We hosted the first Faithful Families Eating Smart and Moving More in western North Carolina. Macon County Public Health hosts the 9-week program to help faith communities connect healthy eating and physical activity to their spiritual beliefs. Faithful Families is the first faith-based intervention to be accepted as a "Practice-Tested Intervention" by the Center of Excellence for Training and Research Translation at UNC Chapel Hill. The Church Wellness Committee has also partnered with the health department to promote healthy eating and physical activity through health classes, create a walking trail, designate tobacco free buildings, and establish a breastfeeding room.

Holly Springs Baptist Church, Faithful Families Eating Smart and Moving More, Holly Springs, NC

The agricultural traditions and variety of fresh local foods are great assets in rural North Carolina. There are active farm-to-table initiatives in many communities including efforts to reach lower-income communities. Many rural areas have local initiatives through schools, churches, and nonprofits to promote healthy eating and active living. These activities include farmers' markets with local foods supporting the local economy; healthier foods being offered during the school day and at community events; and opportunities for active play. Nonetheless, challenges remain in ensuring that individuals and families can make healthy choices that support healthy eating and active living.

Obesity

Overweight and obesity pose significant health concerns for both children and adults. Excess weight is not only a risk factor for several serious health conditions, but it also exacerbates existing conditions. North Carolina is the 16th most overweight/obese state in the nation. In 2011, almost one-third (29.6%) of North Carolina adults were obese (BMI of 30 or greater).[1] Between 1990 and 2010, the prevalence of overweight in North Carolina grew slightly from 33.5% to 37.1%.[2] However, the obesity rate increased rapidly during that time period. In 1990, 12.9% of adults in North Carolina were obese; by 2011, 29.6% of adults in North Carolina were obese.[1] Adults in rural and urban areas have similar rates of overweight or obese (the rural rate is 68.7%; 95% CI: 66.7-70.7, and the urban rate 67.1%; 95% CI: 65.6-68.5).[a] Those in Tier 1 counties—the most economically distressed counties—have the highest rate of overweight or obesity (70.8; 95% CI: 68.1-73.6), compared to those in Tier 2 (69.2%; 95% CI 67.3-71.1), or Tier 3 (65.5%; 95% CI 63.8-67.2).[b] This indicates that overweight and obesity is more closely related to the economic distress of a county rather than the rural/urban nature of a county.

Rates of overweight and obesity are also high for North Carolina's young children and adolescents. In 2011, 14.6% of North Carolina high school students were overweight (≥ 85th and < 95th percentiles for BMI by age and sex, based on reference data) and 13% were obese (≥ 95th percentile BMI by age and sex, based on reference data).[4] Among North Carolina children ages 2-4 in families with low incomes, 16.2% were overweight and 15.4% were obese in 2009.[5] The rate of obesity among these young children with low incomes has more than doubled over the past 30 years, rising from 6.9% in 1981 to 15.4% in 2011. The percentage of overweight children in this age group also increased during this time, from 11.7% in 1981 to 16.2% in 2011. These data are not available comparing rural and urban areas.[6]

a Eleanor Howell, MS, State Center for Health Statistics, North Carolina Department of Health and Human Services, email communication, April 17, 2014

b Eleanor Howell, MS, State Center for Health Statistics, North Carolina Department of Health and Human Services, email communication, April 17, 2014

The trends of increasing overweight and obesity have alarming potential health consequences. Complications of overweight and obesity can negatively affect most organ systems including the cardiovascular, circulatory, digestive, reproductive, respiratory, and skeletal systems. People who are overweight or obese are more likely to develop type 2 diabetes, high blood pressure, heart disease, certain cancers, and stroke.[7] Overweight and obesity can also cause other health complications including high cholesterol, sleep apnea, osteoarthritis, gynecological problems, and liver and gall bladder disease.[8] Although a person's genetic composition can influence obesity, obesity is not predetermined. Other factors aside from genetics can affect body weight, including the community and environment where the person lives and personal lifestyle behaviors.

Physical Activity

North Carolina adults in Tier 1 counties—the most economically distressed counties—have the highest rate of overweight or obesity compared to those in Tier 2 or Tier 3.

