbonated soft drinks; and

(5) Bottled water products are available in every school that has beverage vending.

(b) Nothing in subsection (a) of this section prohibits a school from adopting stricter policies with respect to beverage vending.

(c) Snack vending in all schools shall, by school year 2006-2007, meet the Proficient Level of the NC Eat Smart Nutrition Standards, such that in elementary schools, no snack vending is available to students, and in middle and high schools, seventy-five percent (75%) of snack vending products have not more than 200 calories per portion or snack vending package.”

SECTION 3. This act becomes effective August 1, 2005, and applies to contracts for vending services executed or renewed on and after that date.

In the General Assembly read three times and ratified this the 28th day of July, 2005.
APPENDIX D
NC State Board of Education Healthy Active Children Policy

NORTH CAROLINA STATE BOARD OF EDUCATION
Policy Manual

Policy Identification
Priority: High Student Performance
Category: Student Health Issues
Policy ID Number: HSP-S-000

Policy Title: Policy regarding physical education in the public schools

Current Policy Date: 01/09/2003 - Amended 04/07/2005
Other Historical Information:
Statutory Reference:
Administrative Procedures Act (APA) Reference Number and Category:

HEALTHY ACTIVE CHILDREN:

Section 1. LOCAL SCHOOL HEALTH ADVISORY COUNCIL

(a) Each school district shall establish and maintain a local School Health Advisory Council to help plan, implement, and monitor this policy as well as other health issues as part of the coordinated school health plan.

(b) The local School Health Advisory Council shall be composed of community and school representatives from the eight areas of a coordinated school health program mentioned in Section 4 (a), representatives from the local health department and school administration.

Section 2. PHYSICAL EDUCATION

(a) To address issues such as overweight, obesity, cardiovascular disease, and Type II diabetes, students enrolled in kindergarten through eighth grades are to participate in physical activity as part of the district’s physical education curriculum. Elementary schools should consider the benefits of and move toward having 150 minutes per week with a certified physical education teacher throughout the 180-day school year. Middle schools should consider the benefits of and move toward having 225 minutes per week of Healthful Living Education with certified health and physical education teachers throughout the 180-day school year.

(b) The physical education course shall be the environment in which students learn, practice and receive assessment on developmentally appropriate motor skills, social skills, and knowledge as defined in the North Carolina Healthful Living Standard Course of Study and foster support and guidance for being physically active. In order to meet enhanced goals, these classes should be the same class size as other regular classes.
Section 3. RECESS AND PHYSICAL ACTIVITY

(a) Structured/unstructured recess and other physical activity (such as, but not limited to, physical activity time, physical education or intramurals) shall not be taken away from students as a form of punishment. In addition, severe and/or inappropriate exercise may not be used as a form of punishment for students.

(b) A minimum of 30 minutes of moderate to vigorous physical activity shall be provided by schools for all K-8 students daily. This requirement can be achieved through a regular physical education class and/or through activities such as recess, dance, classroom energizers, or other curriculum based physical education activity programs. However, such use of this time should complement and not substitute for the physical education program.

(c) The physical activity required by this section must involve physical exertion of at least a moderate to vigorous intensity level and for a duration sufficient to provide a significant health benefit to students.

Section 4. COORDINATED SCHOOL HEALTH PROGRAMS (CSHP)

(a) The State Board of Education shall make available to each school district a coordinated school health model designed to address health issues of children. The program must provide for coordinating the following eight components:

1. safe environment;
2. physical education;
3. health education;
4. staff wellness;
5. health services;
6. mental and social health;
7. nutrition services; and
8. parental/family involvement.

(b) The North Carolina Department of Public Instruction shall notify each school district of the availability of professional development opportunities and provide technical assistance in implementing coordinated school health programs at the local level.

Section 5. THIS AMENDED POLICY SHALL BE FULLY IMPLEMENTED BY THE 2006-2007 SCHOOL YEAR.
(a) Each local school district shall develop an action plan prepared in collaboration with the local School Health Advisory Council to assist in the implementation of the policy. This action plan shall identify steps that need to be taken each year to fully implement the policy by the 2006-2007 school year and shall include a review and appropriate modification of existing physical education and health curricula.

(b) Action plans shall be submitted to the North Carolina Department of Public Instruction by July 15, 2004.

(c) Progress reports shall be submitted to the North Carolina Department of Public Instruction by July 15, 2005 and 2006.

(d) Beginning July 15, 2007, each local school district in collaboration with the local School Health Advisory Council shall prepare a report annually which will include the minutes of physical education and/or healthful living, physical activity received by students in each school within the district. Indicators that will mark successful implementation and evidences of completion shall be a part of the plan.

(e) This report shall be completed by July 15th each year and remain on file for a period of 12 months to be provided upon request of the North Carolina Department of Public Instruction and local boards of education.

(f) Progress reports and the annual reports shall also include any other information that may be recommended from the State Board of Education’s Ad Hoc Committee studying implementation of the physical education and Healthful Living programs in kindergarten through eighth grades.
## APPENDIX E

### Eastern North Carolina Kate B. Reynolds SELF Improvement Projects

<table>
<thead>
<tr>
<th>Program/County</th>
<th>Description of Program</th>
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<tbody>
<tr>
<td>HealthWatchers at School, Bladen County Hospital</td>
<td>Provides prevention services at public school sites using teen/peer encouragers, professionals, school staff and volunteers. The program is designed to empower students and their families to adopt healthy lifestyle behaviors. Incorporates a wellness council, peer encouragers, walking trails, nutrition and physical activity curriculum, changes in school policies and incentive programs.</td>
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<tr>
<td>Martin-Tyrell-Washington Health District</td>
<td>Community-based program to increase physical activity and improve nutrition. The program is partnering with local agencies and provides screening and referrals. They are also implementing programs to increase physical activity, assisting food vendors with a Point of Purchase program to increase low fat/high fiber foods, increasing the number of adults and children eating nutritional foods and providing behavioral modification weight management programs.</td>
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<td>Growing Up Fit! – Pitt County</td>
<td>A community level collaborative partnership between the NC Agro-Medicine Institute, Kate B. Reynolds Charitable Trust and the Pitt Memorial Hospital Foundation. The goal is to improve the growth and health of Pitt County children in grades K-5 within the school setting. Growing Up Fit! works to promote healthy eating habits and daily physical activity and improve environmental and policies to support children making those choices.</td>
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<td>Peer Power – Dare County</td>
<td>Peer Power is a peer health education program where high school students are trained as Peer Health Educators to positively influence middle school student health behavior related to nutrition, physical activity and smoking. The Peer Health Educators receive course credit and intensive training for their roles.</td>
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<td>Mission Triangle E – City of New Bern/Craven County</td>
<td>A community-based program in low income areas that is a partnership with the City of New Bern, the Department of Parks and Recreation, and Craven County Health Department. The program aims to increase physical activity, improve nutrition and decrease use of tobacco.</td>
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<tr>
<td>Health Watch – Onslow County</td>
<td>Health Watch is a community-based program focused on the prevention or maintenance of chronic diseases for citizens of all ages. The goal is to motivate residents of Onslow County to adopt healthy lifestyle habits to improve their quality of life. Health Watch provides access to services intended to increase physical activity, improve nutrition and decrease tobacco use.</td>
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<td>Healthy Hearts and Souls – Hertford County</td>
<td>A community risk-reduction program targeted at African Americans that focuses on providing individual nutrition and physical activity behavior change programs. The programs operate out of eight local African American churches. The program does not have a specific youth focus but intends to influence all ages in the community.</td>
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