

**A Pilot Study of the Efficacy and Program Cost-effectiveness of
Prevention Plus for Childhood Obesity**

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Dedication

This dissertation is dedicated to my inspirational mother, Mary Looney; hardworking father, Michael Looney and brothers Ben and Ryan, who remind me to enjoy the beauty of life. In addition, this is dedicated to my Papa, who passed away during the last year of my doctoral program, but was an incredible support of my academic pursuits.

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Abstract

Background: In 2007 an Expert Committee published recommendations using a staged approach for the treatment of childhood obesity in the primary care setting. Limited research has evaluated the efficacy of these recommendations. Thus, the primary aim of this study was to test the efficacy of Prevention Plus for the treatment of childhood overweight and obesity in a primary care setting. Cost is a major barrier to translation of research into practice thus, program cost-effectiveness was also evaluated. **Methods:** Twenty-two children ($8.0 \pm$ [plus-minus] 1.8 years; 2.34 ± 0.48 z-BMI; 68.2% female, 72.7% White, 90.9% non-Hispanic) were randomized to one of three 6-month conditions: 1) newsletter (N); 2) newsletter and growth monitoring (N+GM); 3) newsletter and growth monitoring plus family-based behavior counseling (N+GM+BC). Primary outcomes, z-BMI and program cost-effectiveness, and secondary outcomes, dietary intake and leisure-time behaviors were assessed at 0 and 6 months. Parenting factors were also explored. Outcomes were analyzed using linear mixed models, repeated measure analysis of variance (ANOVAs) and one way ANOVAs using the intent-to-treat principle. **Results:** There was a significant ($p < 0.05$) main effect of time for z-BMI (Δ [change] N+GM+BC: -0.16 ± 0.22 , Δ N+GM: -0.08 ± 0.15 , Δ N: -0.06 ± 0.24). Cost-effectiveness was significantly ($p < 0.001$) different between conditions. While there was a greater decrease in z-BMI in the N+GM+BC condition, it was the most expensive condition due to high personnel cost. The N condition had the smallest decrease of z-BMI, but it was the least costly condition due to low personnel costs, so was the most cost-effective. There was a significant ($p < 0.05$) main effect of time for servings of sugar-sweetened beverages with consumption decreasing

over time from 0-months (Δ N+GM+BC: -0.30 ± 1.39 servings/day, Δ N+GM: -0.70 ± 0.50 servings/day, Δ N: -0.83 ± 1.15 servings/day) to 6-months (N: 1.6 ± 1.7 servings/day, N+GM: 0.7 ± 0.6 servings/day, N+GM+BC: 0.8 ± 1.3 servings/day). Fruit and vegetable intake, percent time in moderate- to vigorous-physical activity and hours of television did not significantly change. Parent factors did not differentially change between conditions. **Conclusion:** N+GM+BC promoted the greatest change in z-BMI, but personnel costs should be considered during implementation.

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Chapter 1: Literature Review

Childhood Overweight and Obesity in the United States

According to the National Health and Nutrition Examination Survey (NHANES), from 1976-1980 to 2007-2008, obesity doubled in children aged 2-5 years and tripled among children aged 6-11 years (1). However, there was no change in prevalence from 2007-2008 to 2009-2010 (2). In addition, data primarily from school body mass index (BMI) monitoring demonstrate that the prevalence of overweight and obesity among children appears to be leveling off or decreasing (3-7). Regardless, the alarming number of overweight and obese children in the United States (8) has established two national priorities. One is to reduce the proportion of obese youth and the second is to prevent inappropriate weight gain in children (9). Additionally, First Lady Michelle Obama has focused the national spotlight on pediatric overweight and obesity with the Let's Move campaign (10).

Identifying and intervening on overweight and obese children is essential due to the well-documented medical and psychosocial risks associated with childhood overweight and obesity. The common co-morbidities associated with overweight and obesity in children include: cardiovascular disease (11), type 2 diabetes (12), fatty liver disease (13), asthma (14, 15) and sleep apnea (16). A lower health-related quality of life and poor psychological well-being tend to be reported by overweight and obese children compared to their normal-weight counterparts (17, 18). Treating overweight and obesity during childhood is important because it tracks into adulthood (19), further increasing the risk of developing related chronic diseases of obesity during adulthood. Moreover, not only is child and adolescent overweight and

obesity associated with adult morbidity, but it is also associated with premature mortality in adulthood (20).

Measuring Overweight and Obesity in Children

Absolute BMI, weight in kilograms divided by the square of height in meters (kg/m^2), in children has been recommended for use since 1994 by the American Academy of Pediatrics (21), Expert Committee (22) and Institute of Medicine (23) to assess weight status; however, an absolute BMI value cannot be used to accurately assess weight status in children since they are growing. During growth, children experience a decrease in BMI from after the age of two years until four to eight years, followed by a period where BMI increases, a phenomenon known as the adiposity rebound (24, 25). Due to the changes in adiposity of children during growth, a standardized methodology to assess weight status and allow for comparison of weight status between children of different ages was needed.

Thus, since 1998, the United States has recommended that the weight status of children (2- to 20 years-old) be assessed using BMI percentile; however, it was not until 2000 when the Centers for Disease Control and Prevention (CDC) published the BMI-for-age, sex-specific growth charts (22, 26) that weight status could be easily assessed. BMI percentile also allows for the comparison of weight status among children of different ages. The BMI-for-age growth chart percentile curves are statistically modeled from pooled national representative data [National Health Examination Survey (NHES) II (1963-1965) and III (1966-1970) and NHANES I (1971-1974), II (1976-1980) and III (1988-1994) datasets]. To generate the percentile curves, observations at each specific age for each sex, were used in the initial smoothing stage. To

achieve precision during smoothing, samples sizes of 400 to 500 observations were needed, thus data from national surveys were pooled (27). A second stage, referred to as the transformation stage, applied a statistical procedure to the smoothed percentile curves to allow the calculation of additional percentiles and z-scores (26).

On the 2000 CDC BMI-for-age growth chart, the point of intersection between absolute child BMI and age determines the BMI percentile for that child. The percentile curves on the BMI-for-age growth chart provide cutoff points to classify the weight status of a child. A child with an age-specific BMI percentile $<5^{\text{th}}$ is classified as underweight, $\geq 5^{\text{th}}$ to $<85^{\text{th}}$ is classified as normal weight, $\geq 85^{\text{th}}$ to $<95^{\text{th}}$ BMI is classified as overweight and a BMI-for-age percentile $\geq 95^{\text{th}}$ is classified as obese.

Causes of Overweight and Obesity in Children

Overweight and obesity result from energy imbalance. When energy intake is greater than energy expenditure an individual is considered to be in positive energy balance. During growth a child is and should be in positive energy balance; however, overweight and obesity in children result from positive energy balance above and beyond what is needed for appropriate linear growth and weight gain. Both behaviors and environmental factors related to diet and leisure-time activity contribute to excess positive energy balance in children.

Increased consumption of sugar-sweetened beverages (28-32), increased consumption of snack foods (29, 33), decreased consumption of fruits and vegetables (29, 34), increased screen time (35-38) and decreased physical activity (37) are dietary and leisure-time behaviors that can contribute to excessive positive energy balance in children. Environmental dietary

factors, such as portion size (39-44), variety (45, 46) and energy density (kcal/g) (40, 47-49) also contribute to overweight and obesity in children. Additionally, the physical environment has encouraged children to become more sedentary in part because of the greater availability of sedentary leisure-time activities, such as television, computers and non-active video games (50-52).

Ideally, changes to both dietary factors (energy intake) and leisure-time activities (energy expenditure) are recommended to alter energy balance in children. To impact weight status, the excess energy intake beyond what is being used for growth needs to be reduced and/or energy expenditure needs to be increased with physical activity. Altering the energy balance of overweight and obese children will allow appropriate linear growth with a reduction in rate of weight gain, which will ultimately reduce weight status assessed by BMI-for-age percentile (53, 54).

Efficacious Childhood Obesity Treatment Conducted in Research Settings

Successful obesity treatment interventions in children have been established in the research setting (54, 55). A meta-analysis of randomized controlled lifestyle interventions (defined as any combination of diet, physical activity and/or behavior treatment recommendations) compared to a waitlist control or education control showed a mean effect size at the end of treatment of 0.75 (0.60 at follow-up) and 0.48 (0.91 at follow-up), respectively demonstrating significant treatment effects when compared to a control condition (56). Treatment ranged from 9 to 77 weeks and participants received an average of 18.3 sessions in the treatment conditions as compared to the 3.6 sessions received in the waitlist

control or education control conditions, with follow-up occurring over a range from 1 month post-treatment to 5 years post-treatment (56). These efficacious pediatric obesity interventions include several components: a dietary prescription, a leisure-time activity prescription, behavior modification techniques, and a family-based approach that targets parenting practices (54, 55, 57-59).

Diet. The most efficacious (60) and commonly tested diet prescription that has produced improvements in child weight status is the Traffic Light Diet developed by Epstein and colleagues (61-66). The Traffic Light Diet initially aimed to provide children with 900-1200 kilocalories per day (66) and foods were divided into three categories of green, yellow and red based on the energy-density per serving of food with the goal to consume no more than 4 “red” foods per week. As noted by the name, the Traffic Light Diet mimics the meaning of colors of a traffic light in relationship to food. Low-energy-dense, high-nutrient-dense foods (e.g., fruits, vegetables) are “green” foods that are recommended by the Traffic Light Diet to be consumed in unlimited quantities. “Green” foods provide less than 20 calories per serving. “Yellow” foods (e.g., grains, proteins) are staples in the diet and recommended to be consumed moderately. “Red” foods (e.g., cookies, cakes, donuts) are high-energy-dense, low-nutrient-dense foods high in fat and simple carbohydrates that are to be consumed sparingly. The color categorization of the Traffic Light Diet was designed to increase overall diet quality and decrease caloric intake through the consumption of more nutrient-dense foods and fewer energy-dense, non-nutrient-dense foods. The goals of the Traffic Light Diet were later modified to a caloric prescription of 1200-1500 kilocalories per day and a limitation of “red” foods to no more than 10 per week (64,

67). Additionally, foods were re-categorized into fruits and vegetables, grains, milk and dairy, protein and other. Within each food group, the foods were classified as “green,” “yellow” and “red” based upon their fat content of 0-1 grams, 2-5 grams and >5 grams, respectively. All foods categorized as fats, oils and sweets, including modified foods, in the 1992 Food Guide Pyramid, were classified as “red” foods regardless of their fat content. Additionally, combination foods (i.e., sandwich, pizza, etc.) were considered a “red” food if they contained at least one half serving of a “red” food (68). The overall goal is still to increase diet quality and decrease caloric intake.

Children were instructed to follow the dietary prescription until they were within 10% of their goal weight for height. Once a child’s goal weight was achieved, a child was considered ready for maintenance, at which point the child increased caloric intake by 100 kilocalories per day each week until weight gain occurred. Outcomes associated with the Traffic Light Diet include a reduction of energy intake and “red” foods and an increase in “green” foods, protein and nutrient density (58, 68).

Leisure-time Behaviors. Leisure-time behaviors include both physical activity and sedentary behaviors. To impact energy balance, children are encouraged to maximize physical activity (69) and minimize sedentary activities, such as television viewing (57, 70). Recommendations for physical activity and television viewing have been established to promote the health and fitness of children. With technology advancing at a rapid rate, children participate in other screen-related activities, such as computer use; however, a positive relationship has not been established between weight status and computer use, as a sedentary

activity (71). Thus, it is recommended children and adolescents (6-17 years old) engage in at least 60-minutes of moderate-vigorous activity per day (69, 72) and watch less than two hours of television per day (70, 72). Television viewing has been thought to compete for time with physical activity (73); however, several non-experimental studies show children can have both high levels of screen time and physical activity (74) or that television viewing only displaces vigorous intensity activity (75). In addition to television viewing being a sedentary activity in which energy expenditure is low, television viewing may also influence energy intake. Positive associations between television viewing and snack consumption have been found (76). Particularly, food advertising during television viewing time is associated with snack food consumption (77). Overall greater time spent in sedentary activity, such as television viewing, has been associated with a higher weight status in children, while greater time spent in physical activity has been associated with a lower weight status in children. Thus, high levels of television viewing may influence both sides of the energy balance equation.

Behavior Modification. To make dietary and leisure-time activity behavior changes, behavior modification techniques are employed based on the combination of three types of learning—classical conditioning, operant conditioning and modeling (78). Classical and operant conditioning are based within the theoretical framework of Behavioral Theory, also known as behaviorism, while modeling comes from Social Learning Theory.

Behavior Theory, founded by John B. Watson, focuses on understanding the general principles of learning underlying human and animal behavior (79). Behavior Theory has three core components: antecedents, events that occur immediately before the behavior; the

behavior; and consequences, events that immediately follow a behavior that reinforce or extinguish the behavior (80). Watson insisted human behavior could be understood by looking outside the organism to rewards and punishments delivered by the environment (79).

Within Behavior Theory, Ivan P. Pavlov, the father of classical conditioning, studied how stimuli evoke a response and how behaviors can be learned. Specifically, Pavlov showed that a stimulus (one that does not elicit an automatic or natural response) could be made to elicit an automatic or natural response by consistently pairing the stimulus with an unconditioned stimulus (US), one that does elicit an automatic or natural response, known as an unconditioned response (UR). Eventually, the presentation of that stimulus elicits a response. The stimulus is then known as the conditioned stimulus (CS) and the response is known as the conditioned response (CR). For example, hunger (US) produces eating (UR). If hunger (US) is paired with watching television (CS) and eating (UR) occurs, after many occurrences, watching television (CS) produces eating (CR).

Pavlov's work influenced B.F. Skinner, who investigated how consequences influenced behaviors. Behaviors or operants as Skinner referred to them, are strengthened or weakened based on the consequences of the behavior. Consequences that follow a behavior and impact a subsequent occurrence of the behavior include reinforcement, punishment and extinction. Reinforcement is a consequence that occurs after a behavior, is contingent upon a behavior and increases the frequency of the behavior. Reinforcement can be positive or negative, but both increase the occurrence of behavior. Positive reinforcement is when the behavior is followed by a favorable consequence, while negative reinforcement is when a behavior is followed by

the removal of an aversive event. An example of positive reinforcement includes providing praise to a child after he or she engaged in the target behavior or providing an incentive after a goal was achieved. An example of negative reinforcement is a parent nagging his/her child to eat vegetables at dinner and when the child does eat the vegetables (behavior), the nagging, an undesirable event, stops. Punishment is a consequence occurring after the behavior that decreases the frequency of behavior. Punishment can include an aversive event or the removal of a positive event right after a behavior. Extinction is defined as the lack of a consequence following a behavior. For example, if a child is throwing a tantrum, the parent ignores the tantrum and continues to ignore the tantrum after several occurrences the parent is not providing any consequence for the behavior. Thus, the tantrums will stop. This process of learning new behaviors through the occurrence of consequences is known as operant conditioning (78).

Along with classical and operant conditioning, other behavior modification strategies used for changing eating and leisure-time activities come from Behavior Theory and include stimulus control, goal setting, pre-planning and monitoring. Stimulus control involves the addition or removal of a stimulus from the environment to prompt a behavior. For example, a child may leave his or her shoes (a stimulus) by the door to encourage physical activity (a behavior) or a stimulus can be removed, such as the parent no longer purchasing sugar-sweetened beverages (a stimulus) to keep in the home environment to help the child reduce sweetened beverage intake (a behavior). In addition to altering the environment, behavior modification encourages goals to be established for the target behavior that is being altered.

Goal setting involves establishing a specific, measurable, achievable goal that will promote change of the target behavior. Eating and physical activity behaviors can be difficult to change, so changes are commonly shaped over time by starting with smaller goals that provide steps to the ultimate larger goal or target behavior. Reaching a goal can be motivating and increase self-efficacy, thus small goals are used to increase an individual's success. Self-efficacy is the ability to successfully execute a behavior required to produce the desired outcome (81). Since barriers can prevent an individual from reaching a goal, pre-planning and problem-solving are behavioral strategies used to assist an individual with meeting his or her goals. Pre-planning involves the development of a specific plan to encourage a particular behavior. For example, to help a child achieve the desired level of physical activity the family may develop a plan which involves writing down the type of physical activity, when it will be accomplished and for how long. Problem-solving on the other hand is used to remove barriers. Problem-solving requires one to identify the problems or barriers, brainstorm solutions and select a solution to implement and evaluate. Monitoring is also employed to assist in changing a behavior because once the target behavior has been identified, to know if a goal has been achieved, the behavior must be monitored. Monitoring the target behavior is essential to changing health and food behaviors (82). When a behavior is monitored more frequently, the target behavior more readily changes due to the increased awareness about that particular behavior. Monitoring progress toward a goal provides feedback to the individual about what behaviors promote or inhibit progress toward the target behavior. Multiple behavior modification strategies are used to alter a target behavior.

Modeling or observational learning comes from the Social Learning Theory (83). Albert Bandura proposed in the Social Learning Theory (83) that the modeled response is acquired by the observer through cognitive or covert coding of the events observed. An example of this is when an individual observes a model (someone who is admired or seen as similar by the observer) engage in a behavior, such as a child observing the parent consume a fruit for a snack. The observer does not engage in the behavior, but simply learns by actively watching. Children spend a significant amount of time with their parents and the parents have the primary responsibility of feeding their children. Thus, parents have a great opportunity to model healthy behaviors that can be learned by the child simply through observation. Research finds that children who are the most successful during weight loss treatment not only have greater parent involvement (84), but also have a parent successful with weight loss (85).

Family-based interventions. A family-based intervention targets the family unit: specifically one child that has a condition that is the focus of the intervention and one caretaker during the intervention. A family-based intervention is defined by the involvement of a caretaker in the intervention and implementation of change within the caretaker, rather than just focusing the intervention and change on the child (86). Parents are an agent of change (87); therefore, parents are thought to be an essential component of childhood obesity treatment. A family-based intervention generally employs a host of strategies, such as behavior modification and parenting behaviors, to assist the parent and child with making a change. Additionally, it incorporates multiple domains of family functioning, such as problem-solving, communication and interpersonal involvement (88).

A family-based pediatric obesity intervention is designed to improve a parent's self-efficacy in managing a child's dietary and leisure-time activity behaviors (89). Treatment sessions attended by the caretaker may or may not be attended by the child; both, however, are asked to engage in making changes to the targeted behaviors. Communication between the caretaker and child is a focus during family-based interventions, particularly in regards to the dissemination of treatment goals and monitoring strategies. In addition to making the same behavior changes as the child, the parent is encouraged to implement appropriate parenting practices and behavior modification techniques, such as praise and positive reinforcement, learned from the intervention to assist the child in making changes. Specifically, the behaviors targeted for change are monitored by the caretaker and child as a way to record progress towards the dietary and leisure-time activity goals. Due to the parent's role, it has been suggested that a broader focus on the family context, including parenting styles, should be a key component of family-based interventions (86, 90, 91).

Parenting. Parenting styles come from the early work of Baumrind (92) and Maccoby and Martin (93) and are viewed as a context that moderates the influence of specific parenting practices on the child (94). General parenting has two dimensions: 1) responsiveness, which is regarded as warmth and support for the child; and 2) demandingness, which is control exerted over the child. When these two parenting dimensions are crossed, the four primary parenting typologies are produced. The four parenting typologies or styles are authoritative (high responsiveness, high demandingness), indulgent (high responsiveness, low demandingness), authoritarian (low responsiveness, high demandingness) and neglectful (low responsiveness,

low demandingness) (92, 93). A parenting style is typically consistent across children in a family, while parenting practices may differ between children in a family and are based on the context of a situation (95). General parenting practices are a set of behaviors through which parents shape daily life with and for children by providing cognitively stimulating activities, setting limits, setting discipline practices and affectively relating to the child (96). Over the last decade, childhood overweight and obesity research has increasingly highlighted the importance of parenting (97-100) due to the believed relationship between parenting styles and practices and a child's weight; however, research is limited in this area.

A parent's feeding style is defined by specific techniques or practices, such as pressure to eat, restriction, monitoring of a child's food intake or rewards for food consumption, used by a parent to facilitate or limit ingestion of the amount or types of food (101). The relationship between caretaker feeding practices and child weight emerged from the early work of Costanzo and Wood (95) and continued later by Birch and colleagues (102), but is poorly understood (103, 104). An authoritative feeding style has been associated with greater availability and higher intakes of fruit, vegetables and dairy (105) among children compared to permissive or authoritarian styles (106, 107), but little is known about the relationship of parent feeding styles and weight status.

Little has been established about the relationship between parenting and parent feedings styles. Even less is known about the role of parenting styles, parenting practices and parent feeding styles in relationship to child weight status. A review of parenting and weight outcomes highlighted the inconsistency in results (98). Due to the minimal research

investigating parenting and the relationship to a healthy weight in children, Stang and colleague (91) recommend including measures on parenting styles and parent feeding practices to allow for the opportunity to further investigate.

Translating Research to Practice

At this time, efficacious treatments for childhood overweight and obesity exist in research settings (54); however, one challenge in translation is that many non-research settings cannot support the intensity of treatment delivery that has been tested in research settings due to various factors, such as time, personnel training and cost (108, 109). Intervention intensity is one of the greatest barriers to sustaining outcomes outside the research setting (110, 111). Child obesity interventions in the research setting typically require specific eligibility requirements for participants, highly trained personnel to deliver the intervention, weekly meetings, daily monitoring of multiple target behaviors (with feedback from intervention personnel) for both the parent and child and financial support for personnel and materials. When any of these components are lessened, cost is reduced; however, to successfully translate efficacious obesity treatment, an intervention must be of an intensity that is cost-effective without compromising outcomes.

Though barriers exist, researchers have been encouraged to translate interventions to alternative settings that may have a larger public health impact, such as schools, camps and, in particular, the clinical setting (112, 113). Schools have been considered an important setting for monitoring growth among children, but results demonstrate obesity interventions in schools, including growth monitoring, are not effective in reducing weight status (114-117).