Physical activity is a key component of a healthy lifestyle and an important part of preventing obesity. The health benefits of high levels of physical activity have been demonstrated by numerous studies. Regular physical activity reduces the risk of premature death by reducing the risk of heart disease, stroke, high blood pressure, type 2 diabetes, and colon cancer. In addition, it protects against feelings of depression and helps build healthy bones, muscles, and joints. Regular physical activity is an important part of reaching and maintaining a healthy weight.[9]

Current recommendations are for adults to have at least 30 minutes of moderate intensity physical activity, such as brisk walking, five days per week, or at least 20 minutes of vigorous intensity physical activity, such as jogging, three days per week. Additionally, adults should incorporate muscle strengthening activities twice a week.[10] Less than half (46.8%) of adults in North Carolina meet the recommended level of aerobic activity and only 27.7% of adults meet the recommended level of muscle strengthening activity.[11] Adults in rural and urban areas report getting the recommended levels of physical activity at similar rates (43.8%; 95% CI: 40.6-47.0) compared to those in urban areas (47.4%; 95% CI: 45.6-49.2).[c] Rates of adequate physical activity are similar across Tier 1, Tier 2, and Tier 3 counties.

Current recommendations are for children and adolescents to have at least 60 minutes or more of physical activity each day.[12] Less than one-quarter (24.1%) of high school students meet the recommended guidelines of physical activity for a total of at least 60 minutes per day during the week and 15.4% did not participate in at least 60 minutes of physical activity on any day during the week. In contrast, 36.2% watched television three or more hours per day on an average school day.[2] The National Association for Sport and Physical Education (NASPE), a leading national authority on physical education, recommends that elementary school students receive 150 minutes (2.5 hours) per week, and middle and high school students receive 225 minutes (3.75 hours) per week of formal instruction in physical education.[13]

c Eleanor Howell, MS, State Center for Health Statistics, North Carolina Department of Health and Human Services, email communication, April 17, 2014

In order to help North Carolina's students achieve the recommended amount of physical activity, in 2009 the North Carolina Institute of Medicine Task Force on Prevention recommended that the State Board of Education implement quality physical education in schools that would reflect the NASPE recommendations.[14]

Healthy Eating

Good nutrition is a cornerstone to optimal health. A healthy diet can help protect against osteoporosis, heart disease, hypertension, type 2 diabetes, and certain cancers. Maintaining a calorie balance over time can help achieve and sustain a healthy weight. Managing calorie intake, while consuming adequate nutrients, is important to avoid overweight and obesity.[15]

Rather than focusing on specific foods, the 2010 Dietary Guidelines for Americans recommend balancing calories and building healthy eating patterns.[d] The balance and patterns can be achieved by reducing some foods and increasing others.[15,16] The guidelines recommend reducing intake of sodium, saturated fats, cholesterol, solid fats, and added sugars. They also recommend increasing intake of fruits and vegetables, with a variety of dark green, red, and orange vegetables; fat free or low fat milk and milk products; and the amount and variety of seafood. In addition, the guidelines recommend replacing refined grains with whole grains; replacing solid fats with oils; and choosing a variety of proteins, as well as foods that provide more potassium, dietary fiber, calcium, and vitamin D. The typical American diet has not achieved the recommended balance, and includes less than the recommended amounts of foods to increase (only 59% of the recommend vegetable intake, 42% of fruit, and 15% of whole grain) and significantly more than the recommended amounts foods to reduce (110% of the recommended saturated fat intake, 149% of sodium, and 280% of solid fat and added sugars).[17] In North Carolina, fewer than one in six (13.7%) adults consume five or more servings of fruits or vegetables a day.[18] Those in rural and urban counties report consuming five or more servings of fruit and vegetables at similar rates (18.8% in rural counties; 95% CI: 16.5-21.0, compared to 21.6% in urban counties; 95% CI: 20.3-22.9).[e] Those in Tier 1 counties are less likely to consume five or more servings of fruit and vegetables (17.4%; 95% CI: 14.4-20.5), than people in Tier 2 counties (19.1%; 95% CI 17.2-21.1) or Tier 3 counties (22.9%; 95% CI 21.3-24.5). Only 19.4% of high school students consume fruits and vegetables five or more times per day.[f,19]

In North Carolina adults in Tier 1 counties are less likely to consume five or more servings of fruit and vegetables than people in Tier 2 counties or Tier 3 counties.

Schools that participate in the National School Lunch Program and School Breakfast Program are required to serve meals that meet the most recent Dietary Guidelines for Americans.[g] The Healthy, Hunger-Free Kids Act of 2010 required

d The US Department of Agriculture and the US Department of Health and Human Services produce the national dietary guidelines. It is updated on a periodic basis, as evidence about diet and health changes over time.

e Eleanor Howell, MS, State Center for Health Statistics, North Carolina Department of Health and Human Services, email communication, April 17, 2014

f Similar data is not available for younger children and adolescents.

g Child Nutrition Act of 1966 and the Richard B. Russell National School Lunch Act (NSLA).

MountainWise is a partnership of the eight far western counties of North Carolina. Through funding from the Community Transformation Grant, several counties have implemented the "MountainMarkets" Healthy Corner Store campaign, a highly targeted marketing campaign aimed at increasing access to healthy items in local convenience stores. Each corner store is located in a rural food desert. They have agreed to sell fresh produce, low fat dairy, whole grains, and lean cut protein. The MountainWise team, in partnership with local health departments and local Cooperative Extension agents, are working to sustain the healthy options after the grant funding ends.

MountainWise
western North Carolina

standards to be applied to all food sold outside the school meal programs, on the school campus, and at any time during the school day.[h] Standards for beverages and snack foods are voluntary. Further, food sold after the school day and during fundraisers may be exempted. Beginning to 2014-2015, the United States Department of Agriculture Smart Snacks rules apply the Dietary Guidelines to a la carte items and food sold in vending machines.[i] In order to meet the intended goals to improve the health and well-being of children, increase consumption of healthful foods during the school day, and create an environment that reinforces the development of healthy eating habits, the Dietary Guidelines should be applied to all food and beverages served at school or sold for fundraisers.

Promoting Healthy Eating and Physical Activity

There are several ways to combat obesity and improve rates of physical activity and healthy eating, commonly referred to as healthy eating and active living (HEAL).[20] As noted in Chapter 2, health is influenced by many different factors, including those at the individual level (e.g. genetics, lifestyle choices), interpersonal level (e.g. friends, family), community and environment level (e.g. school, community, worksite, health care settings), and policy level (e.g. land use, transportation, food policies). The Task Force recommended focusing on improving healthy eating and active living in formal and informal educational settings. Children who are overweight or obese are much more likely to be overweight or obese as older children or adults.[20-22] Conversely, those who are at a healthy weight as young children are more likely to stay at a healthy weight as older children and adults. School-aged children spend a large portion of their week in the school, whereas many younger children spend time in preschool environments. Instilling sound health habits around young children can make a positive impact on their lifelong health. While it is important to focus on children, the Task Force also recognized the importance of promoting healthy eating and active living amongst adults. Thus, the Task Force explored other evidence-based or evidence-informed strategies to promote healthy eating and active living in informal educational settings involving adults.

School-Based Strategies to Promote Healthy Eating and Active Living

The Task Force identified three evidence-based or evidence-informed strategies to improve healthy eating and active living in the preschool and school setting. Two of these interventions have been developed and tested in North Carolina: SHAPE NC (addressing HEAL in the preschool environment) and Motivating Adolescents with Technology to Choose Health (MATCH). The other evidence-based model has been tested in multiple states in the school environment: the Coordinated Approach to Child Health (CATCH).

h 7 CFR Parts 210 and 220.

i Susanne Schmal, MPH, Early Child Care and School Coordinator, Community and Clinical Connections for Prevention and Health Branch, Division of Public Health, North Carolina Department of Health and Human Services. Email communication. July 8, 2014

Shape NC, The North Carolina Partnership for Children, Inc.