Implementing interventions into these alternative settings is a first step to understanding the feasibility and efficacy of an intervention in a non-research setting. Each setting will present its own opportunities and challenges; however, classifying a child as overweight or obese is a medical diagnosis, making the primary care setting appear ideal for overweight and obesity treatment. Ultimately, in primary care the identification of overweight should occur at the time a child meets clinical criteria for being overweight, so the appropriate treatment strategies can be implemented immediately and prevent a child from becoming obese. In the United States, children are encouraged to visit their pediatrician annually until the age of 21 years (118). Because overweight children may be more likely to visit their pediatrician than healthy weight children (119), this again supports primary care as an appropriate setting for overweight and obesity treatment in children. In addition, parents view primary care as an appropriate setting for obesity treatment (120). Furthermore, a primary care provider's advice is highly sought and valued by caretakers and patients (121-124). Pediatricians also report that overweight should be addressed at well-child visits and that families want them to discuss overweight (125).

While this setting appears ideal for translation, there are specific challenges to translating efficacious obesity treatment into primary care. An initial challenge is the notoriously low identification of overweight and obese children in the primary care setting due to the lack of BMI-for-age assessments by primary care providers (125-127). Reasons reported by primary care providers for the lack of BMI-for-age assessment include time constraints (125), lack of self-efficacy (128, 129) and lack of treatment programs for referral (125).

Few pediatric obesity treatment interventions have been evaluated in primary care settings and unfortunately outcomes of the few evaluated show small reduction in z-BMI (standardized z-score of BMI for the population mean) (130, 131) as compared to a more highly controlled research setting (132). The intensity of pediatric obesity treatment delivered in primary care needs to be lower than the intensity of efficacious interventions delivered in research settings. This reduction in intensity of treatment is required due to the amount of time allocated by the primary care provider for each patient in addition to reimbursement for services. Well-child visits are time limited with the majority of well-child visits for children 2 to 12 years-old lasting ≤ 15 minutes (133). With other medical foci during a well-child visit, including physical examination, immunizations, normal development, nutrition, sleep, safety, in addition to answering parent concerns (118), there is inadequate time to deliver effectively obesity treatment as conducted in the research setting. It has been shown that when behavioral health issues are brought up during a visit, the visit length doubles (8.96 minutes longer on average) (134). Unfortunately a longer visit, such as visits related to behavioral issues, does not translate into greater reimbursement because primary care providers typically only bill one service code for a behavioral visit as compared to the ability to bill for multiple service codes during a medical appointment (134). Therefore, a medical appointment that provides multiple services, produces a significantly higher reimbursement rate per minute as compared to appointments that address behavioral issues (134).

The frequency of visits also is based on reimbursement. The Centers for Medicare and Medicaid Services dictate the frequency of care that will be reimbursed and this varies based on

the service provided (135). As compared to the efficacious interventions that meet weekly in the research setting, the primary care setting will not be reimbursed for contact that occurs this frequently. Due to the need to decrease intervention intensity, translating research into primary care can compromise obesity treatment outcomes. Thus, efficacious obesity treatment interventions are needed for children in primary care that provide adequate intervention intensity for improved weight-related outcomes beyond standard care, but are cost-effective.

Recommendations for Childhood Obesity Treatment in the Primary Care Setting

Due to the need for obesity treatment to be made available in the primary care setting, in 2007 an Expert Committee of professional organizations, scientists and clinicians convened to recommend strategies to use in the treatment of overweight and obesity in children and adolescents for primary care providers (72). Recommendations from the Expert Committee were developed from evidenced-based research, but were tailored to the needs of the primary care setting. Specifically, recommendations have been tailored to minimize treatment intensity by suggesting less frequent visits and more generalized dietary behavior targets as compared to child obesity treatment in highly controlled research settings. For example, instead of focusing on the caloric content of all foods and beverages consumed as recommended during obesity treatment in the research setting, the Expert Committee recommendations (72) suggest children focus on specific types of food (fruits, vegetables, sugar-sweetened beverages). Each stage of treatment recommended for implementation in the primary care setting includes a family-based intervention that focuses on changes of dietary and leisure-time activity behaviors with frequent monitoring of growth by the primary care provider.

The obesity treatment recommendations for children and adolescents (2 to 18 years-old) with a BMI-for-age $\geq 85^{\text{th}}$ percentile include a four staged-approach that increases in intensity from stage one to four. If at any stage a child's BMI percentile does not improve after engaging in the staged treatment for three to six months, the provider and family should consider advancing the child to the next stage. A child or adolescent with co-morbidities or severe obesity may begin at a more intense stage of treatment.

Stage 1: Prevention Plus. Families are encouraged to make eating (consume ≥ 5 servings of fruits and vegetables per day, reduce sugar-sweetened beverage intake to ≤ 1 serving per day, prepare more meals at home, eat at the table as a family ≥ 5 times per week, consume breakfast daily at home) and leisure-time activity (decrease television viewing time to ≤ 2 hours per day, be physically active ≥ 1 hour per day) behavior changes, while primary care providers are encouraged to more frequently monitor growth. Additionally, a family-based approach, non-restrictive feeding practices and the tailoring of behavioral recommendations to the child's cultural values are suggested. The implementation of Prevention Plus is to be delivered in the primary care setting and requires the provider to identify target behaviors, engage in motivational interviewing and incrementally work toward goals with families.

Stage 2: Structured Weight Management. The same eating and leisure-time activity behaviors are targeted as in stage 1; however, additional behavioral counseling of the primary care provider is required along with more structure. Providers and families should implement a structured daily meal plan, ≥ 60 minutes of daily active play, ≤ 1 hour of daily screen time, increased behavioral monitoring by the provider, patient and/or family and reinforcement for

achieving the targeted behavior. Monthly follow-up assessments are recommended for families with their primary care provider.

Stage 3: Comprehensive Multidisciplinary Intervention. This stage builds upon the eating and leisure-time activity goals of stage 2 with an increased intensity of behavioral change strategies, greater frequency of patient-provider contact and involvement of a multidisciplinary treatment team. Further foci should include negative energy balance, structured behavioral modification with the involvement of the family, improvements to the family home environment and weekly office visits. The primary care provider will continue to monitor medical issues.

Stage 4: Tertiary Care Interventions. The most intense intervention is for children who have been unsuccessful in stage 3 and are cognitively mature to understand the potential risks associated with this stage. Children will engage in a tertiary weight management center and may try meal replacements, a very-low-energy diet, medication and/or bariatric surgery.

At this time, no pharmacological treatments have been approved for children and currently the only weight loss drug approved by the Food and Drug Administration for use in adolescents and adults is Orlistat (Xenical and Alli®) (136, 137). Orlistat has only been approved for adolescents 12-18 years having a BMI more than 2 units above the 95th BMI-for-age percentile (138), but is limited to adolescents due to the side-effects of oily stools and risk of malabsorption of fat soluble vitamins (139). Additionally, bariatric surgery is not recommended for children, but is currently being explored in adolescents. Varying levels of evidence support each component of the Expert Committee recommendations (72); however, few studies have

investigated the efficacy of these recommendations together as proposed for each stage in the primary care setting.

Translating Obesity Treatment Research into Primary Care Practice

To facilitate and evaluate the translation of efficacious interventions from a research setting into practice, a framework called RE-AIM (reach, efficacy/effectiveness, adoption, implementation and maintenance) was developed (108, 140, 141). RE-AIM measures the public health impact of an intervention based on five evaluative dimensions, each of which is represented on a 0 to 1 (or 0% to 100%) scale (140). Each dimension of RE-AIM is defined to provide meaningful information regarding translation. *Reach* (R) provides the proportion (program participants from a defined population) and representativeness of individuals willing to participate in a given intervention. The representativeness of *reach* is based on individual characteristics (i.e., demographics, health history, etc.) to determine the extent to which the sample is representative of the larger population. This domain also provides feedback on the degree to which an intervention reaches those most in need. *Efficacy* (E) examines the influence of an intervention on important outcomes beyond clinical measures, which include behavioral outcomes, quality of life and economics. An additional component of this domain is evaluating negative effects to assure harm does not outweigh the benefits. *Adoption* (A) is the dimension defined as the proportion and representativeness of locations and intervention staff willing to initiate and adopt an intervention. Direct observation or surveys are used to evaluate *adoption*, which includes assessing barriers to non-participating settings. The fourth dimension, *implementation* (I), evaluates how consistently various elements of an intervention are

delivered as intended by intervention staff, as well as time and cost of the intervention. This domain is measured at the individual (i.e. adherence) and program (i.e. protocol implementation) levels. The fifth domain, *maintenance* (M), is the extent to which participants make and maintain a behavior change and the sustainability of a program or policy in the setting in which it was intervened. This domain evaluates the extent to which a practice or policy has become part of the norm. Across all five dimensions, cost is a key consideration, since ultimately RE-AIM provides a framework for determining what programs are worth sustained investments (140). As cost is a major barrier for implementing obesity treatment interventions outside the research setting, evaluating the program cost-effectiveness of the Expert Committee recommendations for the treatment of childhood overweight and obesity in the primary care setting needs to be investigated.

Program cost-effectiveness. Program cost-effectiveness is a comparison of cost in monetary units with outcomes in quantitative non-monetary units (142) and is a method used to evaluate the efficiency of specific interventions (143). It has also been defined by Banta and colleagues (144) as an estimate of the incremental cost per specified health effect of a program (program cost-effectiveness) compared with another program that may be helpful in decision making. Cost-effectiveness is typically calculated as a ratio of cost to health outcome, and Janicke and colleagues (145) have proposed evaluating the cost-effectiveness of obesity treatment interventions by cost per unit change in weight status $[(\text{cost per child} \times 0.1) / \text{average decrease in z-BMI}]$. Costs are commonly thought of as the monetary sum (at the individual or program level) for program or intervention personnel time (which may or may not include

travel) and program-related materials (i.e., participant manual, equipment to measure growth, etc.). Personnel time typically requires the larger proportion of costs, so interventions where personnel time is minimized may be more cost-effective than those requiring substantial personnel time.

Frequent monitoring of a child's growth, a recommendation from the Expert Committee (72) as part of obesity treatment, may be a cost-effective obesity treatment intervention. It not only requires minimal time, but trained medical personnel (e.g., registered nurses, medical assistants) other than the primary care provider can measure growth, addressing the common barrier of limited time reported by primary care providers (146). Growth is important and is perhaps the best measure of health of a child (147, 148), which is why growth monitoring has been recommended as part of obesity treatment in the primary care setting (57) as the initial step of each well-child visit (72). As self-monitoring increases awareness, potentially that increased awareness of weight status may encourage behavior changes that promote a reduction in weight. Two studies included growth monitoring as a control arm in a randomized control trial and found positive results. Raynor and colleagues (149) conducted two simultaneous 6-month, family-based pediatric intervention trials each with three conditions. Trial 1 randomized 101 overweight and obese children (4-9 years) to one of three conditions: 1) increased growth monitoring with feedback provided to families [GROWTH]; 2) decreased high energy-dense, low nutrient-dense snack foods and sugar-sweetened beverages [DECREASE]; or 3) increased fruits, vegetables, and low-fat dairy [INCREASE]. Trial 2 randomized 81 overweight and obese children to one of three conditions: 1) increased growth monitoring with feedback

provided to families [GROWTH]; 2); decreased sugar-sweetened beverages and increased physical activity [TRADITIONAL]; or 3) increased low-fat milk consumption and reduced TV watching [SUBSTITUTES]. Both trials significantly improved dietary intake, reduced weight status and decreased energy intake over time with no differences between any of the three conditions. Due to these outcomes, the authors hypothesize that growth monitoring may have been the most active component of the intervention (149). However, no studies have directly investigated the impact of frequent growth monitoring on weight status as a treatment intervention. Thus, a further investigation needs to be conducted to directly measure the impact of growth monitoring as an obesity treatment intervention on weight status in children.

Conclusion

In the United States, child overweight and obesity is a public health concern and national priority. To address the childhood overweight and obesity epidemic, efficacious treatment interventions have been developed in the research setting, but not translated to practice. The most efficacious obesity treatment is a family-based intervention that strives to make changes to the child's diet and leisure-time activity through behavior modification techniques and parenting practices. Several barriers to translating efficacious obesity treatment from a research setting into an alternative setting, such as primary care, exist. Treatment intensity and cost-effectiveness have been identified as the greatest barriers to successful translation. Primary care providers are believed to hold a key role in the treatment of child overweight and obesity, and in 2007, the Expert Committee published recommendations for the treatment of childhood overweight and obesity in the primary care

setting (57). Recommendations included a four staged-approach with each subsequent stage increasing in treatment intensity. All stages recommend a family-based treatment structure, dietary and leisure-time activity changes and frequent growth monitoring by the primary care provider. The Expert Committee suggests these key recommendations, each which is supported by varying levels of evidence from the literature on efficacious child obesity treatment in the research setting and has been tailored to meet the needs of the primary care setting. Specifically, the recommendations considered the need for less intensive treatment in primary care. Though these recommendations exist for use in the primary care setting, it is not known if they are efficacious or cost-effective in the intended setting.

Introduction to Dissertation Project

The research conducted for this dissertation addresses the need to evaluate the Expert Committee recommendations in the primary care setting. Thus, the primary aim of this investigation was to test the efficacy of Prevention Plus (stage 1) of the Expert Committee recommendations to improve weight status in a primary care setting using a tiered approach, varying in intensity. The least intensive approach monitored growth and provided monthly feedback to the family on the child's growth using the BMI percentile chart. The more intensive approach combined monthly growth monitoring and feedback with family-based behavioral counseling with a focus on improving two dietary (sugar-sweetened beverage and fruit and vegetable consumption) and two leisure-time (physical activity and television time) behaviors in the child. The parent also was asked to make changes to the same dietary and leisure-time activity behaviors as the child. This study targeted overweight ($\geq 85^{\text{th}}$ to $< 95^{\text{th}}$ BMI-for-age

percentile) and obese (≥ 95 th BMI-for-age percentile) children aged 4 to 10 years. Families were randomized to one of three, 6-month conditions: 1) newsletter (N); 2) newsletter and monthly growth monitoring (N+GM); and 3) newsletter and monthly growth monitoring plus family-based behavioral counseling (N+GM+BC). An additional primary aim of the project was to evaluate the program cost-effectiveness of each treatment condition. The mean total program cost per individual per 0.1 change in z-BMI was calculated and compared between conditions based on previously used methods (16).

The Expert Committee recommendations for primary care were developed to assist with the translation of efficacious treatment strategies from the research setting, but have not been evaluated. Thus, this investigation evaluated the efficacy and program cost-effectiveness of these recommendations for the treatment of childhood overweight and obesity. Additionally, dietary intake leisure-time behaviors, and compliance were compared between conditions. For exploratory reasons, parenting variables were assessed during the investigation.

Chapter 2: Long Manuscript

Introduction

In the United States, childhood overweight and obesity is a public health priority (9, 10). According to the National Health and Nutrition Examination Survey (NHANES), from 1976-1980 to 2007-2008, obesity has doubled in children aged 2-5 years and tripled among children aged 6-11 years (1). Interestingly, the prevalence from 2007-2008 to 2009-2010 has not changed (2). Further, recent data primarily from school body mass index (BMI) monitoring, demonstrate that the prevalence of overweight and obesity among children appears to be leveling off or decreasing (3-7). Identifying and intervening on overweight and obese children is essential due to the well-documented medical and psychosocial risks associated with childhood overweight and obesity (11-18). Treating overweight and obesity during childhood is important because it tracks into adulthood (19), further increasing the risk of developing chronic diseases related to obesity later in life. Moreover, not only is child and adolescent overweight and obesity associated with adult morbidity, but it also is associated with premature mortality in adulthood (20).

Successful obesity treatment interventions in children have been established in research settings (54, 55). These efficacious pediatric obesity interventions include several components: a dietary prescription, a leisure-time activity prescription, behavior modification techniques and a family-based approach that targets parenting practices (54, 55, 57-59). Though barriers exist, researchers have been encouraged to translate efficacious pediatric obesity treatment interventions to alternative settings that may have a larger public health impact, such as

schools, camps and, in particular, the clinical setting (112, 113). One challenge in translation is that many non-research settings cannot support the intensity of treatment delivery that has been tested in research settings due to various factors such as time, personnel training and cost (108, 109).

In the United States, children are encouraged to visit their pediatrician annually until the age of 21 years (118), and overweight children may be more likely to visit their pediatrician than healthy weight children (119). The Health Interview Survey reports 74.2% of children, aged 5-11 years had contact with a health care professional in the past 6 months, with an additional 17.5% having contact in more than 6 months, but no more than a year (150). Additionally, when accessing health care for usual care (i.e., well-child checks), 73.9% of children aged 5-11 years reported attending a doctor's office and 23.7% a clinic setting (150). The classification of a child's weight status is part of a well-child check, making the primary care setting appear ideal for identifying overweight and obesity. As most children visit a primary care setting annually and evaluation of weight status is considered standard care, delivering pediatric obesity treatment in primary care could have the potential to reach the majority of children. Thus, pediatric obesity treatment interventions delivered within primary care settings that provide adequate intervention intensity for improved weight-related outcomes beyond that which occur with standard care, and are also cost-effective, are needed.

Due to the need for obesity treatment to be made available in the primary care setting, in 2007, an Expert Committee of professional organizations, scientists, and clinicians convened to recommend strategies for treating pediatric overweight and obesity that could be

implemented by primary care providers (72). Recommendations from the Expert Committee were developed from evidenced-based research, but were tailored to the needs of the primary care setting. Specifically, the recommendations reduced treatment intensity as compared to treatment conducted in research settings by suggesting less frequent visits and use of broad behavioral targets (i.e., decreasing sugar-sweetened beverage intake vs. decreasing overall energy intake). The obesity treatment recommendations for children and adolescents (2 to 18 years-old) with a BMI-for-age $\geq 85^{\text{th}}$ percentile include a four staged-approach that increases in intensity from Prevention Plus (stage 1), Structured Weight Management (stage 2), Comprehensive Multidisciplinary Intervention (stage 3) to Tertiary Care (stage 4). Each stage of treatment recommended for implementation in the primary care setting includes a family-based intervention that focuses on changes in dietary and leisure-time activity behaviors with frequent monitoring of growth by the primary care provider. If at any stage a child's BMI percentile does not improve after engaging in the staged treatment for three to six months, the provider and family should consider advancing the child to the next stage. A child or adolescent with co-morbidities or severe obesity may begin at a more intense stage of treatment. Varying levels of evidence support each of the Expert Committee recommendations (72); however, few studies have investigated the efficacy of these recommendations together as proposed for each stage in the primary care setting.

It has been suggested recently that frequent growth monitoring, a recommendation from the Expert Committee (72) as part of obesity treatment, by itself may be an active intervention for pediatric weight control (149). In two simultaneous, 6-month, family-based

pediatric intervention trials, growth monitoring was included as a control arm and resulted in a decrease in z-BMI over time from baseline to 12 months (149). Additionally, frequent monitoring of weight in adults is associated with better weight control (151-153). As frequent self-monitoring increases awareness, the increased awareness of weight status may encourage behavior changes that promote a reduction in weight. Importantly, frequent monitoring of a child's growth may be a cost-effective obesity treatment intervention because it requires minimal time and can be conducted by trained medical personnel other than the primary care provider. Since cost is a major barrier for translation (108, 154), developing cost-effective interventions for pediatric weight management that can be implemented within the primary care setting is imperative.

Thus, the primary aim of this investigation was to test the efficacy of various components of stage 1, Prevention Plus, of the Expert Committee recommendations to improve weight status of children aged 4-10 years in the primary care setting using a tiered approach that varied in intensity. Families were randomized to one of three, 6-month conditions: 1) newsletter (N); 2) newsletter and monthly growth monitoring (N+GM); and 3) newsletter and monthly growth monitoring plus family-based behavioral counseling (N+GM+BC). A second primary aim of the project was to evaluate the program cost-effectiveness of each treatment condition. The total cost per 0.1 change in z-BMI was calculated and compared between conditions based on previously used methods (145). Additionally, dietary intake, leisure-time behaviors, and compliance were compared between conditions. Parenting factors were measured for exploratory purposes.

Methods

Study Design

This 3 x 2 pilot randomized controlled trial, with a between-subject factor of condition (N vs. N+GM vs. N+GM+BC) and within-subject factor of time (0 and 6 months), was designed to test the efficacy of the Prevention Plus stage of the Expert Committee recommendations to improve weight status in a primary care setting using a tiered approach. The trial was conducted from April 2011 to November 2012 at primary care offices and the Healthy Eating and Activity Laboratory at the University of Tennessee, Knoxville. Participants were randomly assigned to one of three conditions: newsletter (N); newsletter and monthly growth monitoring (N+GM); or newsletter and monthly growth monitoring plus family-based behavioral counseling (N+GM+BC) for 6 months. Primary outcomes of the study were z-BMI and program cost-effectiveness. Secondary outcomes included dietary intake (sugar-sweetened beverages, fruits and vegetables, energy and percent energy from fat), and leisure-time behaviors (moderate-intense physical activity and television viewing). Parenting practices and feeding styles were examined for exploratory purposes.

Participants

Participants were 4- to 10-year-olds who were ≥ 85 th BMI-for-age percentile. Families were excluded if they reported that their child had a medical condition that affected growth, dietary intake or physical activity; the child was participating in a weight loss program and/or taking weight loss medication; the primary caretaker did not want to participate, receive monthly newsletters or be randomized to one of the three conditions; the caretaker did not

speak or read English; the child did not speak English; the family did not have transportation; the family did not have a working telephone number; the child spent <50% of their time at the primary caretaker's home; or the family planned to move out of the East Tennessee area within the time frame of the study.

Participants were recruited through physician referral from Knoxville Pediatric Associates, Pediatric Clinic, Oak Ridge Pediatric Clinic, and Cherokee Health Systems. Additionally, families ineligible for a study concurrently being conducted at the Healthy Eating and Activity Laboratory were recruited. Families referred by physicians signed a form while at the primary care office that provided permission to be contacted by the principal investigator. Families were screened and eligible families attended orientation, provided informed consent and assent, completed a baseline assessment and were randomized to a treatment condition. Of the 65 families referred to the program, 31 attended an orientation and completed an informed consent and informed assent (only completed for children ≥ 7 years of age) and 22 completed a baseline assessment and were randomized. Twenty-one of 22 families completed a full assessment at 6 months (see Appendix A.1, Figure 1 for participant flow). The study was approved by the Institutional Review Boards at the University of Tennessee, Cherokee Health Systems and East Tennessee Children's Hospital and registered at clinical trials (NCT01358448).

Intervention

Newsletter Condition (N). Families in this group received a monthly educational newsletter on nutrition and leisure-time activity topics that included an activity for the child (i.e., coloring, maze). (See Appendix A.2 for an example of the newsletter). The readability of

each newsletter was prepared at a Flesch-Kincaid grade level of five or lower (155). Topics included MyPlate, physical activity recommendations, energy balance, fruits and vegetables, reducing television, and reducing high energy-dense, low nutrient-dense foods from the diet.