Shape NC aims to address early childhood obesity in early childhood care centers and communities. It began as a $3 million, three-year grant from the Blue Cross and Blue Shield of North Carolina Foundation (BCBSNCF) to the North Carolina Partnership for Children (NCPC). The goal is to promote healthy weight and combat early childhood obesity by enhancing nutrition and physical activity in select Smart Start partnerships across the state. Shape NC unites three initiatives in child care programs that have proven to be effective: Nutrition and Physical Activity Self Assessment in Child Care (NAP SACC) to assess nutrition and physical activity policy and practice; Preventing Obesity by Design (POD) to focus on the built environment and outdoor play and learning; and Be Active Kids® to focus on programming and training with its physical activity curriculum.[23,24]

In Phase 1 of Shape NC's intervention, the program was implemented in 19 Smart Start partnerships. Results from the first phase show:

- Child care centers across North Carolina almost doubled the number of healthy best practices adopted, increasing the percent of best practices met from 40% to 74%.
- The percent of children being provided with 90 minutes or more of physical activity daily rose from 51% to 85%.
- The percent of children being provided with fruit two or more times per day rose from 34% to 80%. Additionally, the percent of children provided with nutrient dense vegetables at least twice a day rose from 16% to 54%.
- All 19 child care centers made improvements to outdoor learning environments including additions such as bike paths and vegetable gardens.
- Smart Start partnerships leveraged almost $1.2 million to support improvements in their local communities.[25]

In Phase 1 of Shape NC's intervention, Smart Start partnerships leveraged almost $1.2 million to support improvements in their local communities.

In early 2014, the BCBSNC Foundation announced it was investing a second $3 million grant over three years to the NCPC to expand Shape NC. The additional $3 million grant will expand the program's reach through the Smart Start network to 240 additional child care centers across the state.[24]

MATCH, East Carolina University

The MATCH project (Motivating Adolescents with Technology to Choose Health) is a school-based childhood obesity prevention program that integrates behavior change curriculum into academic courses in the 7th grade. It was designed to be both feasible and effective by incorporating educational goals of teachers and engaging students by creating internal motivation.[26] The MATCH intervention educational model addresses conceptual knowledge, health skills, individualized tasks, and motivation strategies. Over the course of 14 weeks, students track

Fit to Farm encourages farmers to adopt a healthy lifestyle by partnering with North Carolina Cooperative Extension to offer health education during meetings. Five modules provide farmers with information on health risks associated with poor dietary choices and inactivity. Simple, realistic strategies for making positive health behavior changes amidst the unique challenges of working in the farm environment are also provided. Farmers are also encouraged to complete health screenings with an AgriSafe NC nurse and they are assisted with referrals to a health care provider if needed. Extension agents are encouraged to provide a healthy food option to reinforce Fit to Farm concepts.

Fit to Farm

their daily physical activity with pedometers. They record and analyze their food intake and perform energy balance activities. Students calculate their BMI, determine their weight category, perform fitness testing, and evaluate their own health behaviors. Students set their own goals and develop action plans along with peer accountability contracts. The students receive positive reinforcement through a recognition bulletin board and incentive items for achieving their goals.[27]

The MATCH program began in 2006 with 7th grade students at one rural eastern North Carolina middle school. Before the program, in Cohort 1, 25% of the students were overweight and 36% were obese. In Cohort 2, 15% were overweight and 32% were obese. Following the MATCH intervention and during follow-up, each cohort significantly decreased BMI percentiles among the overweight and obese students.[j,28] Since then, MATCH has expanded to 19 schools in 12 eastern North Carolina counties.[28] In 2014, follow-up results showed MATCH participants sustained improvement from overweight to healthy weight or maintained healthy weight. The MATCH students were compared to data from the 2006 Child Survey and 2010 Child and Young Adult Surveys from the National Longitudinal Survey of Youth. Over the five year follow up, none of the MATCH participants who began at the upper end of healthy weight (between 70th and 85th BMI percentile) increased to overweight. Only 2% (1 of 52) of all participants who began at a healthy weight increased to overweight during the study. In the survey comparison group, 13% increased to overweight or obese after four years.[28] These results suggest that some high risk adolescents can have their growth trajectory follow a healthier path than expected. The program showed cost savings and is expanding into other states.[28]

Coordinated Approach to Child Health (CATCH)

CATCH is a nationally accepted evidence-based program for HEAL in schools. It began as a university study in 1987 and now includes early childhood, middle school, and afterschool programs that teach children how to be healthy for a lifetime.[29] Originally known as the Child and Adolescent Trial for Cardiovascular Health, the controlled clinical CATCH trial was evaluated from 1991 to 1994 in 96 schools (56 intervention and 40 control) in four states (California, Louisiana, Minnesota, and Texas) and included over 5,100 students with diverse cultural and ethnic backgrounds. CATCH was a multi-component, multi-year coordinated school health promotion program designed to decrease fat, saturated fat, and sodium in children's diets; increase physical activity; and prevent tobacco use.[30]

The CATCH program is based on social cognitive theory and includes both school-based and family-based components. The interventions include changes in school food service and physical education (PE), and the addition of the CATCH curriculum with or without a family-based program. The program

j In Cohort 1, the healthy weight subgroup minimally changed BMI measures following the intervention.

reduced the total fat content of food served in schools to 30% of the student's total energy intake and the sodium content to 600-1,000 mg per serving. Food service personnel had a full day of training and monthly follow-up visits to help learn, implement, and maintain the program. The CATCH program also increased the time students spent in PE doing moderate to vigorous physical activity to more than 50% of PE class time. The classroom curricula were specific to the students' grade level and varied from 15-24 lessons in 3rd to 5th grade. Fifth grade students also had four sessions of the tobacco use prevention curriculum called FACTS for Five. Classroom teachers had 1 to 1.5 days of training to implement the program. The home curriculum included activities that complemented classroom activities and required adult participation. There were 19 packets over the course of the three year intervention. Families were invited to fun nights to reinforce the lessons at the end of the classroom sessions.[31]

The MATCH program results suggest that some high risk adolescents can have their growth trajectory follow a healthier path than expected.

The CATCH trial was the largest school-based health promotion study ever funded in the United States (funded through the National Heart, Lung, and Blood Institute). The CATCH results showed decreased student fat consumption and increased physical activity among children and adolescents, as well as maintenance of those results over time. In 1999, CATCH was renamed Coordinated Approach to Child Health to better reflect the shift from a research trial to a proven, sustainable program.[31] Although the program began in large urban centers, it has now expanded to rural communities across the country.

Using Informal Education Settings to Promote Healthy Eating and Active Living among Adults

The North Carolina Institute of Medicine Task Force on Rural Health heard about several examples of evidence-based or promising practices to improve HEAL for adults in informal educational settings, including Faithful Families Eating Smart and Moving More and Living Healthy: Chronic Disease Self-Management Program.

Faithful Families Eating Smart Moving More

Faithful Families Eating Smart and Moving More (FFESMM) is a faith-based community program that promotes healthy eating habits through a series of group nutrition and physical activity education sessions. It can be used within any faith tradition but has been tested mainly in low-income African-American faith communities. FFESMM is a partnership between the North Carolina Division of Public Health and North Carolina Cooperative Extension.

FFESMM works at the four levels of the Socioecological Model of Health. At the individual level, the program coordinator and faith lay leaders work with each faith community to offer educational materials. The individuals complete health assessments and are encouraged to participate in the nutrition and physical activity classes. At the interpersonal/family level, lay leaders offer a series of nine group nutrition, food safety, and food resource management lessons. The participants are encouraged to make positive behavior changes and

set healthy goals. At the organizational level, each faith community conducts a Faith Community Health Assessment to determine the most important areas for behavior, environmental, and policy change. Based on these results, the program coordinator may provide additional education materials for the community. Finally, at the community level, FFESMM staff connects the faith communities with existing resources in their communities and encourages them to make changes around HEAL. One of the resources available to faith communities is the North Carolina Council of Churches' Partners in Health and Wholeness Initiative.[k]

FFESMM has shown positive changes both in individual health behavior and community policy. Over a two-year period, of those who participated in the HEAL education sessions, 43% reported eating more fruit, 46% reported eating more vegetables, and 35% reported increasing amounts of physical activity. The 24 faith communities adopted 14 Eat Smart policies, 9 Move More policies, and 5 environmental policies in 4 counties. Of the 25 faith communities participating, 24 adopted multiple policies. FFESMM began in 2008 with 11 faith communities in Harnett County, NC. In three years, the program spread to more than 39 faith communities in 9 North Carolina counties.