Newsletter and Monthly Growth Monitoring Condition (N+GM). Families in the N+GM condition received the same monthly newsletter as in the N condition plus monitored the weight, height, and BMI-for-age percentile of their child each month. Each family was provided with growth monitoring materials, which included: a scale, wall growth chart to measure height, a BMI wheel to calculate BMI, a BMI-for-age growth chart, a graph ease plotting tool, a binder to hold each lesson and a self-monitoring diary to record the child's height, weight, BMI and BMI percentile. Each lesson outlined a process to measure growth and included information about how children grow. Similar to the newsletters each lesson for the N+GM condition was prepared with a readability at a Flesch-Kincaid level of grade five or lower (155). Families met with the principal investigator at their child's primary care office or the University of Tennessee for 15 minutes during month zero, two and four. During this time, height and weight measures of the child were taken. BMI was calculated from these measures and plotted on the BMI-for-age growth chart. Families received standardized verbal feedback about growth and weight status of their child by the investigator.

A 10-minute phone call, using a standardized script, took place between the caretaker and investigator during month one, three and five. Caretakers measured the height and weight of their child, calculated BMI and plotted it on the BMI-for-age growth chart prior to the phone call. During the phone call the investigator provided feedback on the caretaker's assessment of

growth, as well as changes in the child's growth (see Appendix A.3 for an example lesson and phone script for the N+GM condition).

Newsletter and Monthly Growth Monitoring plus Family-Based Counseling Condition (N+GM+BC). Each family received a monthly newsletter as in the N and N+GM conditions and all materials for growth monitoring as in the N+GM condition. Families met with the principal investigator at their child's primary care office or the University of Tennessee for 30-minutes during month zero, two and four. Fifteen minutes was allocated to assess child growth and provide standardized feedback about growth and weight status of the child by the investigator in the same manner as the N+GM condition. During the additional 15-minutes, the investigator provided family-based counseling to aid with changing two dietary and two leisure-time behaviors of the child. A family-based approach targets both the parent and child for behavior change, understanding the parent is the authority figure and role model who guides the child's weight-related behaviors (156). Thus, both the caretaker and child were encouraged to change and self-monitor eating and leisure-time behaviors with the use of a weekly diary. Caretakers, in conjunction with their child, recorded intake of sugar-sweetened beverages, fruits and vegetables, as well as minutes of physical activity and minutes of television on the diary each day. Families were given weekly, picture-based diaries to monitor dietary and physical activity goals each day (see Appendix A.5 for an example of the child and caretaker self-monitoring diary).

The child's behavioral goals were to consume <3 sugar-sweetened beverages (e.g., regular carbonated soft drinks, sports drinks, lemonades, ice teas, flavored milk, juice drinks <

100% juice, and punches) per week, consume $\geq 1 \frac{1}{2}$ cups of vegetables per day and ≥ 1 cup of fruit per day, participate in ≥ 60 minutes of moderate- or vigorous-intensity physical activity daily and reduce TV viewing to < 2 hours per day. The caretaker was asked to consume < 3 sugar-sweetened beverages (e.g., regular carbonated soft drinks, sports drinks, lemonades, ice teas, flavored milk, juice drinks $< 100\%$ juice, and punches) per week, $\geq 2 \frac{1}{2}$ cups of vegetables per day and $\geq 1 \frac{1}{2}$ cups of fruit per day, participate in ≥ 150 minutes of moderate- to vigorous-intensity physical activity per week and reduce TV viewing to < 10 hours per week. To increase self-efficacy, the dietary and leisure-time activity goals were incrementally increased, with families implementing the full program goals at month four. Additionally, children were asked to achieve at least three of the five goals each day. Of all the recommendations provided by the Expert Committee, the four behavioral goals were selected based on the level of supporting evidence for each recommendation established by the Expert Committee (57). Additionally, with the purpose of obesity treatment to alter energy balance, two goals were established to alter energy intake and two goals to impact energy expenditure. The Expert Committee also reports that, at a minimum, increasing fruits and vegetables, decreasing sugar-sweetened beverages, increasing physical activity and decreasing television viewing time should be included in the Prevention Plus stage (57). The goals for fruits and vegetables, physical activity and television-viewing times are based on the 2005 Dietary Guidelines for Americans, and while sugar-sweetened beverages do not have a specific number target, the goal is similar to that used in a study by Raynor and colleagues (149).

Caretakers were provided behavioral techniques over three 15-minute lessons to assist their child with making gradual changes toward the goals. Each written lesson for the N+GM+BC condition was prepared at a readability of grade 5 or lower using Flesch-Kincaid (155). The techniques covered in the lessons included self-monitoring, modeling (caretakers were asked to make and monitor the same changes as their child), stimulus control and positive reinforcement.

A 20-minute phone call, using a standardized script, took place between the caretaker and investigator during month one, three and five. Caretakers measured the height and weight of their child, calculated BMI and plotted it on the BMI-for-age growth chart prior to the phone call. During the first 10-minutes of the phone call, the investigator provided feedback on the caretaker's assessment of growth and changes in child growth since the previous contact. The remaining 10-minutes were focused on the evaluation of progress toward the child and caretaker meeting the dietary and leisure-time activity goals and implementation of behavioral techniques (see Appendix A.4 for an example lesson and phone script from the N+GM+BC condition).

Measures

Demographic Questionnaire. The demographic questionnaire assessed basic demographic information (e.g., age, gender, race, education level) of the caretaker and child at baseline (Appendix B.1). Demographics information was only collected at month 0.

Anthropometrics. Child height and weight were collected at each assessment at 0 and 6 months (Appendix B.2). Caretaker height was collected at baseline and weight was collected at

0 and 6 months. Child and caretaker weight was assessed by an electronic or balance beam scale, pending the location, and stadiometer using standard procedures, with participants wearing light clothes and no shoes (157). For children at 0 and 6 months, z-BMI was calculated by standardizing the BMI value in relation to the population mean and standard deviation for the child's age and gender (26). BMI percentile was determined by plotting each child's BMI on the 2000 CDC BMI-for-age growth chart. Height and weight measures at 0 and 6 month were used to calculate BMI (kg/m^2) for the caretaker.

Program cost-effectiveness. Program cost-effectiveness was calculated as a ratio of cost to health outcome, specifically the $(\text{cost per child} \times 0.1)/\text{average decrease in z-BMI}$, as proposed by Janicke and colleagues (145). Total program cost of intervention delivery was calculated for each child based on the child's randomly assigned condition. Total program cost of delivery associated with the N condition included the printing and mailing costs of the monthly newsletters. Total program cost of delivery for the N+GM and N+GM+BC conditions included the printing and mailing of monthly newsletters, a binder with printed materials for each lesson and self-monitoring of goals associated with the condition, scale, wall growth chart, BMI-for-age growth chart, BMI wheel, graph ease plotting tool and time spent with the interventionist. The time each family in the N+GM and N+GM+BC conditions spent with the interventionist, in person and on the phone, was recorded as personnel time. Travel time and time allocated to implementing the intervention by the caretaker was not included as program costs. Families in the N+GM and N+GM+BC conditions that missed an in-person or phone appointment were rescheduled; however, if the appointment could not be rescheduled within two weeks of the

originally scheduled appointment, materials were mailed to the family and no time was counted for personnel time, but cost of mailing these materials was included in total cost calculations. Personnel time then was translated into cost based on the United States Department of Labor, Bureau of Labor Statistics median hourly pay for a variety of health professions (Registered Dietitian, Health Educator, Medical Assistant, Licensed Practicing Nurse, Registered Nurse or Physician) that could potentially deliver the intervention in the primary care setting (158). Cost-effectiveness was calculated by taking the mean of the total cost of materials and personnel time for each participant by the average change in z-BMI for the condition in which the participant was randomized (145). The effectiveness of different medical professions implementing the intervention was not considered as a component of cost-effectiveness. The presumption was the effect would be standardized across professions.

Dietary Intake. Three-day (two weekdays, one weekend day) food records were used to assess overall energy intake, percent energy intake from fat, servings of sugar-sweetened beverages and servings of fruits and vegetables at 0 and 6 months (Appendix B.3). Caretakers were asked to record their child's dietary intake, as children do not have the cognitive ability to accurately complete a self-report questionnaire (159). Caretakers received two-dimensional food models to help with the identification of portion sizes. If a child was under the supervision of another adult during this time period, the caretaker was asked to obtain information about the child's intake from the supervising adult.

Each food record was entered into the 2010 Nutrition Data System for Research (NDS-R) software developed by the Nutrition Coordinating Center, University of Minnesota,

Minneapolis, Minnesota. NDS-R codes were used to classify sugar-sweetened beverages (DMF0200, DMR0200, DML0200, DML0300, SWT0600, BVS0100, BVS0400, BVS0300, BVS0500, BVS0600, BVS0700), whole fruits, not including fried fruits (FRU0300, FRU0400, FRU0500) and whole vegetables, not including fried vegetables (VEG0100, VEG0200, VEG0300, VEG0400, VEG0450, VEG0600, VEG0700) (Appendix B.4, Tables B.4-1 to B.4-3). Only the inclusion of whole fruits and whole vegetables were counted toward the fruit and vegetable goal. Fried fruits and fried vegetables were not included toward the servings of fruits and vegetables due to the contribution to energy intake, which does not align with the goal of obesity treatment. Fruit juices and vegetable juices, including those of 100% fruit juice or 100% vegetable juice, also were not included toward the servings of fruits and vegetables as juice provides additional energy, but does not appear to have the same effect on satiety as whole fruits and vegetables (160). Fried fruits and vegetables and fruit and vegetable juices were included in overall energy intake. From NDS-R, mean overall energy intake, percent energy from fat, servings of sugar-sweetened beverages and servings of fruits and vegetables over three days was calculated.

Leisure-Time Behaviors. Leisure-time activity was assessed at 0 and 6 months using the Previous Day Physical Activity Recall (PD-PAR) (161) over three days (two weekdays, one weekend day) (Appendix B.5). The PD-PAR was completed by the caretaker due to the insufficient cognitive ability of children to accurately complete a self-report questionnaire (159). If the child was under the supervision of another adult during this time, the caretaker was asked to obtain necessary information from the supervising adult. The PD-PAR is a self-reported questionnaire, where the type of activity and intensity of the activity is recorded every

30 minutes from 6:00am to 12:00am (over an 18 hour period). An activity list, with the option to add activities not on the list, is provided as part of the questionnaire. Each activity has an associated number that is recorded on the questionnaire in one of four columns, where each column represents a different intensity level (very light, light, medium, or hard). From this information metabolic equivalent (MET) values and percentages of time in varying types and intensities of leisure-time activities are calculated. The outcome of focus, percent of time spent in moderate- to vigorous-intensity activities, was classified as the percentage of time spent in activities with a MET value ≥ 3.0 . The second outcome, hours of television per day, is one of the activities on the PD-PAR activity list. First, minutes spent watching television were determined by the multiplying the reported frequency, number of times television was reported by 30 minutes (the time bouts reported for each activity). The total minutes of television time over 3-days is then divided by three to get the average minutes of television time per day. This was further divided by 60 minutes to obtain the hours per day of television time. The PD-PAR is highly correlated with accelerometer and heart rate estimates of physical activity with an interrater reliability of 0.98 (161).

Parent Feeding Behavior. Assessment of the caretaker's attitudes, beliefs and practices around child feeding was measured using the Child Feeding Questionnaire (CFQ) at 0 and 6 months (Appendix B.6). The CFQ is a 30-item questionnaire that measures seven factors, with each factor evaluated using a 5-point Likert scale. The seven factors measured in the CFQ include: perceived responsibility (3 items), perceived parent weight (4 items), perceived child weight (5-items), concerns about child weight (1-3 items depending on the child's age),

restriction (8 items), pressure to eat (4 items), and monitoring (3 items). The CFQ has been validated for children in preschool to middle childhood (102).

Eating Styles. Child and caretaker eating styles were assessed at 0 and 6 months using the Child Eating Behavior Questionnaire (CEBQ) (Appendix B.7) and Three Factor Eating Questionnaire (TFEQ) (Appendix B.8) for child and caretaker, respectively. The CEBQ is a 35-item assessment tool that measures children's eating styles based on caretaker report of the child's eating behavior using the response options of "never," "seldom," "sometimes," "often" or "always," scored from 0-4, respectively. Children's eating styles are measured by eight factors: food responsiveness (5 items), enjoyment of food (4 items), emotional overeating (4 items), desire to drink (3 items), satiety responsiveness (5 items), slowness in eating (4 items), emotional undereating (4 items) and fussiness (6 items). The CEBQ measures the contribution of these eight factors to body weight. The CEBQ is internally valid and has demonstrated test-retest reliability (162). The TFEQ is a 51-item questionnaire that measures caretaker's eating styles with three scales: dietary restraint (21 items), disinhibition (16 items) and perceived hunger (14 items). The TFEQ response options include a series of true/false and multiple-choice questions. The TFEQ's reliability and validity have been established (163).

Parenting Styles. The Parenting Styles and Dimensions Questionnaire (PSDQ) was administered at 0 and 6 months to the child's caretaker (Appendix B.9). The PSDQ, a validated questionnaire with 57-items, uses three scales to measure authoritarian (20 items), authoritative (27 items) and permissive (15 items) parenting styles (164-166). Responses are provided based on a 5-point Likert scale anchored with "never" to "always."

Caretaker Motivation. Motivation of the caretaker to engage in treatment was assessed at 0 and 6 months using the Parent Motivation Inventory (PMI), modified to the intervention (Appendix B.10). The PMI is a 25-item questionnaire that is reliable (167). The three facets of the PMI include caretaker desire for change in child (7 items), caretaker willingness to change his or her own behavior to influence the child (14 items) and caretaker's perceived ability to change behavior (4 items) (167). A 5-point Likert scale anchored with "strongly disagree" to "strongly agree" provided the response options.

Barriers to Treatment. Caretakers completed the Barriers to Treatment Participation Scale (BTPS) at 6 months (Appendix B.11). The BTPS is a validated questionnaire that assesses a caretaker's barriers to participation in treatment. It is a 58-item questionnaire measuring 5 areas: competing activities/life stressors (20 items), relevance of treatment (8 items), relationship to therapist (6 items), treatment issues (logistics) (10 items) and critical events (14 items) (168). Competing activities/life stressors, relevance of treatment, relationship to therapist and treatment issues are measured using a 5-point Likert scale, while critical events are assessed using a dichotomous (yes/no) response. Questions 9, 10, 37 and 46 from the original BTPS were removed and wording was modified for study purposes. BTPS was only administered at 6 months.

Evaluation. To obtain feedback about the program, an evaluation questionnaire, using a Likert scale, and multiple choice and open-ended response options, for each condition was used (Appendix B.12). All conditions evaluated the program in regards to usefulness, number of additional contacts in relationship to nutrition, physical activity and growth, and additional

overall comments. Participants in the N+GM condition additionally reported on ease of achieving program-related goals, while the N+GM+BC condition reported on ease of the caretaker and child achieving program-related goals, usefulness of behavior therapy strategies and frequency of implementing the behaviors.

Compliance. Intervention contact and treatment outcomes are known to be correlated (169, 170). Treatment attendance (in-person meeting and phone call contact) was recorded. Self-monitoring can be predictive of behavior change (171), thus, in the N+GM and N+GM+BC conditions, caretaker adherence to self-monitoring of growth was assessed by visual inspection of points plotted on the BMI-for-age growth charts and recorded. Self-monitoring adherence was evaluated also by the number of diaries targeting the eating and leisure-time behaviors in the N+GM+BC condition returned to the interventionist during in-person sessions. Additionally, compliance to the dietary and leisure-time activity goals for families in the N+GM+BC condition was evaluated by the number of days the child reported meeting at least three of the five goals and the number of goals met per week reported by the caretaker.

Statistical Analysis

Normality and equality of variance of the data were examined using Shapiro-Wilk and Levene's test, respectively. Initial analyses compared baseline characteristics of children and caretakers (e.g., age, income level, z-BMI, dietary intake) using Chi-Square analyses and one-way analyses of variance (ANOVA) for nominal and interval/ratio data, respectively.

A linear mixed-factor ANOVA was used to analyze primary outcomes of z-BMI with a within-subject factor of time (0 months vs. 6 months) and between-subject factor of condition

(N vs. N+GM vs. N+GM+BC). Intent-to-treat analysis was calculated by carrying the baseline z-BMI value forward for participants lost to follow-up, as it was assumed their z-BMI returned to baseline. The average of total program costs per participant by medical profession and cost-effectiveness, the second primary outcome, were analyzed using a one-way ANOVA with a between-subject factor of condition. Post hoc comparisons, using Bonferroni corrections, were used to delineate differences between conditions for each of the primary outcomes.

Linear mixed-factor ANOVAs were used to analyze secondary outcomes with a within-subject factor of time and between-subject factor of condition. Intent-to-treat analyses were completed by carrying baseline values forward for participants who did not complete a full 6-month assessment. One-way ANOVAs were used to analyze the BTPS factors and study retention, using a between-subject factor of condition. Means and frequencies were used to analyze data for compliance to self-monitoring in the N+GM+BC condition and for the evaluation questionnaire, respectively. For the N+GM and N+GM+BC conditions, independent t-tests were used to analyze compliance with attendance and growth monitoring with a between-subject factor of condition. All analyses were conducted at a significance level of $\alpha < 0.05$. Statistical analysis was completed using IBM SPSS version 20.0 (172).

Effect sizes were calculated using G Power (173). For significant outcomes, effect sizes occurring across time were calculated with Cohen's d , using condition means and standard deviations at 0 and 6 months for each condition. The effect sizes were classified as small (0.20), medium (0.50) or large (0.80) (174).

Results

Participants

Baseline characteristics were not significantly different between families who completed all assessments and the family who did not complete a full assessment or between conditions for all families (Appendix C, Table C-1). As a whole, child participants were 8.0 ± 1.8 years, had a BMI percentile of 97.6 ± 2.2 and z-BMI of 2.34 ± 0.48 and were 68.2% female, with the majority white (72.7%) and non-Hispanic (90.9%). Of the caretakers, 77.3% reported being the mother of the child. On average, caretakers were aged 38.8 ± 8.3 years, had a BMI of $32.8 \pm 6.5 \text{ kg/m}^2$ with 31.8% overweight and 59.1% obese and were predominantly female (86.4%), white (86.4%), non-Hispanic (95.5%) and married (63.6%). Furthermore, 54.6% of caretakers reported having completed less than 4-years of college and 54.8% reported an income $\geq \$50,000$, respectively (Appendix C, Table C-2).

Anthropometrics

There were no differences between conditions for z-BMI at baseline. There was a significant ($F(1, 19) = 5.092, p < 0.05$) main effect of time for z-BMI. There was a decrease in z-BMI from baseline (N: 2.21 ± 0.66 , N+GM: 2.39 ± 0.34 , N+GM+BC: 2.45 ± 0.36) to 6 months (N: 2.14 ± 0.54 , N+GM: 2.31 ± 0.26 , N+GM+BC: 2.29 ± 0.55). There was not a significant condition by time interaction (Appendix C, Table C.3) for z-BMI. Effect sizes for change in z-BMI from baseline to 6 months were $N = 0.12$, $N+GM = 0.26$, and $N+GM+BC = 0.34$. While not significant, N+GM+BC had a greater change in z-BMI than N+GM and N (N+GM+BC: -0.16 ± 0.22 , N+GM: -

0.08 ± 0.15, N: -0.06 ± 0.24). There were no differences between conditions for caretaker BMI at baseline (Appendix C, Table C-4).

Program Cost-effectiveness

As expected, due to the study design, there were significant ($p < 0.001$) differences between conditions for average total program cost by profession (Appendix C, Table C-5), with the N+GM+BC condition being the most costly as delivered for all professions. There were significant ($p < 0.001$) differences between conditions for cost-effectiveness with the N condition being more cost effective than N+GM and N+GM+BC, and the N+GM+BC being more cost-effective than the N+GM condition (Appendix C, Table C-6). The mean of individual program cost per 0.1 change in z-BMI per condition ranged from \$20.36 ± 0.69 for N, \$85.81 ± 3.53 for N+GM, and \$69.26 ± 3.35 for N+GM+BC if implemented by a medical assistant to \$20.36 ± 0.69 for N, \$164.16 ± 19.80 for N+GM, and \$156.04 ± 20.55 for N+GM+BC if implemented by a physician.

Dietary Intake

There were no significant differences between conditions in servings of sugar-sweetened beverages, servings of fruits and vegetables, total energy intake or percent energy from fat consumed per day at baseline. There was a significant main effect of time for servings of sugar-sweetened beverages ($F(1, 19) = 6.787, p < 0.05$), with consumption decreasing over time from 0 months (N: 1.9 ± 0.9 serving/day, N+GM: 1.4 ± 0.7 servings/day, N+GM+BC: 1.7 ± 1.1 servings/day) to 6 months (N: 1.6 ± 1.7 servings/day, N+GM: 0.7 ± 0.6 servings/day, N+GM+BC: 0.8 ± 1.3 servings/day). Effect sizes for change in sugar-sweetened beverage

consumption from baseline to 6 months were $N = 0.20$, $N+GM = 1.07$ and $N+GM+BC = 0.74$.

There was not a significant condition by time interaction for servings of sugar-sweetened beverages (Appendix C, Table C-7). There was no significant main effect or interaction of servings of fruits and vegetables, total energy intake or percent energy from fat by condition per day (Appendix C, Table C-7).

Leisure-time Behaviors

There were no significant differences between conditions in percent of time spent in moderate- to vigorous-intensity activities or hours of television watched per day at 0 months. There was no significant main effect of time or interaction of percent of time spent in moderate- to vigorous-intensity activities or hours of television watched per day by condition (Appendix C, Table C-8). While not significant, percent of time spent in moderate- to vigorous-intensity activities by condition increased over time from 0 months ($N: 9.5 \pm 7.1\%$, $N+GM: 9.4 \pm 3.6\%$, $N+GM+BC: 11.2 \pm 1.5\%$) to 6 months ($N: 14.4 \pm 8.0\%$, $N+GM: 13.1 \pm 5.8\%$, $N+GM+BC: 14.2 \pm 10.3\%$).