In North Carolina, a significant percentage of participants reported improvements in general health and daily activities through the Living Healthy program.

Living Healthy: Chronic Disease Self-Management Program

Living Healthy is North Carolina's version of the internationally recognized evidence-based programs developed by Stanford University and collectively referred to as Chronic Disease Self-Management Programs (CDSMP). CDSMP are a series of workshops lasting 2.5 hours, once a week for six weeks, in community settings such as senior centers, churches, libraries, and hospitals.[32]

In North Carolina, Living Healthy is offered in all 16 Area Agencies on Aging. Since April 2010, more than 6,500 people have participated in 628 workshops. People with different chronic health problems attend together. Workshops are facilitated by two trained leaders, one or both of whom are non-health professionals with chronic diseases themselves. North Carolina has more than 983 lay leaders, 105 master trainers, and 4 T-trainers (who can lead the program in Spanish).[l]

Although the program was developed to improve the health of people with chronic diseases, it has components that are targeted to improve healthy eating and enhance physical activity. The HEAL subjects covered include appropriate exercise for maintaining and improving strength, flexibility, and endurance. Nutrition classes are highly participatory, where mutual support and success build the participants' confidence in their ability to manage their health and

k Partners in Health and Wholeness, an initiative of the North Carolina Council of Churches, is designed to promote health as an expression of faith and to improve the health of clergy and congregants through increased physical activity, healthy eating, and tobacco use prevention and cessation.

l Heather Burkhardt, MSW. Division of Aging and Adult Services, North Carolina Department of Health and Human Services. Email communication. February 12, 2014.

maintain active and fulfilling lives. In North Carolina, a significant percentage of participants reported improvements in general health and daily activities through the Living Healthy program.

In the rural meetings held across the state, community members and participants discussed other opportunities for healthy eating and active living. The community discussed the need for greater investments into the built

infrastructure (to support sidewalks, bike lanes, and parks). They also talked about the need to promote the use of EBT cards at farmers markets, support community gardens, and expand the use of joint use agreements so that communities could use existing school and/or other resources to promote greater physical activity. Partners like the Blue Cross and Blue Shield of North Carolina Foundation and the Center for Environmental Farming Systems have been working with rural communities to provide grant funding and other support to improve opportunities for healthy eating and active living. The Task Force thought it was important for foundations and other partners to continue this work and involve other stakeholders in their efforts.

Recommendation 3: In order to promote these types of evidence-based and evidence-informed strategies to support healthy eating and active living, the NCIOM Rural Health Task Force recommends:

a) The North Carolina Division of Child Development and Early Education, in collaboration with the Partnership for Children, local Smart Start partnerships, North Carolina foundations, and other collaborating partners, should implement evidence-based and evidence-informed strategies to promote and support healthy eating, increased physical activity, reduced screen time, and active learning environments in licensed child care settings. Such strategies should include, but not be limited to, implementation of SHAPE NC.

b) The State Board of Education (SBE) should develop a model local wellness policy that includes evidence-based or evidence-informed age-appropriate strategies to reduce overweight and obesity among school-aged children. The SBE should promote the use of this model policy by all local education agencies. The policy should include, but not be limited to:

1) A requirement that all food and beverages served during and after school hours comports with the nutritional content required in the National School Breakfast Program and the National School Lunch Program; and

2) At least 2.5 hours (for elementary students) and 3.75 hours (for middle and high school students) per week of physical education.

c) The State Board of Education should require that:

1) Schools implement evidence-based educational curricula that are woven through different courses that teach students about healthy weight, good nutrition, and the importance of physical activity; and give students the skills to make healthy choices. Such curricula could include, but not be limited to, MATCH or CATCH.

2) The Healthful Living curriculum be updated to include evidence-based information about healthy weight, nutrition, and physical activity; and to teach students skills to make healthy choices.

d) North Carolina private foundations, the faith community, community-based organizations, and other agencies that work with rural communities should continue to partner and support:

1) Opportunities for healthy eating and active living (e.g. farmers markets, community supported agriculture, and green spaces for play/exercise); and

2) Implementation of evidence-based or evidence-informed strategies that have been shown to improve healthy eating and active living among different rural populations. Such strategies may include, but not be limited to, implementation of Faithful Families, Living Healthy, and other promising practices.

References

1. United Health Foundation. America's Health Rankings. Obesity: North Carolina rank: 33. United Health Foundation website. http://www.americashealthrankings.org/NC/Obesity/2013. Accessed February 25, 2014.

2. National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition, Physical Activity, and Obesity. *Overweight and Obesity. North Carolina: State Nutrition, Physical Activity, and Obesity Profile*. Atlanta, GA: Centers for Disease Control and Prevention; 2012. http://www.cdc.gov/obesity/stateprograms/fundedstates/pdf/north-carolina-state-profile.pdf. Accessed July 18, 2013.

3. Centers for Disease Control and Prevention. Adolescent and school health. Youth Risk Behavior Surveillance System (YRBSS). Centers for Disease Control and Prevention website. http://www.cdc.gov/HealthyYouth/yrbs/index.htm?s_cid=tw_cdc16. Updated July 9, 2014. Accessed July 16, 2014.

4. Centers for Disease Control and Prevention. *Table 6D. 2011 Pediatric Nutrition Surveillance. National Comparison of Growth and Anemia Indicators by Contributor: Children Aged < 5 Years*. Atlanta, GA: Centers for Disease Control and Prevention; 2012. http://www.cdc.gov/pednss/pednss_tables/pdf/national_table6.pdf. Accessed July 24, 2014.

5. Centers for Disease Control and Prevention. Overweight and obesity. Centers for Disease Control and Prevention website. http://www.cdc.gov/obesity/index.html. Updated May 22, 2014. Accessed July 25, 2014.

6. Centers for Disease Control and Prevention. Overweight and obesity. Causes and consequences. Centers for Disease Control and Prevention website. http://www.cdc.gov/obesity/adult/causes/index.html. Published April 27, 2012. Accessed April 5, 2013.

7. Centers for Disease Control and Prevention. Healthy weight - it's not a diet, it's a lifestyle! About BMI for adults. Centers for Disease Control and Prevention website. http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html. Updated July 11, 2014. Accessed July 24, 2014.

8. Centers for Disease Control and Prevention. Physical activity and health. Centers for Disease Control and Prevention website. http://www.cdc.gov/physicalactivity/everyone/health/index.html. Accessed March 21, 2014.

9. Centers for Disease Control and Prevention. How much physical activity do you need? Centers for Disease Control and Prevention website. http://www.cdc.gov/physicalactivity/everyone/guidelines/index.html. Accessed March 21, 2014.

10. Adult participation in aerobic and muscle-strengthening physical activities — United States, 2011. *MMWR Morb Mortal Wkly Rep*. 2013;62(17):326-330.

11. Centers for Disease Control and Prevention. Physical activity. How much physical activity do children need? Centers for Disease Control and Prevention website. http://www.cdc.gov/physicalactivity/everyone/guidelines/children.html. Published November 9, 2011. Accessed July 24, 2014.

12. National Association for Sport and Physical Education. No time to lose in physical education class. Published November 6, 2007.

13. North Carolina Institute of Medicine Task Force on Prevention. *Prevention for the Health of North Carolina: Prevention Action Plan*. Morrisville, NC: North Carolina Institute of Medicine;.2009. http://www.nciom.org/wp-content/uploads/NCIOM/projects/prevention/finalreport/PreventionReport-July2010.pdf. Accessed July 24, 2014.

14. US Department of Agriculture, US Department of Health and Human Services. *Dietary Guidelines for American, 2010: Executive Summary*. 7th edition. Washington, DC: US Government Printing Office; 2010. http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/ExecSumm.pdf. Accessed March 17, 2014.

15. US Department of Health and Human Services and US Department of Agriculture. *Dietary Guidelines for Americans, 2005*. Washington DC: US Government Printing Office; 2006. http://www.health.gov/dietaryguidelines/dga2005/document/pdf/DGA2005.pdf Accessed March 21, 2014.

16. US Department of Agriculture, Agricultural Research Service What We Eat in America, NHANES overview. US Department of Agriculture website. http://www.ars.usda.gov/services/docs.htm?docid=13793. Updated November 13, 2013. Accessed July 24, 2014.