Parent Feeding Behavior

There were no significant differences between conditions at 0 months between scores on any of the seven factors (perceived responsibility, perceived parent weight, perceived child weight, concerns about child weight, restriction, pressure to eat, and monitoring) measured by the CFQ. There was no significant main effect of condition or time and no significant condition by time interaction (Appendix C, Table C-9).

Eating Styles

There were no significant differences between conditions at 0 months between scores on any of the eight factors (food responsiveness, enjoyment of food, emotional overeating, desire to drink, satiety responsiveness, slowness in eating, emotional undereating, and fussiness) measured by the CEBQ or three factors (hunger, restraint, and disinhibition) measured by the TFEQ. There was a significant main effect of time for food fussiness ($F(1, 19) = 14.268, p < 0.05$) as measured by the CEBQ, with a reported decrease in food fussiness over time from 0 months ($N: 18.1 \pm 6.8$, $N+GM: 17.1 \pm 5.5$, $N+GM+BC: 16.7 \pm 6.8$) to 6 months ($N: 16.9 \pm 6.8$, $N+GM: 15.7 \pm 4.8$, $N+GM+BC: 13.3 \pm 6.0$). Effect sizes for change in food fussiness from 0 to 6 months were $N = 0.18$, $N+GM = 0.27$ and $N+GM+BC = 0.53$. All other main effects and interactions were not significant for CEBQ (Appendix C, Table C-10). There were no significant main effects or condition by time interactions for factors measured by the TFEQ (Appendix C, Table C-11).

Parenting Styles

There were no significant differences between conditions at 0 months between scores on any of the three factors (authoritative, authoritarian, permissive) measured by the PSDQ. There were no significant main effects or condition by time interactions for factors measured by PSDQ (Appendix C, Table C-12).

Caretaker Motivation

There were no significant differences between conditions at 0 months for scores on any of the three factors (caretaker desire for change in child, caretaker willingness to change their

own behavior in order to influence their child and caretaker's perceived ability to change behavior) measured by the PMI. There was a significant main effect of caretaker desire for change in child ($F(1, 19) = 5.847, p < 0.05$) with desire decreasing over time from 0 months ($N: 29.6 \pm 4.0, N+GM: 30.1 \pm 2.3, N+GM+BC: 31.6 \pm 2.1$) to 6 months ($N: 27.1 \pm 5.8, N+GM: 27.7 \pm 3.4, N+GM+BC: 29.7 \pm 3.9$). Effect sizes for change in the caretaker's desire for change in child from 0 to 6 months were $N = 0.49, N+GM = 0.80$, and $N+GM+BC = 0.50$. There was no significant interaction of condition by time. There was a significant main effect of time in caretaker readiness to change his or her own behavior in order to influence the child ($F(1, 19) = 14.266, p < 0.05$), with a decrease over time from 0 months ($N: 64.9 \pm 6.3, N+GM: 61.4 \pm 6.8, N+GM+BC: 65.0 \pm 4.9$) to 6 months ($N: 60.1 \pm 9.8, N+GM: 57.1 \pm 6.6, N+GM+BC: 63.0 \pm 5.4$). Effect sizes for change in the caretaker's readiness to change his or her own behavior in order to influence the child from baseline to 6 months were $N = 0.56, N+GM = 0.64$, and $N+GM+BC = 0.39$. There was no significant interaction of condition by time. There were no significant main effects or condition by time interactions for caretaker's perceived ability to change behavior (Appendix C, Table C-13).

Barriers to Treatment

There were no significant differences between conditions at 6 months for scores on any of the five factors: competing activities/life stressors, relevance of treatment, relationship to therapist, treatment issues (logistics) and critical events measured by the BTPS (Appendix C, Table C-14).

Evaluation

There were no significant differences between conditions at 6 months regarding program usefulness, additional contacts for nutrition, physical activity or growth and overall rating of the program. Overall, 95% of families reported the program provided the caretaker with important information about his or her child's health and 90% reported the information provided was easy to understand. One family reported receiving additional nutrition-related services, 2 families reported receiving additional physical activity-related services and 10 families reported additional primary care offices visits. Of the 10 families reporting additional primary care visits, 4 reported having their child's growth measured, and 2 of the 4 families reported the primary care provider discussing their child's weight status. Ninety-percent of families rated the program as very good or excellent. Of families in the N+GM and N+GM+BC condition, 69.3% reported monitoring their child's height monthly as very easy or extremely easy, 92.3% reported monitoring their child's weight monthly as very easy or extremely easy, 69.3% reported using the BMI wheel monthly as very easy or extremely easy and 53.9% reported plotting their child's BMI-for-age on the growth chart monthly as very easy or extremely easy. There were no significant differences between the N+GM and N+GM+BC conditions regarding ease of completing the goals related to growth monitoring.

For families in the N+GM+BC condition, decreasing sugar-sweetened beverages was reported to be the easiest dietary behavior to change, with 66.7% of caretakers reporting decreasing sugar-sweetened beverages as very easy/extremely easy and 83.4% reporting it was very easy/extremely easy for their child. In the N+GM+BC condition, caretakers reported their

child increasing fruit and vegetable intake as the most difficult behavior to change, with only 16.7% reporting it was very easy/extremely easy to increase fruits and vegetables. Additionally, caretakers in the N+GM+BC condition reported it was very useful/extremely useful to use praise (100%), stimulus control for fruits and vegetables (83.4%) and sugar-sweetened beverages (83.4%) and self-monitoring of fruits and vegetables (66.6%) and sugar-sweetened beverages (66.6%) to assist their child in reaching the dietary and leisure-time activity goals of the program. The behavioral strategies that were reported as most practiced included caretakers modeling drinking fewer sugar-sweetened beverages (100%), keeping fruits and vegetables in the home (100%), removing sugar-sweetened beverages from the home (73.3%) and praising the child for meeting goals (73.3%). Additional evaluation outcomes reported for the N+GM+BC condition are in Appendix C, Table C-15-Table C-17.

Compliance

There was not a significant difference between conditions for session attendance (N+GM: 5.6 ± 0.8 vs. N+GM+BC: 5.3 ± 1.1) over the 6 months. Additionally, there was no significant difference between conditions for the number of months child BMI percentile was monitored on the BMI-for-age growth chart between conditions (N+GM: 5.6 ± 0.8 vs. N+GM+BC: 5.3 ± 1.1) over 6 months. On average, children and caretakers in the N+GM+BC condition turned in 20.6 ± 5.9 diaries and 21.0 ± 6.0 (out of 24) respectively, to the interventionist over the 6 months of the intervention. Children self-reported meeting at least 3 of the 5 goals on 108.0 ± 40.9 days (out of 168 possible days). Caretakers self-reported meeting on average 2.2 ± 0.9 goals, out of the possible five, each week. There were no significant

differences between conditions for retention at the 6 month (N: 7/8 completed an assessment vs. N+GM: 7/7 completed an assessment vs. N+GM+BC: 7/7 completed an assessment) assessment.

Discussion

This pilot investigation evaluated the efficacy and program cost-effectiveness of Prevention Plus to treat obesity in the primary care setting using a tiered approach, varying in treatment intensity. While significant reductions in z-BMI were found over time, the reductions were small with no statistical difference between conditions, which may be a consequence of the small sample size in the investigation. Change in z-BMI over time had a small to medium effect size in the N+GM+BC condition compared to a small effect size in the N+GM and N conditions (174). Based on the achieved change in z-BMI over time, a sample size of 188 families would be needed to find a significant difference between the N+GM+BC and N conditions at 80% power and α (two-tailed) at 0.05. While a greater change in z-BMI was found in the N+GM+BC condition, it was also the most expensive program, with costs ranging from $\$108.32 \pm 5.25$ per child to $\$244.04 \pm 32.14$ per child, depending upon the medical professional delivering the intervention. The N condition had the smallest decrease of z-BMI, but since the N condition was the least costly condition due to low personnel costs, it was the most cost-effective. Furthermore, the N+GM+BC condition was more cost-effective than the N+GM condition.

Other child obesity interventions with similar intensity and methods of delivery designed for the primary care setting demonstrate comparable findings to the N+GM+BC

condition, with reductions in z-BMI of -0.10 ± 0.20 (130) and -0.18 ± 0.44 (131). For example, a retrospective cohort study by Dolinsky and colleagues (130) investigated the impact of the Healthy Lifestyle Program (HLP) in obese children ($\geq 95^{\text{th}}$ percentile BMI-for-age) between the ages of 2-19 years who were referred to the program by a primary care provider between baseline and a follow-up visit occurring 6 to 8 months after the initial visit. This study was similar to the current investigation in length and frequency of contact (monthly), yet families had more contact time based on the length of visit. Families had an initial 1-hour appointment with the HLP medical provider, followed by a 1-hour appointment (30 minutes with the HLP medical provider, 30 minutes with a registered dietitian) every 4-6 weeks until 5 appointments had been completed. The initial visit included: a comprehensive lifestyle, birth, medical, family and social history; a physical exam; an assessment of psychological or disordered eating concerns; a discussion of meaning of weight BMI percentile with relationship to history; and a motivational interviewing session to make dietary and physical activity changes. The follow-up visits provided management of obesity-associated comorbidities with the HLP medical provider and medical nutrition therapy with the Registered Dietitian. Families then entered the maintenance phase where families had an appointment every 6 months, until the child turned 23 years. The average change in z-BMI for all children in the HLP ($\Delta = -0.10 \pm 0.20$) was less than that of the N+GM+BC condition ($\Delta = -0.16 \pm 0.22$).

A pre/post-test experiment designed for the primary care setting was examined by Jacobson and colleagues (131). While the intervention was shorter in length in comparison to the current study, the number of contact times and delivery format (in-person visits and phone

calls) were similar to that used in the N+GM+BC condition. For the study, a 7-week intervention was implemented in overweight and obese children with a mean age of 10 years 7 months, who participated in four, 30-60 minute face-to-face contacts alternating with three, 30-45 minutes phone contacts with the parent and child. Each session began with review of homework from the previous session, then provided nutrition and physical activity education along with behavioral strategies (e.g., goal setting, negative thinking, emotions, stimulus control, problem solving, social cues). Outcomes showed a significant change in z-BMI from baseline to 7 weeks ($\Delta -0.18 \pm 0.44$) (131), which was slightly greater than the -0.16 ± 0.22 in the N+GM+BC condition. An effect size of 0.42 was reported by Jacobson and colleagues (131), which is larger than the effect size of 0.34 for the change in z-BMI for the N+GM+BC condition. Both effect sizes reported are considered small (174).

A smaller effect size was found for the reduction in z-BMI for N+GM as compared to N+GM+BC. This may be attributed to the stepped-approach examined in this investigation, with the N+GM condition receiving a lower intensity intervention than N+GM+BC. One study conducted by Raynor and colleagues (149) reported an effect size of 0.17 for change in z-BMI over time in a research setting when weight status was simply monitored and feedback was given. This is smaller than the 0.26 effect size calculated for change in z-BMI in the N+GM condition; however, the study by Raynor and colleagues (149) was over a 12-month time frame, compared to the present study's 6 month time frame. While the population was similar between the two studies, intensity of treatment varied. Families in the N+GM condition received monthly feedback at in-person appointments or over the phone as compared to

mailed feedback provided every three months in the study conducted by Raynor and colleagues (149).

Interestingly, there was a decrease in z-BMI in the N condition that was similar to that of the N+GM condition. While the nutrition and leisure-time education provided by the newsletter may have prompted the family to make dietary and/or leisure-time activity changes, it has been well established that education does not change behavior (56, 175-177). Thus, the trends in overweight and obesity prevalence in the United States may be a historical artifact and must be considered as a possible explanation for change in z-BMI in the N condition. Nationally, obesity rates are leveling off (2). Further data primarily collected from BMI screenings in school show the prevalence of overweight and obesity is no longer increasing (3-5) or is, in some cases, decreasing (3, 6, 7). Consistent with these findings is the trend in Tennessee, where all families in the study lived. Data from the Tennessee Coordinated School Health program show a decrease in rates of overweight and obesity among children in grades kindergarten through eighth grade from 40.9% in 2007-2008 to 39.0% in 2008-2009 (178).

Furthermore, other child obesity treatment interventions report finding a decrease in z-BMI in control conditions. Hughes and colleagues (179) in Royal Hospitals for Sick Children in Glasgow and Edinburg, Scotland randomized 134 overweight children to an 8-week family-based, best-practice behavioral intervention delivered by dietitians trained in behavior change or usual care (control). Families in the family-based, best-practice behavioral intervention condition attended 8 appointments with 7 in-patient visits and 1 home visit, with overall contact time not exceeding 5 hours, similar to the intensity of the N+GM+BC condition. While

changes in z-BMI were not different between groups, a significant reduction in z-BMI occurred for both groups from baseline to 6 months (intervention: -0.10; control: -0.06, $p < 0.01$) and 12 months (intervention: -0.07; control: -0.19, $p < 0.01$). Golley and colleagues (180) conducted a 12-month, randomized control trial in a teaching hospital, investigating the impact of parenting skills on obesity treatment, with families randomized to parenting-skills training plus intensive lifestyle education, parenting skill training alone, or a waitlist control. The only contact received by the wait-list control was a 5-minute phone call for the purpose of retention that occurred 3-4 times over the 12-months. While z-BMI decreased across all conditions, the wait-list control condition reduced z-BMI by -0.13 ± 0.40 from baseline to 12 months (180). These findings suggest that the recruitment of families for obesity treatment intervention and the engagement in an assessment may increase awareness among families prompting a change in behavior that impacts the weight status of their child.

While changes in z-BMI in the N+GM+BC condition were largest, this condition was not the most cost-effective based on the total program cost associated with a 0.1 change in z-BMI. Similar to the N+GM+BC condition, a family-based, best-practice behavioral intervention conducted by Hughes and colleagues (179) in Royal Hospitals for Sick Children in Glasgow and Edinburgh, Scotland described above was estimated to cost £108 (\$192) per child for the intervention and £29 (\$52) per child for the control condition. Based on the -0.10 and -0.06 decrease in z-BMI for the intervention and control group respectively at 6 months reported by Hughes and colleagues (179), the program cost-effectiveness based in US dollars would be estimated to be \$192 per 0.1 change in z-BMI for the intervention and \$86.67 per 0.1 change in

z-BMI for the control group. Both are less cost-effective than the findings in this intervention of \$84.65 in the N+GM+BC if delivered by a Registered Dietitian and \$20.36 in the N condition. Similar to this pilot study, outcomes in the control condition were more cost effective than the intervention condition in the study by Hughes and colleagues (179). In addition, these study findings and those of Hughes and colleagues (179) were significantly lower than the total cost of \$872 per child and cost-effectiveness of \$758 per 0.1 change in z-BMI associated with the delivery of a family-based obesity intervention to rural communities through Cooperative Extension Service offices (145).

Personnel appear to be the most costly component of obesity treatment. The total cost of individuals in the N condition did not include personnel time and was significantly less costly than the N+GM and N+GM+BC conditions, both of which required personnel to deliver each intervention. The N+GM condition had more personnel time than the N condition, but approximately half the personnel time as the N+GM+BC condition, and was significantly less costly than the N+GM+BC for all medical professions included in the analysis. Due to the personnel time required for implementation of the N+GM or N+GM+BC conditions, the average total program cost per participant for delivery by the physician was the highest compared to other medical professions. This would argue that the physician is not the most cost-effective person to deliver the intervention due an estimated average of total program cost per participant of $\$135.92 \pm 16.39$ and $\$244.04 \pm 32.14$, for the N+GM and N+GM+BC conditions, respectively. For the primary care setting, it may be more cost-effective to train medical personnel, other than the physician, for intervention delivery; however, this is based on the

presumption there is a standardized effect across medical professionals. The effectiveness of each medical professional was not included in this investigation.

Having appropriate skills and training to adequately implement an obesity intervention is important. For this particular study, the required skills and training of the personnel for each condition differed. In the N+GM condition, personnel must have the skills to measure growth of a child using a stadiometer, scale and BMI-for-age growth charts, interpret the results, and provide feedback about the child's growth to the family. In the N+GM+BC condition personnel must encompass the same skills as in the N+GM condition, but also must be trained in delivering family-based behavioral treatment. Specifically, the interventionist needs to be comfortable with teaching and providing feedback based on behavioral strategies (e.g., self-monitoring, goal setting, reinforcement, stimulus control, etc.) used to help the family achieve the established dietary and physical activity goals during obesity treatment.

To assist with weight management, the Prevention Plus stage of the Expert Committee recommendations provides several dietary behavioral targets to prevent excessive weight gain, including decreasing sugar-sweetened beverages and increasing fruits and vegetables (22). Overall, children significantly decreased sugar-sweetened beverages ($p < 0.05$) from 1.6 ± 0.2 servings per day at 0 months to 1.0 ± 0.3 servings per day at 6 months. Ideally, the goal is to eliminate sugar-sweetened beverages from the child's diet (22). Children did not significantly change their fruit and vegetable consumption over the length of the intervention. Fruit and vegetable intake remained constant over time, with children consuming 2.9 ± 0.3 servings per day at 6 months. NDSR defines servings according to the 2005 Dietary Guidelines for Americans

(181). Thus, one serving of fruits or vegetables is equivalent to ½ cup fresh, frozen or canned, one medium piece or ¼ cup dried. Reported fruit and vegetable intake in this investigation fell below the United States Department of Agriculture’s recommendations of three cups per day for children 4-8 years-old and up to four cups for boys aged 9-13 years-old (182, 183). Furthermore, 83.4% of caretakers in the N+GM+BC condition reported their child decreasing sugar-sweetened beverages as “very easy” or “extremely easy,” while only 16.7% reported the same for their child increasing fruit and vegetable consumption. Outcomes from the High Five for Kids Study, a 12-month clustered, randomized controlled trial, examining the effectiveness of an obesity intervention in primary care, showed similar findings with a change in sugar-sweetened beverages, but not fruit and vegetable consumption (184). Additionally, 100% of caretakers in the N+GM+BC condition reported modeling drinking fewer sugar-sweetened beverages 5-7 times per week, indicating reducing sugar-sweetened beverages is an easier behavioral goal for caretakers and children to achieve.

The change in z-BMI over time does not appear to be due to the percent of time spent in moderate- to vigorous-physical activity or hours per day of television, as both leisure-time activities did not significantly change over time. While parent feeding behaviors, parent and child eating styles and parenting styles were measured for exploratory reasons, they did not appear to be altered during the intervention. Indication of caretaker motivation, particularly the caretaker’s desire for change in the child and perceived ability to change behavior (readiness), significantly decreased over time. While caretakers reported a reduction in motivation, it did not alter compliance or caretaker evaluation of the program.

Varying levels of evidence support the recommendations included in Prevention Plus of the Expert Committee recommendations (22); however, even less research has evaluated the impact of these recommendations on obesity. While a significant reduction in weight status occurred over time, findings suggest that focusing on frequent growth monitoring and particular dietary behaviors (increasing fruits and vegetables, decreasing sugar-sweetened beverages) and leisure-time activities (increasing physical activity, decreasing television time) do not produce significantly greater changes in child weight status. In the N+GM+BC condition, where both dietary and leisure-time activity behaviors were targeted, energy intake and energy expenditure remained stable from 0 to 6 months. Of the behavioral targets, sugar-sweetened beverages was the only one to change significantly over time, indicating it may be the strongest contributor to the decrease in z-BMI over time. Alternatively, the reduction in z-BMI can be attributed to the significant increase in height at a disproportional rate to the significant increase in weight. These findings argue that to produce a significant decrease in energy intake a more global dietary prescription may be needed. For example, including a caloric prescription as part of the recommendations, such as in the Traffic Light Diet developed by Epstein and colleagues (61-66), may be helpful if a greater change in weight status is desired.

The challenge is that a greater change in z-BMI may require a more intensive intervention that includes a caloric prescription. For example, Epstein and colleagues (132) randomized 8-12 year-olds to a group that focused on increasing fruits, vegetables and low-fat dairy (INCREASE) or to a group that decreased high energy-dense foods (DECREASE) for 24 months. The Traffic Light Diet with a caloric prescription of 1,000-1,500 per day was

implemented and outcomes showed children decreased z-BMI at 6 months by -0.25 ± 0.09 in the INCREASE group and -0.31 ± 0.05 in the DECREASE condition (132). This decrease was substantially larger than the -0.16 ± 0.22 found in the N+GM+BC condition, which did not include a caloric prescription. However, when efficacious programs are translated into alternative settings, a reduction in treatment intensity is typically required (110). Thus, to better evaluate how interventions work in real-world settings, such as public health clinics, health systems or community settings, the RE-AIM (reach, efficacy/effectiveness, adoption, implementation, and maintenance) framework was established (140). This framework provides insight into the required balance of efficacy and effectiveness (108). Due to the size and design of this study, all aspects of RE-AIM cannot be appropriately evaluated; however, the balance between efficacy and effectiveness should be considered. Furthermore, RE-AIM urges cost-effectiveness to be strongly considered because large public health interventions, such as implementation of the Expert Committee recommendations (22), can be costly and the expectation of outcomes improve incrementally with cost. While not significant, the results demonstrate this with a greater change in z-BMI from 0 to 6 months as intensity, thus cost, increased (N: $-\Delta 0.06 \pm 0.24$; N+GM: $-\Delta 0.08 \pm 0.15$; N+GM+BC: $-\Delta 0.16 \pm 0.22$). However, based on cost-effectiveness, the N condition was significantly more cost-effective (total program cost per 0.1 change in z-BMI) than N+GM and N+GM+BC.

Findings suggest that the Expert Committee recommendation to reduce sugar-sweetened beverages is more helpful for reducing weight status in children than increasing fruits and vegetables, increasing physical activity and decreasing television time during obesity

treatment. Additionally, caretakers in the N+GM+BC condition report the ease of changing this behavior. Future research should isolate the recommended strategies in a larger, more diverse population over a longer period of time to determine the most helpful strategy.

While this study was only a pilot, it was limited by sample size primarily due to the challenge of recruitment. To enhance recruitment, physician referral, an active form of recruitment was utilized (185). Primary care providers were asked to complete an eligibility form where they indicated “yes” or “no” to five questions related to study eligibility. If a child appeared eligible, the caretaker provided a signature indicating the principal investigator could contact the family to screen further for the study. The bulk of recruitment occurred in four large clinics, three solely pediatric-focused, of which one serves over 20,000 children in the Knoxville area. Poor recruitment for child obesity treatment interventions is believed to be due to the lack of identification of overweight and obesity among children by the primary care provider (126). The reasons for the lack of assessment of overweight and obesity for children, as reported by primary care providers, include: time constraints (125); lack of self-efficacy (128, 129); and lack of treatment programs for referral (125). Primary care providers referring families to this investigation reported to the principal investigator that practices had few overweight and obese children, which is not consistent with the 39% prevalence of childhood overweight and obesity in Tennessee reported in 2008-2009 (178).

The limitations of the pilot study include a small sample size, homogeneity of the sample (primarily female, White, non-Hispanic) and the use of self-reported dietary and leisure-time activity data. The majority (18 of 22) of families was recruited by referral by the child’s primary

care provider, but the differences between these families and families recruited from the Healthy Eating and Activity Laboratory were not considered. In addition, a short study time frame of 6 months does not allow the influence of the Expert Committee recommendations (57, 72) on growth and maintenance of a healthy weight to be ascertained. The Prevention Plus stage of the recommendations is suggested to be the first step; however, children with co-morbidities or severe obesity are advised to begin at a more intense stage of treatment. Co-morbidities and severity of obesity were not assessed as part of eligibility and several children in this intervention may have benefited from engaging at a more intense stage.

Strengths of the study include the study design, the use of active recruitment, allowing primary care providers to identify children $\geq 85^{\text{th}}$ BMI-for-age percentile and a 95% retention of families.

Conclusion

Overall, findings suggest that a more intense intervention, such as the N+GM+BC condition, which represents the Prevention Plus stage of the Expert Committee recommendations, may assist in promoting greater improvements in weight status as compared to nutrition education. The small to medium effect size (0.34) found for the N+GM+BC condition supports the potential impact of Prevention Plus in a larger sample; however, if implemented, to assist with increasing cost-effectiveness, Prevention Plus should be implemented by trained medical professionals, which are less costly than physicians.

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Appendices

Appendix A.1: Participant Flow Chart

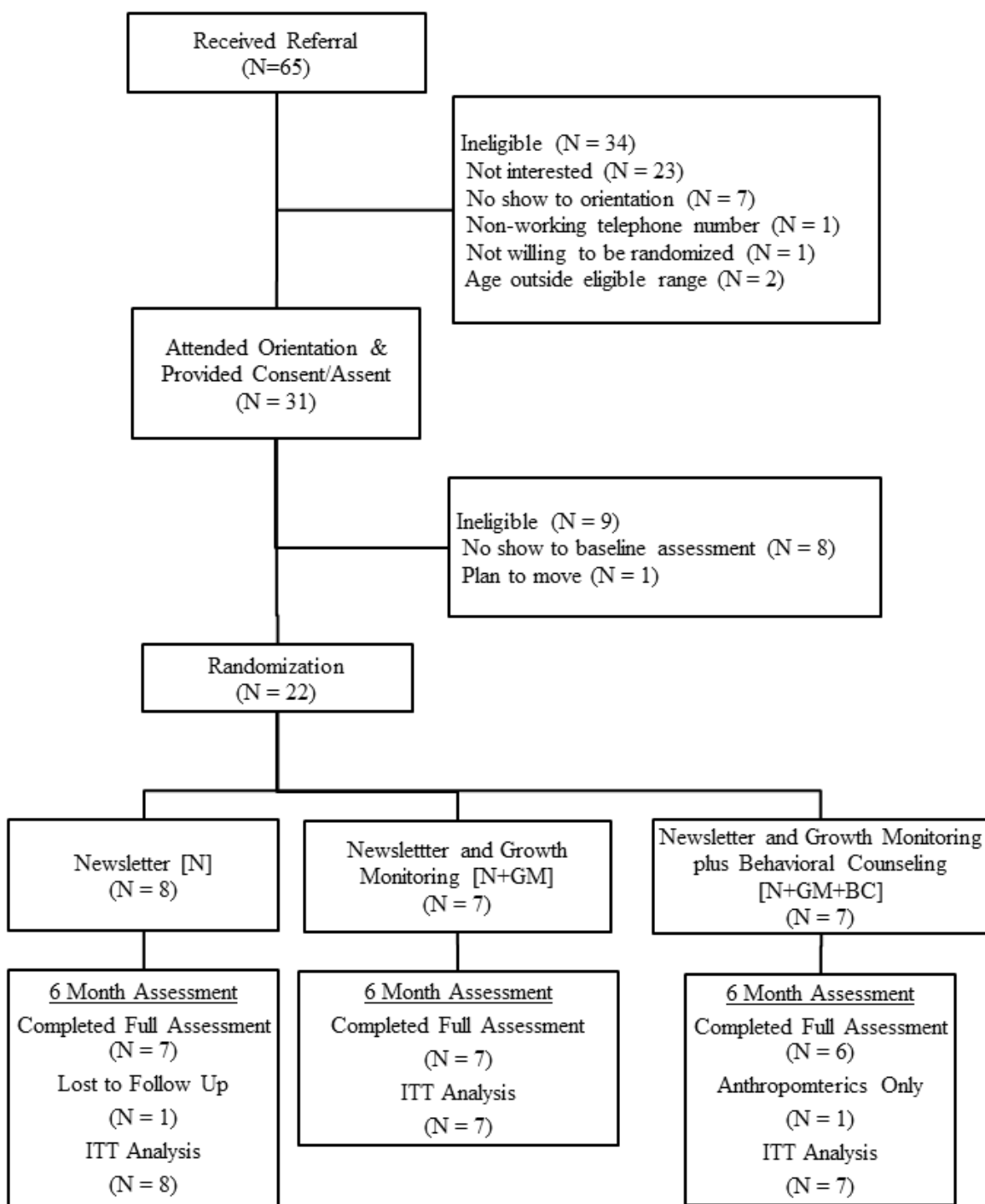


Figure A.1. Participant Flow Chart

Appendix A.2: Example Newsletter



Growing Healthy Newsletter

Volume 1, Issue 1

MyPlate



What do the colors mean?

Orange = Grains
Green = Vegetables
Red = Fruits

Blue = Milk and dairy products
Purple = Protein like meat, beans, fish, and nuts

The U.S. Department of Agriculture (USDA) developed MyPlate to represent the 2010 Dietary Guidelines for Americans. The purpose of MyPlate is to help Americans understand how to eat healthy.

Each colored section of the plate represent a food group. This graphic uses a familiar mealtime place setting.

What do you notice about the sections of the plate? Note that the red (fruits) and green (vegetables)

together account for half of your plate!

You will also see that each section is not the same size. That is on purpose! Realize you and your child need different amounts of food from each food group!

MyPlate Speaks

What are the messages this symbol is trying to send?

Balance calories. Remember to enjoy your food, but don't eat oversized portions. Eating the right amount of food is an important part of having a healthy weight. Refer to page 3 to know how much your child should be eating.

Food to increase. Fill half of your plate with fruits and vegetables and make at least half of your grain whole grains. MyPlate also encourages you to switch to low-fat (1%) or fat-free milk. All of these foods are part of a healthy diet.

Food to reduce. Foods today are high in sodium so compare food labels when shopping and choose the food with the lowest number for sodium. Reducing the number of sugary drinks is important for health so drink water instead!

For more information visit MyPlate.gov.

Healthy Eating Tips

Encouraging Food Choices for a Healthy Diet in Children

Be Patient. Children may not be interested in trying new foods. Offer a new food more than once.

Be a Role Model. What you do can mean more than what you say. Your child learns from you about how and what to eat.

Be Adventurous. At the store, ask your child to choose a new vegetable or fruit. At home, your child can help you wash and prepare the food.

Be creative. Encourage your child to invent a new snack or sandwich from three or four healthful ingredients you provide.

Be a Planner. Plan snacks so they are not served too close to mealtime and offer foods from two or more of the five major food groups.

How much does my child need?

Children Ages 4- to 10-Years-Old



Grains: 5 to 6 oz.
Vegetables: 1-1/2 to 2 1/2 cups
Fruits: 1 to 1-1/2 cups
Milk and Dairy: 2 1/2 to 3 cups
Protein: 4 to 5 oz.



What counts as One Serving?

Grain Group:

1 slice of bread = 1 oz. serving
1/2 cup cooked rice or pasta = 1 oz. serving
1 oz. ready-to-eat cereal = 1 oz. serving

Vegetable Group:

1/2 cup raw or cooked vegetables =
1/2 cup serving
1 cup of raw leafy vegetables =
1/2 cup serving

Fruit Group:

1 piece of fruit = 1 cup serving
1/2 cup of juice = 1/2 cup serving
1/2 cup canned fruit = 1/2 cup serving

Milk and Dairy Group:

1 cup of milk or yogurt = 1 cup serving
2 oz. of cheese = 1 cup serving

Protein Group:

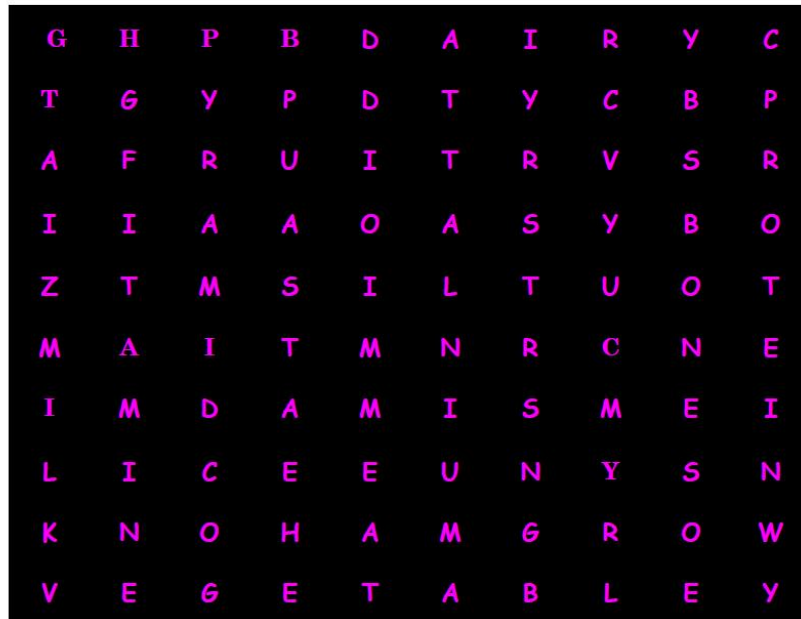
1 oz. of cooked lean meat, poultry, or fish = 1 oz. serving
1/4 cup cooked dry beans = 1 oz. serving
1 egg = 1 oz. serving
1 Tablespoon of peanut butter = 1 oz. serving



Kids' Corner



Can you find all of the words?



Milk
Fruit
Grains
Protein

Dairy
Vegetable
Meat



Kids' Corner

Write or draw a picture of each food you eat on one day and place each in the correct food group:

Grains (Bread, Cereal, Pasta, Rice)

Fruits

Vegetables

Meat/Protein

Dairy



Kids' Corner



Appendix A.3: Example Lesson and Phone Script for N+GM Condition

Session 1: Welcome to Growing Healthy

Welcome to the Growing Healthy Program!

Program Schedule:

After today, you will come to the Oak Ridge Pediatric Clinic for two, 15-minute appointments and one final assessment visit.

You will participate in three, 10-minute phone appointments every other month.

You will receive a monthly newsletter in the mail for the entire length (6-months) of the study.

Here are some guidelines for being in Growing Healthy:

- Call the Healthy Eating and Activity Laboratory (865-974-0754) if you will be late to your scheduled appointment.
- Call the Healthy Eating and Activity Laboratory (865-974-0754) if you are unable to make you and your child's scheduled appointment.
- Bring your child to all scheduled appointments.
- Have your Growing Healthy notebook at all appointments.
- Turn off cell phones during in-person appointments.
- Please do not eat during the in-person appointments.

Growing Healthy's goal is to monitor your child's growth so that you are aware of your child's rate of growth.

Growing Healthy Goal:

1. Keeping Track of Your Child's Growth Once a Month

Your child is still growing. Your child's weight and height will continue to change with growth. The body mass index (BMI)-for-age percentile charts can be used to see your child's growth over time. These charts help with knowing your child's weight status.



Why does my scale at home not match the scale at my doctor's office?



Home



Doctor's Office

Two scales may not give the same weight. Each scale is slightly different. Also the time of day when a person is weighed can make weights not match. The clothes a person has on can make weights not match. Because of this, try to always weigh at the same time and with the same type of clothing.

If one month you weigh your child in the morning with pajamas on and the next at night with jeans and a sweatshirt the difference in time and clothing can add or subtract some pounds!

You should see the same change regardless of what scale you use. For example, last month you weighed 130.3 at your doctor's office and 129.2 on your home scale. This month at your doctor's office you weighed 128.3 pounds and at home you weigh 127.2 pounds. Both scales show a 2 pound loss.

You will be receiving a scale to use at home. Let's weigh your child on both scales so we can look at any differences.

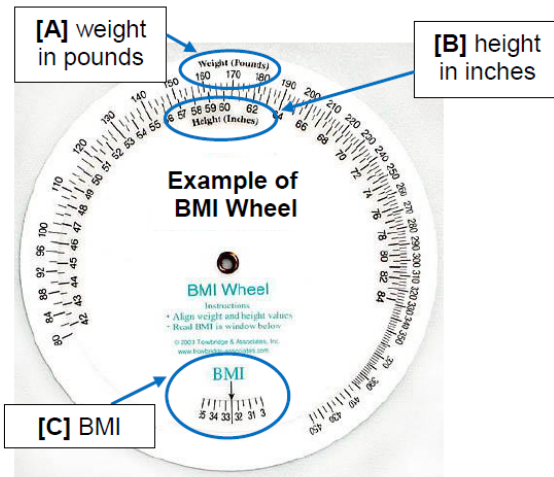
Pediatrician Office Scale: _____ lbs. Growing Healthy Scale: _____ lbs.

Difference between scales = _____ lbs.

What is Body Mass Index (BMI)?

BMI is a way to determine if someone is in a healthy weight range. BMI compares weight to height.

A BMI wheel is a tool used to help calculate BMI quickly. The outside portion of the wheel **[A]** has the weight in pounds and the inside wheel **[B]** has height in inches. When you turn the inside wheel and match your child's height and weight, your child's BMI will show up in the window **[C]**.



Steps to calculate your child's BMI using the BMI wheel:

1. Get your child's weight and height.
2. Convert their height to inches (1 foot = 12 inches), if not already in inches.
3. Move the inside wheel so that their height and weight align.
4. Record BMI from wheel.

Example: Johnny is 6 years, 3 months old, weighs **72 pounds** and is **4 feet, 6 inches** tall.



1. To get height in inches, **4 feet** x 12 = 48 inches + **6 inches** = 54 total inches
 2. Align height with weight on wheel
 3. BMI ≈ 17.4
- Johnny's BMI is 17.4

Let's try calculating your child's BMI using your BMI Wheel!

1. Your child's weight in pounds = _____ lbs.
Your child's height = _____ feet _____ inches **OR** _____ inches
2. If you recorded your child's height in feet and inches, let's convert it to all inches. If you recorded it in inches let's move to number 3.

_____ feet x 12 = _____ inches + _____ inches = _____ total inches
3. Using the BMI wheel align your child's height and weight.
4. What is your child's BMI? _____

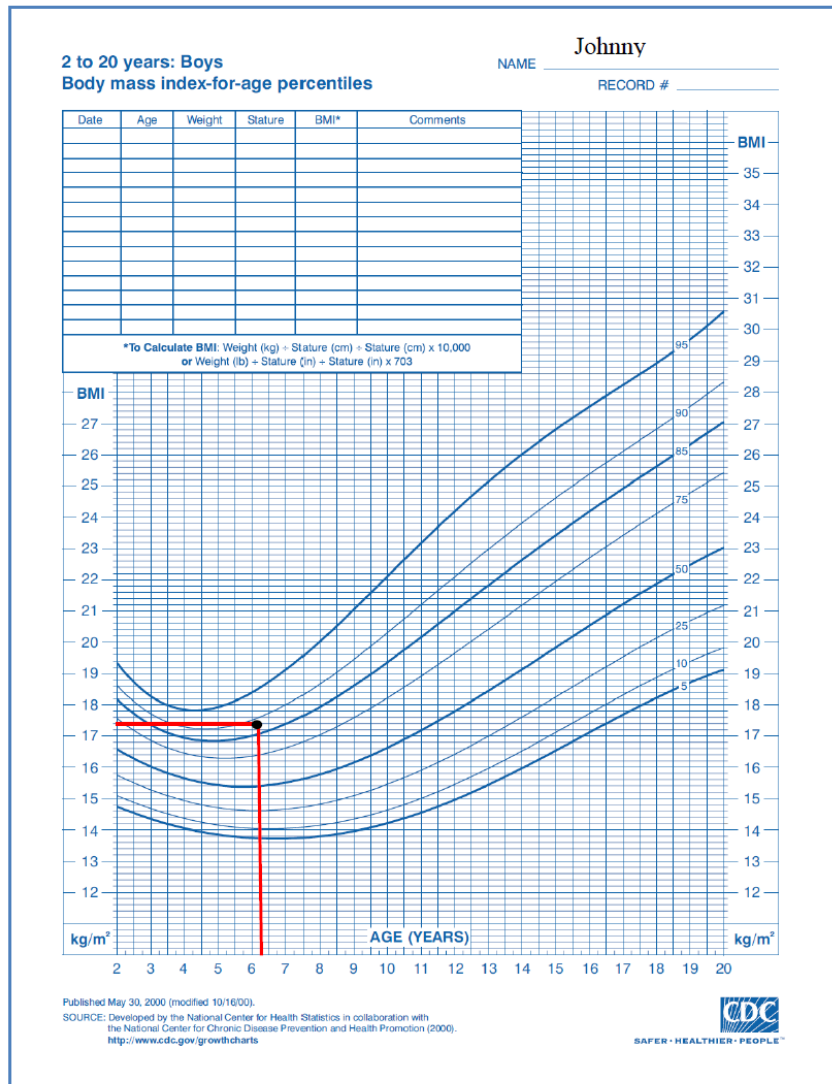
Because a child is growing, a child's BMI needs to be compared to a BMI-for-age percentiles chart. A healthy BMI changes as a child gets older. There is a BMI-for-age percentile chart for males (blue) and females (pink). These charts go from age 2 to adulthood (20 years-old). Children with a BMI from the 85th to the 94th percentile are considered overweight. Children with a BMI at the 95th percentile and above are considered obese.

To find a BMI percentile for a given BMI:

1. Select the table that corresponds to your child's gender from the Male (blue) and Female (pink) BMI-for-age percentile charts.
2. Age values are listed at the bottom of the BMI chart. Round your child's age to the nearest half year.
3. Draw a line (or an imaginary line) upwards to match where your child's age crosses with your child's BMI.
4. Find the percentile curve that the intersection of your child's age and BMI falls closest. This is your child's BMI percentile.



Example: Johnny's BMI is 17.4. Johnny's age, 6 years and 3 months, places him on the line one-third of the way between 6 and 7 years. Drawing a line upward from there to where his BMI falls places him between the 85th and 95th BMI percentile. This indicates that Johnny is overweight for his gender and age.



Now plot your child's BMI-for-age.

Your child's BMI: _____ Your child's age: _____ years _____ months

Your child's BMI percentile: _____ (determined from BMI-for-age growth chart)

When you weigh and measure your child and plot growth on the chart, if your child asks, let your child know that his/her weight and height has increased, decreased, or stayed the same. Do not focus on BMI percentile gain, loss or maintenance as being positive or negative.

Keeping Track:

The most important part of Growing Healthy is what we call "Keeping Track."



You will monitor (monthly):

- Your child's weight
- Your child's height
- Your child's BMI percentile

Writing down your child's growth each month will develop awareness about your child's rate of growth. **The measures will be recorded in the Growth Monitoring Diary found in the front of your Growing Healthy notebook.**

Growing Healthy is giving you the tools to monitor your child's growth each month. Please follow the directions below when measuring your child's growth at home.

Scale. Place the scale on a flat, hard surface. Have your child remove shoes and any extra clothing before stepping on the scale. Write down your child's weight in the Growth Monitoring diary found in the front of your Growing Healthy notebook.

Wall Growth Chart. Attach the growth chart to a wall starting with the bottom (starting at 0). Align the bottom of the wall growth chart with the wall where the floor meets the wall. Have your child remove shoes and stand with back against the wall. Have your child stand tall with their heels, bottom, shoulder and head against the wall. Have your child look straight ahead and mark their height. Write their height in the Growth Monitoring Diary found in the front of your Growing Healthy notebook.

BMI Wheel. The BMI wheel helps you calculate your child's BMI. If you need to remind yourself how to use the wheel, look over the first two pages of this lesson.

BMI-for-age Growth Chart. Remove the chart from your Growing Healthy notebook and plot your child's BMI-for-age according to the directions on pages 4 and 5. Use the graph ease plotting tool in your Growing Healthy binder to help with plotting your child's weight status. From the BMI-for-age growth chart, write your child's BMI percentile in the Growth Monitoring diary in the front of your Growing Healthy notebook.

To do next month:



Keep Track of:

- Your child's weight
- Your child's height
- Your child's BMI percentile

It's best to keep your Growing Healthy notebook in a place that will remind you to write this information next month. **48 hours before our phone call be sure to 1) measure and write down your child's current weight; 2) measure and write down your child's current height; 3) plot your child's BMI on the BMI-for-age growth chart.**

Goal: Monitor your child's growth by correctly plotting your child's BMI-for-age on the growth chart once a month.



On _____ at _____ am/pm I will call to discuss your child's growth. I will answer any questions you may have about the newsletter you received (you will receive a reminder call 72 hours in advance of this appointment.)

During the phone call you will need your Growing Healthy notebook (specifically, the Growth Monitoring diary and BMI-for-age growth chart).

Session 1: Phone Contact

Anthropometric Data from ___ / ___ / ___ (Month 1):

Weight: _____ Height: _____ BMI Percentile: _____

Start Time: _____ a.m./p.m. End Time: _____ a.m./p.m. → Total Minutes _____

Hello, this is Shannon from the Growing Healthy study. I am calling to discuss _____'s progress in the program. This conversation will last for approximately 10-minutes, is now still a good time?

Before we go any further were you able to obtain your child's current weight, height and plot his/her BMI on the BMI-for-age growth chart?

If "no."—Is your child available to get that information while we are on the phone? If not—well unfortunately we need that information to discuss how he/she is growing.
Reschedule the appointment: _____.

Excellent, that means you have met your goal for Growing Healthy this month! Let me gather that information before I ask any more questions.