17. North Carolina State Center for Health Statistics. 2011 BRFSS Survey results: North Carolina, tobacco use, current smoker. North Carolina State Center for Health Statistics website. http://www.schs.state.nc.us/SCHS/brfss/2011/nc/all/_rfsmok3.html. Published September 14, 2012. Accessed April 5, 2013.

18. North Carolina Department of Public Instruction. *North Carolina Youth Risk Behavior Survey High School 2011 Survey Results*. Raleigh, NC: North Carolina Department of Health and Human Services; 2012. http://www.nchealthyschools.org/docs/data/yrbs/2011/statewide/high-school.pdf. Accessed July 1, 2013.

19. Ammerman A. Healthy eating and active living: overview of evidence-based and promising practices, school focus. Presented at: North Carolina Institute of Medicine Task Force on Rural Health; January 8, 2014; Morrisville, NC. http://www.nciom.org/wp-content/uploads/2013/04/RH_Ammerman_1-8-14.pdf. Accessed July 24, 2014.

20. Singh AS, Mulder C, Twisk JW, van Mechelen W, Chinapaw MJ. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev*. 2008;9(5):474-488.

21. Nader PR, O'Brien M, Houts R, et al; National Institute of Child Health and Human Development, Early Child Care Research Network. Identifying risk for obesity in early childhood. *Pediatrics*. 2006;118(3):e594-601.

22. NCIOM Task Force on Preventing Early Childhood Obesity. *Promoting Healthy Weight for Young Children: A Blueprint for Preventing Early Childhood Obesity in North Carolina*. Morrisville, NC: North Carolina Institute of Medicine; 2013. http://www.nciom.org/wp-content/uploads/2013/09/ChildObesityRpt_090513.pdf. Published September 2013.

23. Be Active Kids. Be Active Kids. Blue Cross and Blue Shield of North Carolina Foundation website. http://beactivekids.org/bak/Front/Default.aspx. Accessed July 24, 2014.

24. Hansen P. Healthy eating and active living panel and discussion. Presented at: North Carolina Institute of Medicine Rural Health Task Force; January 8, 2014; Morrisville, NC.

25. Smart Start. Shape NC awarded $3 million from BCBSNC Foundation. North Carolina Partnership for Children, Inc. website. http://www.smartstart.org/shape-nc/shape-nc-in-the-news/shape-nc-awarded-3-million-from-bcbsnc-foundation. Published January 23, 2014. Accessed July 24, 2014.

26. Lazorick S, Hardison G, Esserman D, Perrin E. Sustained Body Mass Index changes one and two years post MATCH: a school-based wellness intervention in adolescents. *Child Obes*. 2011;7(5):372-378.

27. Lazorick S, Crawford Y, Gilbird A, et al. Long-term obesity prevention and the Motivating Adolescents with Technology to CHOOSE Health™ program. *Child Obes*. 2014;10(1):25-33.

28. Hardison T. MATCH – Motivating Adolescents with Technology to CHOOSE Health.™ Presented at: North Carolina Institute of Medicine Task Force on Rural Health; January 8, 2014; Morrisville, NC. http://www.nciom.org/wp-content/uploads/2013/04/MATCHpresentation.pdf. Accessed July 24, 2014.

29. CATCH. CATCH research. CATCH website. http://catchusa.org/catchresearch.htm. Accessed July 24, 2014.

30. Luepker RV, Perry CL, McKinlay SM, et al. Outcomes of a field trial to improve children's dietary patterns and physical activity. The Child and Adolescent Trial for Cardiovascular Health. CATCH collaborative group. *JAMA*. 1996;275(10):768-776.

31. Nader PR, Stone EJ, Lytle LA, et al. Three-year maintenance of improved diet and physical activity: the CATCH cohort. Child and Adolescent Trial for Cardiovascular Health. *Arch Pediatr Adolesc Med*. 1999;153(7):695-704.

32. Stanford Patient Education Research Center. Chronic Disease Self Mangement Program: Better Choices, Better Health® Workshop. Stanford School of Medicine website. http://patienteducation.stanford.edu/programs/cdsmp.html. Accessed July 24, 2014.