When did you record his/her height and weight? ___ / ___ / ___

How much did he/she weight? _____ What was his/her current height? _____

Were you able to calculate his/her BMI and plot it on the growth chart? Yes or No

When you used the BMI wheel what value did you get? _____

What was your son's/daughter's BMI percentile? _____

We had given you a lot of materials last time we met at KPA/CHS. Did you find a place for the scale and wall growth chart? Where?

Do you find that you are using this equipment more often than once a month, as required by Growing Healthy? Yes or No

What are the challenges to getting your child's weight? Height?

Once you got your child's anthropometric data Growing Healthy then asks you to calculate their body mass index and determine their weight status. Can you walk me through the steps you took? While you tell me how you calculated your child's BMI percentile I am going to follow along to see if I got a BMI percentile that is the same or different.

- Did you find the instructions from Session 1 helpful?
- How do you feel about using the BMI wheel?
- How useful was the graphing tool in plotting the BMI-for-age?
- What challenges occurred?
- I got the same/different BMI percentile...

It is important that you have all this information recorded because we will review it very briefly again next month when we meet at CHS/KPA.

Let discuss how your child's growth has changed from last month when we met.

- Have you noticed any changes in your child's growth?
- How do you feel about your child's growth?

We will continue to monitor your child's growth on a monthly basis as part of Growing Healthy. In addition to monitoring monthly you also should have received the second newsletter in the mail. Did you receive the newsletter about the Activity Pyramid? Yes or No

Excellent do you have any questions about the materials in the newsletter?

Again, I want to commend you on meeting the goal of Growing Healthy this month! Next month we will meet at your child's primary care office. It looks like we should meet the week of _____. Typically I am at CHS/KPA on _____, will that day work for you? What time would you like to meet?

Again, the meeting will only last 15-minutes; however, it will be important you bring you and your child's Growing Healthy notebook. You will receive a reminder phone call 24-hours before your appointment. Congratulations on a very successful month and I look forward to seeing you and _____ next month!

End Time: _____ a.m./p.m. (record again above to calculate total minutes)

Appendix A.4: Example Lesson and Phone Script for N+GM+BC Condition

Session 1: Welcome to Growing Healthy

Welcome to the Growing Healthy Program!

Program Plan:

After today, you will come to Knoxville Pediatric Associates for two, 30-minute sessions and one final visit at the end of the 6-months.

You will take part in three, 20-minute phone calls every other month.

You will receive a monthly newsletter in the mail for the entire length (6-months) of the study.

Here are some guidelines for Growing Healthy:

- Call Knoxville Pediatric Associates (865-690-1161) if you will be late to your session.
- Call the Healthy Eating and Activity Lab (865-974-0754) if you are unable to make your child's session.
- Bring your child to all sessions at Knoxville Pediatric Associates.
- Have your Growing Healthy notebook at all sessions.
- Turn off cell phones during in-person sessions.
- Please do not eat during the in-person session.

The Growing Healthy Program has two goals. One goal is to monitor your child's growth to help with reaching a healthy weight. The second goal is to meet eating and leisure-time activity goals that will help with reaching a healthy weight.

Growing Healthy Goal:

1. Keeping Track of Your Child's Growth Once a Month

Your child is still growing. Your child's weight and height will change with growth. The body mass index (BMI)-for-age percentile charts can be used to see your child's growth over time. These charts help you be aware of your child's weight status.

Why does my scale at home not match the scale at my doctor's office?



Home



Doctor's Office

Two scales may not give the same weight. Each scale may not be the same. Also the time of day when a person is weighed can make weights not match. The clothes a person has on can make weights not match. Because of this, try to always weigh at the same time and with the same type of clothing.

If one month you weigh your child in the morning with pajamas on and the next at night with jeans and a sweatshirt the difference in time and clothing can add or subtract some pounds!

It doesn't matter what scale you use, you should see the same change. For example, last month you weighed 130.3 at your doctor's office and 129.2 on your home scale. This month at your doctor's office you weigh 128.3 pounds and at home you weigh 127.2 pounds. Both scales show a 2 pound loss.

You will get a scale to use at home. To see if your scale matches the doctor's scale let's weigh your child on both scales.

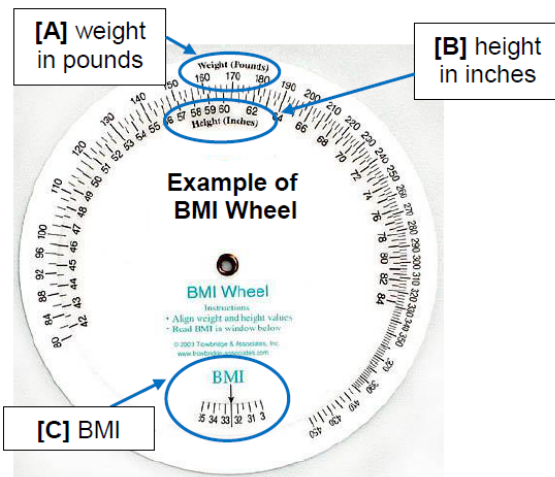
Doctor's Office Scale: _____ pounds. Growing Healthy Scale: _____ pounds.

Difference between scales = _____ pounds.

What is Body Mass Index (BMI)?

BMI is a way to find out if someone is in a healthy weight range. BMI compares weight to height.

A BMI wheel is a tool used to help compute BMI quickly. The outside part of the wheel **[A]** has the weight in pounds and the inside wheel **[B]** has height in inches. When you turn the inside wheel to match your child's height and weight, your child's BMI will show up in the window **[C]**.



Steps to calculate your child's BMI using the BMI wheel:

1. Get your child's weight and height.
2. Convert their height to inches (1 foot = 12 inches).
3. Move the inside wheel so that their height and weight align.
4. Record BMI from wheel.

Example: Johnny is 6 years, 3 months old, weighs **72 pounds** and is **4 feet, 6 inches** tall.



1. To get height in inches, **4 feet** x 12 = 48 inches + **6 inches** = 54 total inches
2. Align height with weight on wheel
3. BMI ≈ 17.4

Johnny's BMI is 17.4

Calculate your child's BMI with the BMI Wheel!

1. Your child's weight equals _____ pounds
Your child's height equals _____ feet _____ inches **OR** _____ inches
2. If you have your child's height in feet and inches, let's change it to all inches.
If his/her height is in inches we can move to number 3.

_____ feet x 12 = _____ inches + _____ inches = _____ total inches
3. Use the BMI wheel to align child's height to his/her weight.
4. What is your child's BMI? _____

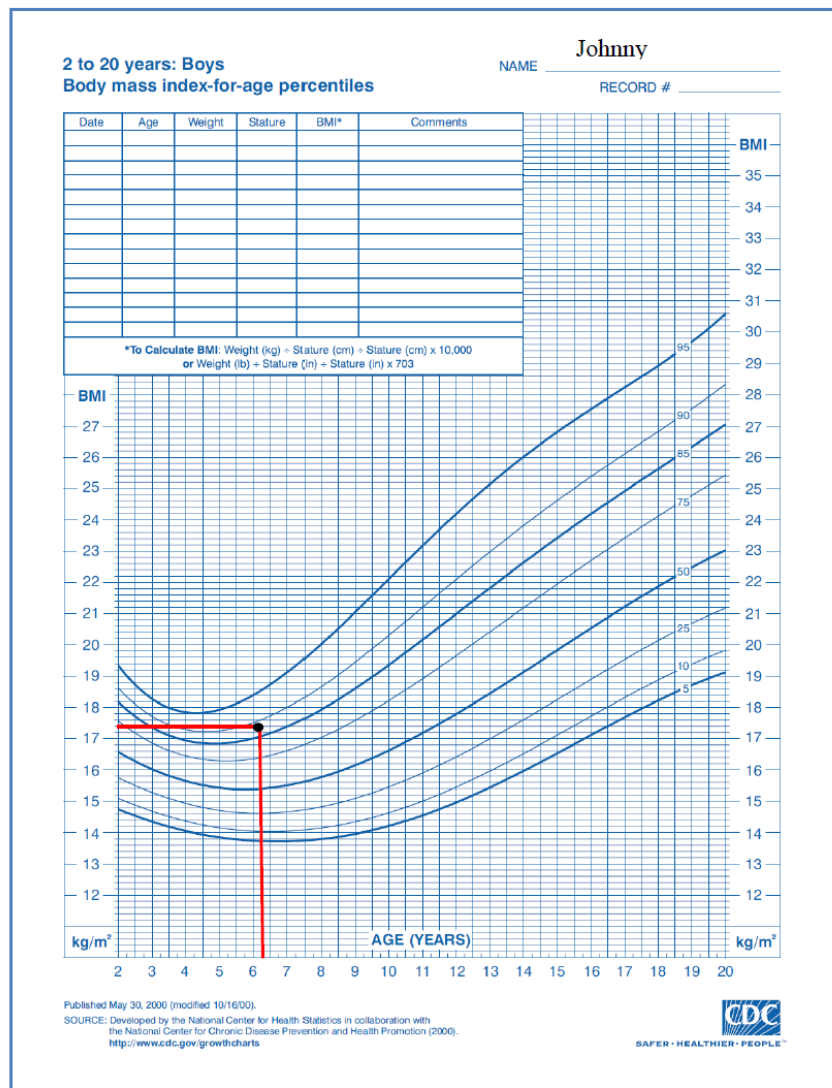
Since a child is growing, a child's BMI needs to be compared to a BMI-for-age growth chart. A healthy BMI changes as a child gets older. There is a BMI-for-age growth chart for males (blue) and females (pink). These charts go from age 2 to 20 years. Children with a BMI from the 85th to the 94th percentile are overweight. Children with a BMI at the 95th percentile and above are obese.

To find a BMI percentile for a given BMI:

1. Select the growth chart based on your child's gender (male = blue and female = pink).
2. Ages are listed at the bottom of the BMI chart. Round your child's age to the nearest half year.
3. Draw a line (or an imaginary line) upwards to match where your child's age crosses with your child's BMI.
4. Find the percentile curve that the intersection of your child's age and BMI falls closest. This is your child's BMI percentile.



Example: Johnny's BMI is 17.4. Johnny's age, 6 years and 3 months, places him on the line one-third of the way between 6 and 7 years. Drawing a line upward from there to where his BMI falls places him between the 85th and 95th BMI percentile. This indicates that Johnny is overweight for his gender and age.



Now plot your child's BMI-for-age.

Your child's BMI: _____. Your child's age: _____ years _____ months

Your child's BMI percentile: _____ (from BMI-for-age growth chart)

2. Eating Goals.

You and your child will work toward a few eating goals in the program. These goals will help you and your child have a healthy weight. These goals are for sweetened drinks and fruits and vegetables. Sweetened drinks contain a lot of calories and very few nutrients. When you have these drinks they often push other healthy drinks, such as water, out of the diet. These drinks, which are high in sugar, are also not healthy for your child's teeth. Fruits and vegetables are low in calories and provide nutrients which can give your child long-term health benefits.

Your Child's Eating Goals

- Drink less than 3 sweetened drinks (8 oz, or 1 cup, is one serving) per week (see page 12 for a list of sweetened drinks)
- Eat at least 1 ½ cups of vegetables per day
- Eat at least 1 cup of fruit per day



2. Leisure-time Activity Goals.

Physical activity is a key part of being healthy. Not only is being active good for heart health, but also helps with having a healthy weight. Inactive things, such as watching TV, can compete with doing physical activity. When you watch less TV, more time is free to be active! When a person sees a TV commercial that shows high-calorie foods, this may increase the chance of eating those foods. Watching less TV decreases the chance for seeing those commercials and can help with not wanting to eat high-calorie foods!

Your Child's Leisure-time Activity Goals

- Take part in at least 60 minutes of moderate- or vigorous-intensity aerobic physical activity daily
- Reduce TV viewing to less than 2 hours per day

Examples of these physical activities are skating, biking, running, and playing active games. Family activities like walking at the park or at the beach, also count for this goal.

The types of physical activities your child does should be fun and help your child feel good about physical activity.

THE INFLUENCE OF MODELING ON BEHAVIOR

You need to model healthy eating and leisure-time behaviors. Your child learns a lot by watching what you do!

You want to model the eating and leisure-time goals. You also need to model positive attitudes about the changes that you and your child are working on in Growing Healthy. Try to not focus on and talk to your child about how hard it is to change behaviors. For example, don't talk about how hard it is to find time to be more active. If you make a comment, your child will also make them. This will make it harder for your child to make these changes in his/her diet and leisure-time behaviors.

Be Positive!

The more you are able to achieve the goals in Growing Healthy, the greater the chance that your child will make these changes as well! To help you work as a team the Growing Healthy program has goals for you!

Your Eating Goals

- Drink less than 3 sweetened drinks (8 oz, or 1 cup, is one serving) per week (see page 11 for a list of sweetened drinks)
- Eat at least 17.5 cups per week (2 ½ cups per day) [females] to 21 cups per week (3 cups per day) [males] of vegetables per day
- Eat at least 10.5 cups per week (1 ½ cups per day) [females] to 14 cups per week (2 cups per day) [males] of fruit per day

Your Leisure-time Activity Goals

- Take part in at least 150 minutes of moderate- or vigorous-intensity aerobic physical activity per week
- Reduce TV viewing to less than 10 hours per week

The physical activity goal for adults is 30 minutes per day on at least 5 days per week. To help your child achieve the physical activity goal, try to do physical activity together, such as taking family biking or skating trips, walking the dog, etc. You may not be able to do all your physical activity with your child, so try to do some on your own, like brisk walking, to help you reach your physical activity goals.

Ways to Model Healthy Behaviors



There are many ways you can model the healthy behaviors you and your child are working on in Growing Healthy:

1. Try not to drink sweetened drinks at meals or snacks you have with your family.
2. Eat a fruit or vegetable in front of your child at a meal or snack and encourage him/her to try a bite.
3. Brainstorm a list of things with your child to do instead of watching TV (i.e., play a board game, play outside, make an art & craft project, etc.). Ask your child to do one of the activities from the list you make.
4. Choose to not buy sweetened drinks at the grocery store.
5. Place a bowl of fruit on the counter instead of a candy dish.
6. Talk with your child about plans you have to help you decrease the intake of sweetened drinks.
7. At social events, like a family party, say, "No thank you," to a sweetened drink in front of your child.
8. Buy a physical activity video/DVD with your child and do it together!
9. Walk to the mailbox instead of drive and ask your child to walk with you.
10. Keep a record of the minutes of your physical activity for the week on the refrigerator.



List other ways you can model healthy behaviors for your child?

- _____
- _____
- _____

DAILY MEETINGS:

You and your child should meet daily to talk about how you each are doing with the goals of the Growing Healthy program. During this meeting, take time to complete the Keeping Track diary in the Growing Healthy notebook. Complete your own Keeping Track diary with your child to model this behavior. If your child has a hard time meeting his/her goals, take time to problem solve ideas to better help them meet his/her goals.

Keeping Track:

The most main part of Growing Healthy is what we call “Keeping Track.”



You will monitor:

- Your child's weight (monthly)
- Your child's height (monthly)
- Your child's BMI percentile (monthly)
- You and your child's sweetened drink intake
- You and your child's fruit and vegetable intake
- You and your child's minutes of daily physical activity
- You and your child's minutes of TV

Monitoring and writing down your child's growth and their dietary and leisure time behaviors will help you be aware about your child's rate of growth and the behaviors that impact energy balance. **Record your child's growth in the Growth Monitoring Diary and their dietary and leisure-time behaviors in the Keeping Track diary, both found in your Growing Healthy notebook.**



Growing Healthy will give you the tools to monitor your child's growth each month. Please follow the directions below when measuring your child's growth at home.

Scale: Place the scale on a flat, hard surface. Have your child remove shoes and any extra clothing before stepping on the scale. Write down your child's weight in the Growth Monitoring diary found in the front of your Growing Healthy notebook.

Wall Growth Chart: Attach the growth chart to a wall starting with the bottom (starting at 0). Align the bottom of the height chart with the wall where the floor meets the wall. Have your child remove shoes and stand with back against the wall. Have your child to stand tall with their heels, bottom, shoulder and head against the wall. Have your child look straight ahead and mark their height. Write their height in the Growth Monitoring Diary found in the front of your Growing Healthy notebook.

BMI Wheel: The BMI wheel helps you calculate your child's BMI. If you need to remind yourself how to use the wheel, look over the first two pages of this lesson.

BMI-for-age Growth Chart: Remove the chart from your Growing Healthy notebook and plot your child's BMI-for-age using the directions on pages 4 and 5. Use the graph ease plotting tool in your Growing Healthy binder to help with plotting your child's weight status. From the BMI-for-age growth chart, write your child's BMI percentile in the Growth Monitoring diary in the front of your Growing Healthy notebook.

To do over the next month:



Keep Track of:

- Your child's weight
- Your child's height
- Your child's BMI percentile
- You and your child's sweetened drink intake
- You and your child's fruit and vegetable intake
- You and your child's minutes of daily physical activity
- You and your child's minutes of TV
- Meet daily with your child to discuss progress

It's best to keep your Growing Healthy notebook in a place that will remind you to record. **48 hours before our phone call be sure to 1) measure and record your child's current weight; 2) measure and record your child's current height; 3) plot your child's BMI on the BMI-for-age growth chart.**

Your Child's Goals for Month 1*:

1. Drink less than 6 sweetened drinks per week
2. Eat at least $\frac{1}{4}$ cup of fruit per day
3. Eat at least $\frac{1}{4}$ cup of vegetable per day
4. Watch less than 5 hours of TV per day
5. Be physically active at least 10 minutes per day



Your Goals for Month 1*:

1. Monitor your child's growth by plotting your child's BMI-for-age on the growth chart
2. Drink less than 6 sweetened drinks per week
3. Eat at least $1\frac{3}{4}$ cups of fruit per week ($\frac{1}{4}$ of a cup per day)
4. Eat at least 7 cups of vegetables per week (1 cup per day)
5. Watch less than 13 hours of TV per
6. Be physically active at least 60 minutes per week

***If you and/or your child are meeting the goals for this month please continue and do not change their current behavior.**



On _____ at _____ am/pm I will call to talk about your child's growth. I can also answer any questions you may have about the newsletter you will get in the mail (you will get a reminder call 72 hours before this appointment.)

During the phone call you will need your Growing Healthy notebook (with, the Growth Monitoring Diary, Keeping track Diaries and BMI-for-age growth chart).

Sweetened Drinks

- Capri Sun
- Flavored milk (chocolate milk, strawberry milk, etc.)
- Gatorade, Powerade, and other sports drinks
- Iced Tea
 - Snapple, Arizona, etc.
- Kool-Aid
- Lemonade
- Non-100% Juices
 - Hi-C
 - Hawaiian Punch
- Smoothies
- Snapple
- Soda
 - Coke, Pepsi, Sprite, Root Beer, Mountain Dew, Dr. Pepper, etc.
- Sunny Delight



Shaping you and your child's dietary and physical activity goals

You and your child are both working toward healthy dietary and physical activity goals in the Growing Healthy program.

To reach these goals it is suggested to take small steps to shape you and your child's new behaviors. Below are recommendations on how to work toward the goals of Growing Healthy over the next 4 months.

	CHILD GOALS					CARETAKER GOALS**				
MONTH	Sweetened Beverages	Vegetable	Fruit	Physical Activity	TV	Sweetened Beverages	Vegetable	Fruit	Physical Activity	TV
1	<6 per week	≥¼ cup per day	≥¼ cup per day	≥10 min. per day	<5 hours per day	<6 per week	≥7 cup per week	≥1 ¾ cup per week	≥60 min. per week	<13 hours per week
2	<5 per week	≥½ cup per day	≥½ cup per day	≥20 min. per day	<4 hours per day	<5 per week	≥10 ½ cups per week	≥3 ½ cup per week	≥90 min. per week	<12 hours per week
3	<4 per week	≥1 cup per day	≥¾ cup per day	≥40 min. per day	<3 hours per day	<4 per week	≥14 cups per week	≥7 cup per week	≥120 min. per week	<11 hours per week
4 - 6	<3 per week	≥1 ½ cups per day	≥1 cup per day	≥60 min. per day	<2 hours per day	<3 per week	≥17 ½ cups per week	≥10 ½ cups per week	≥150 min. per week	<10 hours per week

**All caretaker goals are on a per week basis. For fruits and vegetables it is recommended to consume some each day.

Session 1: Phone Contact

Anthropometric Data from __ / __ / __ (Month 1):

Weight: _____ Height: _____ BMI Percentile: _____

Start Time: _____ a.m./p.m. End Time: _____ a.m./p.m. → Total Minutes _____

Hello, this is Shannon from the Growing Healthy study. I am calling to discuss _____'s progress in the program. This conversation will last for approximately 20-minutes, is now still a good time to talk? Great, the first 10-minutes of our conversation will focus on growth and then we will discuss you and your child's progress in meeting the goals of Growing Healthy.

We will be discussing your child's growth and how it is going for you and your child in meeting the goals of the Growing Healthy Program. Before we go any further were you able to obtain your child's current weight, height and plot his/her BMI on the BMI-for-age growth chart?

If "no."—Is your child available to get that information while we are on the phone? If not—well unfortunately we need that information to discuss how he/she is growing.
Reschedule the appointment: _____.

That is wonderful you were able to meet one of the goals of Growing Healthy. Congratulations on measuring his/her growth.

I had given you a lot of materials last time we met at KPA/CHS. Did you find a place for the scale and wall growth chart? Where?

When did you record his/her height and weight? __ / __ / __

How much did he/she weigh? _____ What was his/her current height? _____

Were you able to calculate his/her BMI? Yes or No

When you used the BMI wheel what value did you get? _____ How comfortable did you feel in using the BMI wheel?

Can you walk me through the steps you took to plot BMI on the growth chart? Did you use the instructions from session 1?

What was your son's/daughter's BMI percentile? _____

Was the graphing tool helpful in plotting the BMI-for-age? (This is the clear plastic sheet)

Wonderful job this month in regards to the growth component of Growing Healthy. The goal of the program is to only measure your child's growth once a month, but do you find that you are using this equipment more often than once a month, as required by Growing Healthy?

Yes or No

How did your child respond when measuring their growth? Was there any challenges?

Have you recorded all this information in your child's growth monitoring diary?

This is important because next time we meet at your child's primary care office we will review this information again.

What changes have you noticed in your child's growth over the last month? How have you responded to these changes?

Again, I want to commend you on accomplishing the first goal of Growing Healthy. Next month, we will measure your son's/daughter's growth at the primary care office when we meet. Now let's focus on the eating and leisure-time activity goals.

Over the past month your child was working to reduce sweetened beverage intake to <6 per week, consume $\geq 1/4$ cup of fruit and $\geq 1/4$ cup of vegetables per day, less than 5 hours of TV per day and be physically active for at least 10 minutes per day. We will now review each of these goals individually. Do you have her Keeping Track charts available?

Great so with Keeping Track we are asking that your child achieve at least 3 of the 5 goals each day. You can determine this by looking down each column and noticing for each goal if it was achieved. We are going to focus on the goal starting with week 1. I will ask how many goals you met for that week and then what goals were easy and what were more difficult.

Dates	Week	Number of days of the week ≥ 3 of 5 goals were obtained									
		0	1	2	3	4	5	6	7		
	1	0	1	2	3	4	5	6	7		
	2	0	1	2	3	4	5	6	7		
	3	0	1	2	3	4	5	6	7		
	4	0	1	2	3	4	5	6	7		

For week 1: what were the easiest goals to meet? What were the most difficult?

For week 2: what were the easiest goals to meet? What were the most difficult?

For week 3: what were the easiest goals to meet? What were the most difficult?

For week 4: what were the easiest goals to meet? What were the most difficult?

In what ways did you model healthy dietary behaviors? Did you refer to the list from session 1? Did you come up with other way to model eating more fruits/vegetables or less sweetened beverages? Did you participate in activity with your child?

You also had your own goal to achieve over the past month. Similar to your child I am going to ask how many times you achieved each goal over the past month?

Dates	Week	Number of Goals Achieved					
	1	0	1	2	3	4	5
	2	0	1	2	3	4	5
	3	0	1	2	3	4	5
	4	0	1	2	3	4	5

PRAISE. What is the most difficult goal to achieve? PROBLEM SOLVE.

It sounds like you and your child are making good progress toward the Growing Healthy goals. Again, these goals are designed to help your son/daughter reach a healthy weight. Understand that you may not achieve these goals, but what is important is you continue to work toward them. One bad day does not mean to give up on the next you must remain positive and keeping working toward a goal.

As we move into month two (November) of the program the goals will change slightly. These are reflected in your keeping track diaries that should be in your Growing Healthy Diary. You can also refer to page 13 of the first lesson with how we will shape you and your child's dietary and physical activity goals.

For your child:

- <5 sweetened beverages per day (8 oz = 1)
- ≥1/2 cup of vegetables per day
- ≥1/2 cup of fruit per day
- >20 minutes of physical activity per day
- <4 hours of TV per day

For you:

- <5 sweetened beverages per day (8 oz = 1)
- ≥10.5 cup of vegetables per week (1 ½ cups per day)
- ≥2.5 cup of fruit per week (1/2 cups per day)
- >90 minutes of physical activity per week
- <12 hours of TV per week

Do you have any questions about the new goals for Month 2?

We will continue to monitor your child's growth and progress toward their dietary and physical activity goal on a monthly basis as part of Growing Healthy. In addition seeing how you and your child progress toward the goals of Growing Healthy you also should have received the second newsletter in the mail. Did you receive the newsletter about the Activity Pyramid?

Yes or No

Excellent do you have any questions about the materials in the newsletter?

Again, you have done a great job keeping track of you and your child's dietary and physical activity this month! Monitoring all of these components is important in moving toward a healthier lifestyle. Next month we will meet at your child's primary care office. It looks like we should meet the week of _____. Typically I am at CHS/KPA/PC on _____, will that day work for you? What time would you like to meet?

The appointment next month will last 30-minutes; however, it will be important you bring you and your child's Growing Healthy notebook. We will discuss his/her progress in addition to talking about how to improve the home environment. You will receive a reminder phone call 24-hours before your appointment. Congratulations on a very successful month and I look forward to seeing you on _____.

End Time: _____ a.m./p.m. (record again above to calculate total minutes)

Appendix A.5: Example of Self-monitoring Diaries for the N+GM+BC Condition

Caretaker Keeping Track: ___ / ___ to ___ / ___

	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	Goal Met?
Sweetened Beverages (less than 6 per week)	  	  	  	  	  	  	  	
Fruit (at least 1 3/4 cups per week)								
Vegetable (at least 7 cups per week)	   	   	   	   	   	   	   	
TV (less than 13 hours per week)	  	  	  	  	  	  	  	
Physical Activity (at least 60 minutes per week)								

 = 8oz sweetened beverage
  = 1/4 cup fruit
  = 1/4 cup vegetable
  = 30 minutes of TV
  = 10 minutes of physical activity

How many goals did you meet this week? (circle the number)

0 1 2 3 4 5

Keeping Track: ___ / ___ to ___ / ___

	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	Goal Met?
Sweetened Beverages (less than 6 per week)	  	  	  	  	  	  	  	
Fruit (at least 1/4 cup per day)								
Vegetable (at least 1/4 cup per day)								
TV (less than 5 hours per day)	        	        	        	        	        	        	        	
Physical Activity (at least 10 minutes per day)								
How many of the goals did you meet today?	_____ of 5	_____ of 5	_____ of 5	_____ of 5	_____ of 5	_____ of 5	_____ of 5	



= 8oz sweetened beverage



= 1/4 cup fruit



= 1/4 cup vegetable



= 30 minutes of TV



= 10 minutes of physical activity

Appendix B.1: Demographic Questionnaire

DATE //
M M D D Y Y

Caretaker Demographic Information

Please fill out this questionnaire if you are the caretaker primarily in charge of feeding the child that will be involved in this study.

1. AGE
2. SEX: ☐ MALE ☐ FEMALE
(1) (2)
3. RELATIONSHIP TO CHILD
 - ☐ (1) Mother (biological, adopted, step-parent)
 - ☐ (2) Father (biological, adopted, step-parent)
 - ☐ (3) Grandmother
 - ☐ (4) Grandfather
 - ☐ (5) Aunt
 - ☐ (6) Uncle
 - ☐ (7) Sister
 - ☐ (8) Brother
 - ☐ (9) Cousin
 - ☐ (10) Legal guardian
 - ☐ (11) Other (specify): _____
4. EDUCATION: Check years of school completed. (CHECK ONLY ONE ANSWER)
 - ☐ (1) Grade School (6 yrs or less)
 - ☐ (2) Junior High School (7-9 yrs)
 - ☐ (3) High School (10-12 yrs)
 - ☐ (4) Vocational Training (beyond High School)
 - ☐ (5) Some College (less than 4 yrs)
 - ☐ (6) College/University degree
 - ☐ (7) Graduate or Professional Education
5. MARITAL STATUS:
 - ☐ (1) Married
 - ☐ (2) Separated
 - ☐ (3) Divorced
 - ☐ (4) Widowed
 - ☐ (5) Never Married
 - ☐ (6) Not Married (living with significant other)
 - ☐ (7) Other (specify): _____

6. HOUSEHOLD INCOME: Check your total household income (CHECK ONLY ONE ANSWER)

- ☐ (1) Under \$10,000
- ☐ (2) \$10,000 - 19,999
- ☐ (3) \$20,000 - 29,999
- ☐ (4) \$30,000 - 39,999
- ☐ (5) \$40,000 - 49,999
- ☐ (6) \$50,000 - 74,999
- ☐ (7) \$75,000 - 99,999
- ☐ (8) \$100,000 – 150,000
- ☐ (9) Over \$150,000

7. Which of the following best describes your racial heritage? (you may choose more than one)

- ☐ (1) American Indian or Alaskan Native
- ☐ (2) Asian
- ☐ (3) Black or African American
- ☐ (4) Native Hawaiian or other Pacific islander
- ☐ (5) White
- ☐ (6) Other _____

8. Which of the following best describes your ethnic heritage?

- ☐ (1) Hispanic or Latino
- ☐ (2) Not Hispanic or Latino

Weight History

1. How much did you weigh when you were 20 years old? _____ lbs
2. How much did you weigh when you were 30 years old? _____ lbs
(Do not answer if you have not reached 30 years of age yet.)
3. How much did you weigh when you were 40 years old? _____ lbs
(Do not answer if you have not reached 40 years of age yet.)
4. How much did you weigh when you were 50 years old? _____ lbs
(Do not answer if you have not reached 50 years of age yet.)
5. How much did you weigh when you were 60 years old? _____ lbs
(Do not answer if you have not reached 60 years of age yet.)
6. What is the most you have ever weighed, not counting pregnancies? _____ lbs
7. Since you were 20 years old, how many different times did you lose each of the following amounts of weight ON PURPOSE (not including pregnancy or childbirth)?

Please check one box for each row, even if the answer is zero.

	(1)	(2)	(3)	(4)	(5)
	0 times	1-2 times	3-4 times	5-6 times	7+ times
a) 5-9 pounds	☐	☐	☐	☐	☐
b) 10-19 pounds	☐	☐	☐	☐	☐
c) 20-49 pounds	☐	☐	☐	☐	☐
d) 50-79 pounds	☐	☐	☐	☐	☐
e) 80-99 pounds	☐	☐	☐	☐	☐
f) 100+ pounds	☐	☐	☐	☐	☐

8. Since you were 20 years old, how many different times did you lose each of the following amounts of weight NOT ON PURPOSE (not including pregnancy or childbirth)?

Please check one box for each row, even if the answer is zero.

	(1) 0 times	(2) 1-2 times	(3) 3-4 times	(4) 5-6 times	(5) 7+ times
a) 5-9 pounds	☐	☐	☐	☐	☐
b) 10-19 pounds	☐	☐	☐	☐	☐
c) 20-49 pounds	☐	☐	☐	☐	☐
d) 50-79 pounds	☐	☐	☐	☐	☐
e) 80-99 pounds	☐	☐	☐	☐	☐
f) 100+ pounds	☐	☐	☐	☐	☐

Child Demographic Information

1. CHILD'S BIRTHDATE / /
M M D D Y Y Y Y
2. CHILD'S SEX: ☐ MALE ☐ FEMALE
(1) (2)
3. Which of the following best describes this child's racial heritage? (you may choose more than one)
- ☐ (1) American Indian or Alaskan Native
 - ☐ (2) Asian
 - ☐ (3) Black or African American
 - ☐ (4) Native Hawaiian or other Pacific islander
 - ☐ (5) White
 - ☐ (6) Other _____
6. Which of the following best describes your child's ethnic heritage?
- ☐ (1) Hispanic or Latino
 - ☐ (2) Not Hispanic or Latino

Appendix B.2: Anthropometric Form

DATE //
M M D D Y Y

Office Use Only	
Reference #:	
Assessment #:	

Anthropometrics

Assessment: Child Height _____ inches Caretaker height _____ inches
 Child Weight _____ lbs. Caretaker Weight _____ lbs.
 Child BMI: _____ Caretaker BMI: _____
 Child BMI Percentile: _____
 Child BMI z-score: _____

Child Medications:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Appendix B.3: Food Record

Office Use Only
Reference #:
Assessment #:

Child Food Diary

In the following table below, please write down a description of what your child ate and drank in the past 24 hours. In the description, include the time that your child started eating and/or drinking each meal or snack, a complete description of each item that he/she drank, how the food was cooked and prepared, and the amount that he/she ate or drank of each item.

Example: At dinner (6:00 pm), Sally's daughter ate half a hamburger, corn on the cob, a soda, and cookies.

Time	Description of Food/Drink	Preparation	Amount
6:00 pm	½ Hamburger		
	Bun		½ bun
	Ground beef	Grilled	2 oz
	American Cheese		1 slice
	Mayonnaise (regular)		1 tsp
	Lettuce (iceberg)		1 leaf
	Ketchup		1tsp
	Corn on the Cob	Boiled with 1tsp butter	½ ear
	Coke		12 oz
	Oreo Cookies		2

Time	Description of Food	Preparation	Amount

Appendix B.4: NDSR Code Descriptions

Table B.4-1. Description of NDS-R Codes Used to Define Sugar-sweetened Beverages

Food Group	NDS-R Code	Description
Sugar-sweetened Beverages	DMF0200	Ready-to-drink flavored milk, whole
	DMR0200	Ready-to-drink flavored milk, reduced fat
	DML0200	Ready-to-drink flavored milk, low fat and fat free
	DML0300	Sweetened flavored milk beverage powder with non-fat dry milk
	SWT0600	Sweetened flavored milk beverage powder without non-fat dry milk
	BVS0100	Sweetened coffee
	BVS0300	Sweetened fruit drinks
	BVS0400	Sweetened soft drinks
	BVS0500	Sweetened tea
	BVS0600	Sweetened water
	BVS0700	Nondairy-based sweetened meal replacement/supplement

Table B.4-2. Description of NDS-R Codes Used to Whole Fruits

Whole fruits	FRU0300	Citrus fruit
	FRU040	Fruit excluding citrus fruit
	FRU0500	Avocado and similar

Table B.4-3. Description of NDS-R Codes Used to Whole Vegetables

Whole vegetables	VEG0100	Dark green vegetables
	VEG0200	Deep yellow vegetables
	VEG0300	Tomato
	VEG0400	White potatoes
	VEG0450	Other starchy vegetables
	VEG0600	Other vegetables
	VEG0700	Legumes (cooked dried beans)

Appendix B.5: Previous Day Physical Activity Recall (PD-PAR)

Date: _____

Office Use Only
Reference #:
Assessment #:

Child One Day Physical Activity Questionnaire

We want to know about the activities that your child did today. Then we want you to tell us two things about each activity that your child did: how long he/she did it for and how tired it made him/her feel to do the activity. On the next page is a list of activities that many people do throughout the day. Each activity has a number next to it. You will use the number for the activities that your child did, rather than writing out the activity. Then, you will tell us if the activity was a very light, light, medium, or hard activity, based on how tired it made your child feel to do the activity.

A very light activity is something that makes your child feel as tired as he/she feels when he/she does something like read a story. A very light activity doesn't make him/her tired at all.



A light activity is something that makes your child feel as tired as he/she feels when he/she does something like go shopping with you at the market. A light activity makes him/her a little tired.

A medium activity is something that makes your child feel like he/she feels when he/she plays in the park. When your child does a medium activity he/she breathes a little harder and begins to sweat.



And a hard activity is something that makes your child feel like he/she feels when he/she runs or plays organized sports. When your child does a hard activity he/she gets *very* tired, and he/she breathes very hard and sweats a lot.

Date: _____

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ACTIVITY LIST

ACTIVITY	NUMBER
EATING	
Meal	1
Snack	2
Helping parents cook	3
SLEEPING/BATHING	
Sleeping	4
Resting	5
Shower/Bath	6
TRANSPORTATION	
Ride in car/Bus	7
Travel by walking	8
Travel by bike	9
WORK/SCHOOL	
School	10
Homework	11
SPARE TIME	
Household chores/gardening (write description on daily activity list)	12
Watch TV	13
Movies/Concert	14
Listen to music	15
Talk on the phone	16
Hang around	17
Shopping	18

ACTIVITY	NUMBER
Reading	19
Hobby (write description on daily activity list)	20
Other- Spare time (write description on daily activity list)	21
PLAY/RECREATION	
Bicycle (easy pace)	22
Walk (slowly)	23
Dance (for fun)	24
Swim (for fun)	25
Skateboard or rollerblade	26
EXERCISE/WORK-OUT	
Organized sport (slow pace) (e.g. baseball, softball, volleyball)	27
Individual exercise (slow pace) (e.g. bowling, golf)	28
Bicycle (fast)	29
Walk (fast)	30
Jog/run	31
Swim laps	32
Lift weights	33
Aerobic dance, dance class	34
Organized sport (fast pace) (e.g. soccer, football, hockey)	35
Individual exercise (fast pace) (e.g. jumping rope, karate, tennis singles)	36
Other- Play/Exercise (write description on daily activity list)	37

Date: _____

Example

Office Use Only
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At 7:30 am Sally drove her daughter to school so she wrote the number 7 in the very light activity box since it took around 30 minutes. Her daughter would be at school until 3:00 pm, so Sally wrote down the number 10 in the boxes from 8:00 am until 11:30 am and from 12:30 pm until 2:30 pm in the very light activity box. These were the times that Sally's daughter was in class and was sitting down most of the time at a desk. Her daughter had two recesses and a lunch break that day so Sally wrote down the number 1 in the very light activity box and the number 37 in the medium activity box alongside 12:00 noon to indicate the lunch break. It took Sally's daughter the full 30 minutes to eat lunch because she was jumping rope at the same time. Sally circled the number 37 since her daughter spent more energy jumping rope than eating lunch, and jumping rope made her daughter tired and slightly sweaty. She did not record the recesses since these were not 30 minutes each.

In the afternoon Sally picked her daughter up from school and drove her to her dance class. This was not recorded, as it did not take 30 minutes for her to drive to the class. The class lasted for one hour. Sally wrote the number 34 next to 3:30 pm and 4:00 pm and under the box for medium activity. Dancing made her daughter tired and caused her to sweat a little. After this Sally drove home, but did not record this either since it did not take up 30 minutes of time.

They ate dinner at 5:30 pm and then her daughter helped her clear the table. Her daughter then talked on the phone with her Grandmother. None of these activities took 30 minutes so Sally did not write any of them down. At 6:15 pm her daughter sat down to do her homework, which took an hour. Sally wrote down the number 11 next to 6:00 pm and 6:30 pm and under the very light box because it did not make her daughter tired at all. After finishing her homework, Sally's daughter watched TV for an hour and ate popcorn for half the time she was watching TV. Sally wrote down the number 13 next to 7:30 pm and 8:00 pm in the very light activity box. She also wrote the number 2 next to the number 13 in the 8:00 pm block, but she circled the number 13 because watching TV took more of her daughter's attention than eating popcorn. Then her daughter brushed her teeth and got ready for bed. Sally read with her daughter for half an hour so she wrote down the number 19 next to 9:00 pm and under the box for very light activity.

Remember that you don't have to write down things that take less than 30 minutes. For example, Sally's daughter ate breakfast for 20 minutes, got dressed in 10 minutes, and was in the car for 20 minutes on the way home from her dance class. Even though Sally did not write down everything her daughter did during the day, Sally made sure to write all of the things down that took at least 30 minutes.

Date: _____

Instructions

Office Use Only
Reference #:
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- ① Use the number from the list for the activity of your child. If there is something that your child did, and it is not on the list, use the numbers for "Other" (21,37). Whenever codes 21 or 37 are used, a description of the activity should be written next to the number in the time block. You should also remember to write down the description of the activity when using the codes for "Household chores/gardening" (12) and "Hobby" (20).
- ② **Only write the number for the activities that your child did for the last 30 minutes.** If your child starts or finishes an activity between 30 minute blocks, go back to the closest previous 30 minute block and put the number of his/her activity in the row for that time and under the box for how tired that activity made him/her feel. For example, if he/she started an activity at 9:45 and finished it at 10:15, you would put the number of your child's activity in the row for 9:30. If your child did an activity for more than 30 minutes, you would put the number of his/her activity next to each half hour that he/she did the activity. For example, if he/she started an activity at 9:30 and finished it at 11:00, you would put the number for his/her activity next to 9:30, 10:00, and 10:30 because the activity lasted for 1½ hours.
- ③ You do not have to write down all the activities that your child does while at school. Just write down when he/she has lunch, and the activities that he/she does during lunch, while in recess, or in gym class. When you record what your child does in gym class be sure to draw a star next to that number.
- ④ Use the pictures on the top of the page to help you decide if the activity that your child did was "very light," "light," "medium," or "hard" for him/her.
- ⑤ If your child did two activities at one time and they both lasted at least 30 minutes, write both activities in the appropriate box and circle the primary activity (i.e. the one taking the most energy; if they take the same energy then circle the one that takes the most attention).

Time	Very Light 	Light 	Medium 	Hard 
6:00 am				
6:30 am				
7:00 am				
7:30 am				
8:00 am				
8:30 am				
9:00 am				

Date: _____

Office Use Only
Reference #:
Assessment #:

Time	Very Light 	Light 	Medium 	Hard 
9:30 am				
10:00 am				
10:30 am				
11:00 am				
11:30 am				
12:00 noon				
12:30 pm				
1:00 pm				
1:30 pm				
2:00 pm				
2:30 pm				
3:00 pm				
3:30 pm				
4:00 pm				
4:30 pm				
5:00 pm				
5:30 pm				
6:00 pm				
6:30 pm				
7:00 pm				
7:30 pm				
8:00 pm				
8:30 pm				
9:00 pm				
9:30 pm				
10:00 pm				
10:30 pm				
11:00 pm				
11:30 pm				
12:00 midnight				

Appendix B.6: Child Feeding Questionnaire (CFQ)

Official Use Only
Reference #:
Assessment #:

DATE //
M M D D Y Y

Child Feeding Questionnaire

Please indicate your response in the column based on the question or statement.

	never (1)	seldom (2)	sometimes (3)	often (4)	always (5)
When your child is at home, how often are you responsible for feeding her?					
How often are you responsible for deciding what your child's portion sizes are?					
How often are you responsible for deciding if your child has eaten the right kind of foods?					

	markedly underweight (1)	underweight (2)	normal (3)	overweight (4)	markedly overweight (5)
Your childhood (5 to 10-years-old)					
Your adolescence					
Your 20s					
At present					
Your child during the first year of life					
Your child as a toddler					
Your child as a preschooler					

1 of 3

Official Use Only
Reference #:
Assessment #:

	markedly underweight (1)	underweight (2)	normal (3)	overweight (4)	markedly overweight (5)
Your child kindergarten through 2 nd grade					
Your child 3 rd through 5 th grade					

	unconcerned (1)	a little concerned (2)	concerned (3)	fairly concerned (4)	very concerned (5)
How concerned are you about your child eating too much when you're not around her?					
How concerned are you about your child having to diet to maintain a desirable weight?					
How concerned are you about your child becoming overweight?					

	disagree (1)	slightly disagree (2)	neutral (3)	slightly agree (4)	agree (5)
I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries).					
I have to be sure that my child does not eat too many high-fat foods.					
I have to be sure that my child does not eat too much of her favorite foods.					
I intentionally keep some foods out of my child's reach.					
I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior.					
I offer my child her favorite foods in exchange for good behavior.					

2 of 3

Official Use Only
Reference #:
Assessment #:

	disagree (1)	slightly disagree (2)	neutral (3)	slightly agree (4)	agree (5)
If I did not guide or regulate my child's eating, she would eat too many junk foods.					
If I did not guide or regulate my child's eating, she would eat too much of her favorite foods.					

	disagree (1)	slightly disagree (2)	neutral (3)	slightly agree (4)	agree (5)
My child should always eat all of the food on her plate.					
I have to be especially careful to make sure my child eats enough.					
If my child says "I'm not hungry", I try to get her to eat anyway.					
If I did not guide or regulate my child's eating, she would eat much less than she should.					

	never (1)	rarely (2)	sometimes (3)	mostly (4)	always (5)
How much do you keep track of the sweets (candy, ice cream, cake, pastries) that your child eats?					
How much do you keep track of the snack food (potato chips, Doritos, cheese puffs) that your child eats?					
How much do you keep track of the high-fat foods that your child eats?					

Appendix B.7: Child Eating Behavior Questionnaire (CEBQ)

Office Use Only
Reference #:
Assessment #:

Child Eating Behavior Questionnaire (CEBQ)

For each statement mark an "x" in the response column (never, seldom, sometimes, often, or always) that best represents how often your child displays that particular behavior.

	NEVER (0)	SELDOM (1)	SOMETIMES (2)	OFTEN (3)	ALWAYS (4)
1. Even if my child is full up, s/he finds room to eat his/her favorite food	①	①	②	③	④
2. Given the choice, my child would eat most of the time	①	①	②	③	④
3. If allowed to, my child would eat too much	①	①	②	③	④
4. If given the chance, my child would always be having a drink	①	①	②	③	④
5. If given the chance, my child would always have food in his/her mouth	①	①	②	③	④
6. If given the chance, my child would drink continuously throughout the day	①	①	②	③	④
7. My child cannot eat a meal if s/he has had a snack just before	①	①	②	③	④
8. My child decides that s/he doesn't like food, even without tasting it	①	①	②	③	④
9. My child eats less when s/he is angry	①	①	②	③	④
10. My child eats less when s/he is tired	①	①	②	③	④
11. My child eats less when s/he is upset	①	①	②	③	④
12. My child eats more and more slowly during the course of a meal	①	①	②	③	④
13. My child eats more when annoyed	①	①	②	③	④
14. My child eats more when anxious	①	①	②	③	④
15. My child eats more when s/he has nothing else to do.	①	①	②	③	④
16. My child eats more when s/he is happy	①	①	②	③	④

	NEVER (0)	SELDOM (1)	SOMETIMES (2)	OFTEN (3)	ALWAYS (4)
17. My child eats more when worried	①	①	②	③	④
18. My child eats slowly	①	①	②	③	④
19. My child enjoys a wide variety of foods	①	①	②	③	④
20. My child enjoys eating	①	①	②	③	④
21. My child enjoys tasting new foods	①	①	②	③	④
22. My child finishes his/her meal very quickly	①	①	②	③	④
23. My child gets full before his/her meal is finished	①	①	②	③	④
24. My child gets full up easily	①	①	②	③	④
25. My child has a big appetite	①	①	②	③	④
26. My child is always asking for a drink	①	①	②	③	④
27. My child is difficult to please with meals	①	①	②	③	④
28. My child is interested in food	①	①	②	③	④
29. My child is interested in tasting food s/he hasn't tasted before	①	①	②	③	④
30. My child leaves food on his/her plate at the end of a meal	①	①	②	③	④
31. My child looks forward to mealtimes	①	①	②	③	④
32. My child loves food	①	①	②	③	④
33. My child refuses new foods at first	①	①	②	③	④
34. My child's always asking for food	①	①	②	③	④
35. My child takes more than 30 minutes to finish a meal.	①	①	②	③	④

Appendix B.8: Three Factor Eating Questionnaire (TFEQ)

DATE □□/□□/□□
M M D D Y Y

Eating Habits

Please answer true or false to the following statements.

	(1) True	(2) False
1. When I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal.	☐	☐
2. I usually eat too much at social occasions, like parties and picnics.	☐	☐
3. I am usually so hungry that I eat more than three times a day.	☐	☐
4. When I have eaten my quota of calories, I am usually good about not eating any more.	☐	☐
5. Dieting is so hard for me because I just get too hungry.	☐	☐
6. I deliberately take small helpings as a means of controlling my weight.	☐	☐
7. Sometimes things just taste so good that I keep on eating even when I am no longer hungry.	☐	☐
8. Since I am often hungry, I sometimes wish that while I am eating, an expert would tell me that I have had enough or that I can have something more to eat.	☐	☐
9. When I feel anxious, I find myself eating.	☐	☐
10. Life is too short to worry about dieting.	☐	☐
11. Since my weight goes up and down, I have gone on reducing diets more than once.	☐	☐

	True	False
12. I often feel so hungry that I just have to eat something.	☐	☐
13. When I am with someone who is overeating, I usually overeat too.	☐	☐
14. I have a pretty good idea of the number of calories in common food.	☐	☐
15. Sometimes when I start eating, I just can't seem to stop.	☐	☐
16. It is difficult for me to leave something on my plate.	☐	☐
17. At certain times of the day, I get hungry because I have gotten use to eating then.	☐	☐
18. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.	☐	☐
19. Being with someone who is eating often makes me hungry enough to eat also.	☐	☐
20. When I feel blue I often overeat.	☐	☐
21. I enjoy eating too much to spoil it by counting calories or watching my weight.	☐	☐
22. When I see a real delicacy, I often get so hungry that I have to eat it right away.	☐	☐
23. I often stop eating when I am not really full as a conscious means of limiting the amount that I eat.	☐	☐
24. I get so hungry that my stomach seems like a bottomless pit.	☐	☐
25. My weight has hardly changed at all in the last ten years.	☐	☐

	True	False
26. I am always hungry so it is hard for me to stop eating before I finish the food on my plate.	☐	☐
27. When I feel lonely, I console myself by eating.	☐	☐
28. I consciously hold back at meals in order not to gain weight.	☐	☐
29. I sometimes get very hungry late in the evening or at night.	☐	☐
30. I eat anything I want, any time I want.	☐	☐
31. Without even thinking about it, I take a long time to eat.	☐	☐
32. I count calories as a conscious means of controlling my weight.	☐	☐
33. I do not eat some foods because they make me fat.	☐	☐
34. I am always hungry enough to eat at any time.	☐	☐
35. I pay a great deal of attention to changes in my figure.	☐	☐
36. While on a diet, if I eat a food that is not allowed, I often then splurge and eat other high calorie foods.	☐	☐

Please answer the following questions with one of the responses that is appropriate for you.

37) How often are you dieting in a conscious effort to control your weight?

- ☐ (1) Rarely
- ☐ (2) Sometimes
- ☐ (3) Usually
- ☐ (4) Always

38) Would a weight fluctuation of 5 lbs affect the way you live your life?

- ☐ (1) Not at all
- ☐ (2) Slightly
- ☐ (3) Moderately
- ☐ (4) Very Much

- 39) How often do you feel hungry?
- ☐ (1) Only at meal times
 - ☐ (2) Sometimes between meals
 - ☐ (3) Often between meals
 - ☐ (4) Almost always
- 40) Do your feelings of guilt about overeating help you to control your food intake?
- ☐ (1) Never
 - ☐ (2) Rarely
 - ☐ (3) Often
 - ☐ (4) Always
- 41) How difficult would it be for you to stop eating halfway through dinner and not eat for the next four hours?
- ☐ (1) Easy
 - ☐ (2) Slightly difficult
 - ☐ (3) Moderately difficult
 - ☐ (4) Very difficult
- 42) How conscious are you of what you are eating?
- ☐ (1) Not at all
 - ☐ (2) Slightly
 - ☐ (3) Moderately
 - ☐ (4) Extremely
- 43) How frequently do you avoid “stocking up” on tempting foods?
- ☐ (1) Almost never
 - ☐ (2) Seldom
 - ☐ (3) Usually
 - ☐ (4) Almost always
- 44) How likely are you to shop for low calorie foods?
- ☐ (1) Unlikely
 - ☐ (2) Slightly unlikely
 - ☐ (3) Moderately likely
 - ☐ (4) Very likely
- 45) Do you eat sensibly in front of others and splurge alone?
- ☐ (1) Never
 - ☐ (2) Rarely
 - ☐ (3) Often
 - ☐ (4) Always

- 46) How likely are you to consciously eat slowly in order to cut down on how much you eat?
- ☐ (1) Unlikely
 - ☐ (2) Slightly unlikely
 - ☐ (3) Moderately likely
 - ☐ (4) Very likely
- 47) How frequently do you skip dessert because you are no longer hungry?
- ☐ (1) Almost never
 - ☐ (2) Seldom
 - ☐ (3) At least once a week
 - ☐ (4) Almost every day
- 48) How likely are you to consciously eat less than you want?
- ☐ (1) Unlikely
 - ☐ (2) Slightly unlikely
 - ☐ (3) Moderately likely
 - ☐ (4) Very likely
- 49) Do you go on eating binges though you are not hungry?
- ☐ (1) Never
 - ☐ (2) Rarely
 - ☐ (3) Sometimes
 - ☐ (4) At least once a week
- 50) On a scale from 0-5, where 0 means no restraint in eating (eating whatever you want, whenever you want) and 5 means total restraint (constantly limiting food intake and never “giving in”), what number would you give yourself?
- ☐ (0) – eat whatever you want, whenever you want
 - ☐ (1) – usually eat whatever you want, whenever you want
 - ☐ (2) – often eat whatever you want, whenever you want
 - ☐ (3) – often limit food intake, but often “give in”
 - ☐ (4) – usually limit food intake, rarely “give in”
 - ☐ (5) – constantly limiting foods intake, never “giving in”
- 51) To what extent does the statement describe your eating behavior? “I start dieting in the morning, but because of any number of things that happen during the day, by evening I have given up and eat what I want, promising myself to start dieting again tomorrow.”
- ☐ (1) Not like me
 - ☐ (2) Little like me
 - ☐ (3) Pretty good description of me
 - ☐ (4) Describes me perfectly

Appendix B.9: Parenting Styles and Dimensions Questionnaire (PSDQ)

Office Use Only
Reference #:
Assessment #:

Parenting Styles and Dimensions Questionnaire (PSDQ)

Instructions: The following pages contain a list of behaviors that parents may exhibit when interacting with their children. The questions are designed to measure how often you exhibit certain behaviors toward your child(ren).

Use the following scale to respond to each statement:

- 1 = never
- 2 = once in a while
- 3 = about half the time
- 4 = very often
- 5 = always

- ___ 1. I encourage our child to talk about the child's troubles.
- ___ 2. I guide our child by punishment more than by reason.
- ___ 3. I know the name of our child's friends.
- ___ 4. I find it difficult to discipline our child.
- ___ 5. I give praise when our child is good.
- ___ 6. I spank when our child is disobedient.
- ___ 7. I joke and play with our child.
- ___ 8. I withhold scolding and/or criticism even when our child acts contrary to our wishes.
- ___ 9. I show sympathy when our child is hurt or frustrated.
- ___ 10. I punish by taking privileges away from our child with little if any explanations.
- ___ 11. I spoil our child.
- ___ 12. I give comfort and understanding when our child is upset.
- ___ 13. I yell or shout when our child misbehaves.
- ___ 14. I am easy going or relaxed with our child.
- ___ 15. I allow our child to annoy someone else.
- ___ 16. I tell child our expectations regarding behavior before the child engages in an activity.
- ___ 17. I scold and criticize to make our child improve.
- ___ 18. I show patience with our child.
- ___ 19. I grab our child when being disobedient.
- ___ 20. I state punishments to our child and do not actually do them.

Use the following scale to respond to each statement:

1 = never

2 = once in a while

3 = about half the time

4 = very often

5 = always

- ___ 21. I am responsive to our child's feelings or needs.
- ___ 22. I allow our child to give input into family rules.
- ___ 23. I argue with our child.
- ___ 24. I appear confident about parenting abilities.
- ___ 25. I give our child reasons why rules should be obeyed.
- ___ 26. I appear to be more concerned with own feelings than with our child's feelings.
- ___ 27. I tell our child that we appreciate what the child tries or accomplishes.
- ___ 28. I punish by putting our child off somewhere along with little if any explanations.
- ___ 29. I help our child to understand the impact of behavior by encouraging our child to talk about the consequences of own actions.
- ___ 30. I am afraid that disciplining our child for misbehavior will cause the child to not like his/her parents.
- ___ 31. I take our child's desires into account before asking the child to do something.
- ___ 32. I explode in anger toward our child.
- ___ 33. I am aware of problems or concerns about our child in school.
- ___ 34. I threaten our child with punishment more often than actually giving it.
- ___ 35. I express affection by hugging, kissing, and holding our child.
- ___ 36. I ignore our child's misbehaviors.
- ___ 37. I use physical punishment as a way of disciplining our child.
- ___ 38. I carry out discipline after our child misbehaves.
- ___ 39. I apologize to our child when making a mistake parenting.
- ___ 40. I tell our child what to do.
- ___ 41. I give in to our child when the child causes a commotion about something.
- ___ 42. I talk it over and reason with our child when the child misbehaves.
- ___ 43. I slap our child when the child misbehaves.
- ___ 44. I disagree with our child.

Office Use Only
Reference #:
Assessment #:

Use the following scale to respond to each statement:

- 1 = never
- 2 = once in a while
- 3 = about half the time
- 4 = very often
- 5 = always

- ___ 45. I allow our child to interrupt others.
- ___ 46. I have warm and intimate times together with our child.
- ___ 47. When two children are fighting, I discipline children first and ask questions later.
- ___ 48. I encourage our child to freely express him/herself even when disagreeing with parents.
- ___ 49. I bribe our child with rewards to bring about compliance.
- ___ 50. I scold or criticize when our child's behavior doesn't meet our expectations.
- ___ 51. I show respect for our child's opinions by encouraging our child to express them.
- ___ 52. I set strict, well-established rules for our child.
- ___ 53. I explain to our child how we feel about the child's good and bad behavior.
- ___ 54. I use threats as punishment with little or no justification.
- ___ 55. I take into account our child's preferences in making plans for the family.
- ___ 56. When our child asks why he or she has to conform I state: because I said so, or I am your parent and I want you to.
- ___ 57. I appear unsure of how to solve our child's misbehavior.
- ___ 58. I explain the consequences of the child's behavior.
- ___ 59. I demand that our child do things.
- ___ 60. I channel our child's misbehavior into a more acceptable activity.
- ___ 61. I shove our child when the child is disobedient.
- ___ 62. I emphasize the reason for rules.

Appendix B.10: Parent Motivation Questionnaire (PMI)

Office Use Only
Reference #:
Assessment #:
Date:

Parent Motivation Inventory

All caretakers who participate in Growing Healthy are different; however, everyone involved in Growing Healthy has shown an interest in the treatment of their child's eating and leisure-time behaviors. To understand the differences among caretakers please indicate how much do you agree with each of the following statements related to your participation in Growing Healthy.

Thank you.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My child's eating and leisure-time behaviors have to improve soon.	1	2	3	4	5
2. I am willing to work on changing my own eating and leisure time behaviors as it related to managing my child.	1	2	3	4	5
3. It is very important for the well-being of my family that my child changes his eating and leisure-time behaviors.	1	2	3	4	5
4. I am prepared to come to Growing Healthy every month in order to change my child's eating and leisure-time behaviors.	1	2	3	4	5
5. Although the main problem is with my child's eating and leisure-time behaviors, I believe I should come to Growing Healthy every month.	1	2	3	4	5
6. It is very important for the well-being of my child that he/she changes his/her eating and leisure-time behaviors.	1	2	3	4	5
7. I am willing to change my current parenting techniques and try new ones.	1	2	3	4	5
8. I think the benefits of this Growing Healthy will be greater than the costs (i.e., travel, time, effort).	1	2	3	4	5
9. I would like my child's eating and leisure-time behaviors to change.	1	2	3	4	5
10. I am willing to try parenting techniques even if I think they might not work.	1	2	3	4	5
11. I want to be involved in my child's treatment at this point in time.	1	2	3	4	5

12. My child will experience many negative outcomes in life if his/her eating and physical activity behaviors does not change.	1	2	3	4	5
13. I am motivated to practice the techniques I will learn in session at home with my child.	1	2	3	4	5
14. I believe that my child's eating and leisure-time behaviors cannot change without my involvement in Growing Healthy.	1	2	3	4	5
15. My family will experience many negative outcomes in life if my child's eating and leisure-time behavior does not change.	1	2	3	4	5
16. I am eager to participate in Growing Healthy.	1	2	3	4	5
17. I believe that changing my own eating and leisure-time behaviors can cause my child's behavior to change.	1	2	3	4	5
18. I want my child's eating and leisure-time behaviors to improve.	1	2	3	4	5
19. I am motivated to change the way I reward and punish my child if it will lead to improvement.	1	2	3	4	5
20. I believe that I can learn to change my child's eating and leisure-time behaviors.	1	2	3	4	5
21. I am motivated to participate in my child's treatment each month.	1	2	3	4	5
22. Participation in Growing Healthy is a top priority in my schedule and that of my child.	1	2	3	4	5
23. I believe that I am capable of learning the skills needed to change my child's eating and leisure-time behaviors.	1	2	3	4	5
24. I look forward to learning new techniques for managing my child's eating and leisure-time behaviors.	1	2	3	4	5
25. I am motivated to work with the researcher each month in order to change my own eating and leisure-time behaviors.	1	2	3	4	5

Appendix B.11: Barriers to Treatment Participation Scale (BTPS)

ID _____
(office use)

Barriers to Treatment Participation Scale (Parent)

Date: _____

DIRECTIONS

Coming to Growing Healthy is often difficult because of the many demands on parents and families such as school, work, and other activities. It is important to understand different factors and how they affected your participation and attendance in Growing Healthy. Please answer the items below which will be used to help us make Growing Healthy better. As you answer the questions, please think about your own situation only and things that you felt about coming to Growing Healthy. (All answers are completely confidential.)

Below are common problems that come up in treatment. For each one, place an “X” for the answer that applies to you.

Never a
problem

Once in a
while

Sometimes a
problem

Often a
problem

Very often a
problem

Please turn the page and mark your answers.

Please rate the extent to which various problems applied to you and were related to coming to Growing Healthy.

1. My child refused to come to the sessions

<u>Never a problem</u>	<u>Once in a while</u>	<u>Sometimes a problem</u>	<u>Often a problem</u>	<u>Very often a problem</u>
----------------------------	----------------------------	--------------------------------	----------------------------	---------------------------------

2. Transportation (getting a ride, driving, taking a bus) to the my child's primary care office for a session

<u>Never a problem</u>	<u>Once in a while</u>	<u>Sometimes a problem</u>	<u>Often a problem</u>	<u>Very often a problem</u>
----------------------------	----------------------------	--------------------------------	----------------------------	---------------------------------

3. My child was in other activities (such as sports, boy/girl scouts, and other afterschool functions) that made it hard to come to a session

<u>Never a problem</u>	<u>Once in a while</u>	<u>Sometimes a problem</u>	<u>Often a problem</u>	<u>Very often a problem</u>
----------------------------	----------------------------	--------------------------------	----------------------------	---------------------------------

4. Scheduling of appointment times for Growing Healthy

<u>Never a problem</u>	<u>Once in a while</u>	<u>Sometimes a problem</u>	<u>Often a problem</u>	<u>Very often a problem</u>
----------------------------	----------------------------	--------------------------------	----------------------------	---------------------------------

5. Growing Healthy lasted too long (too many months)

<u>Not too long</u>	<u>Lasted a little too long</u>	<u>Lasted too long</u>	<u>Lasted much too long</u>	<u>Lasted very much too long</u>
-------------------------	-------------------------------------	----------------------------	---------------------------------	--------------------------------------

6. Growing Healthy was in conflict with another of my activities (such as job, friends, classes)

<u>Never</u>	<u>Once in a while</u>	<u>Sometimes</u>	<u>Often</u>	<u>Very often</u>
--------------	----------------------------	------------------	--------------	-------------------

7. Growing Healthy did not seem necessary

<u>Needed very much</u>	<u>Needed quite a bit</u>	<u>Needed</u>	<u>Needed a little bit</u>	<u><u>Not</u> needed for my child</u>
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8. I did not like the interventionist

<u>Liked a lot</u>	<u>Liked</u>	<u>Liked a little</u>	<u>Did not like very much</u>	<u>Did not like at all</u>
------------------------	--------------	-----------------------	-----------------------------------	--------------------------------

11. Growing Healthy was not what I expected

<u>Just like</u> I expected	<u>Mostly what</u> I expected	<u>Sort of what</u> I expected	<u>A little of what</u> I expected	<u>Not at all what</u> I expected
--------------------------------	----------------------------------	-----------------------------------	---------------------------------------	--------------------------------------

12. Information in the session and handouts seemed confusing

<u>Not confusing</u> at all	<u>A little</u> confusing	<u>Somewhat</u> confusing	<u>Often</u> confusing	<u>Very often</u> confusing
--------------------------------	------------------------------	------------------------------	---------------------------	--------------------------------

13. My child had trouble understanding Growing Healthy

<u>No trouble</u> understanding	<u>Had a little</u> trouble	<u>Sometimes</u> had trouble	<u>I had</u> trouble	<u>Had a lot</u> of trouble
------------------------------------	--------------------------------	---------------------------------	-------------------------	--------------------------------

14. During the course of Growing Healthy I experienced a lot of stress in my life

<u>No stress during</u> Growing Healthy	<u>A little</u> bit of stress	<u>Some</u> stress	<u>Moderate</u> stress	<u>A lot</u> of stress
---	----------------------------------	-----------------------	---------------------------	---------------------------

15. I lost interest in coming to sessions for Growing Healthy

<u>No I didn't lose</u> interest at all	<u>Yes, a little</u>	<u>Yes, I lost a</u> moderate amount	<u>Lost most</u> of my interest	<u>I lost all of</u> my interest in coming
--	----------------------	--	------------------------------------	--

16. I was sick on the day when Growing Healthy was scheduled

<u>Never a</u> problem	<u>Once in a</u> while	<u>Sometimes a</u> problem	<u>Often a</u> problem	<u>Very often a</u> problem
---------------------------	---------------------------	-------------------------------	---------------------------	--------------------------------

17. My child was sick on the day when Growing Healthy was scheduled

<u>Never a</u> problem	<u>Once in a</u> while	<u>Sometimes a</u> problem	<u>Often a</u> problem	<u>Very often a</u> problem
---------------------------	---------------------------	-------------------------------	---------------------------	--------------------------------

18. Crises at home made it hard for me to get to a session

<u>Never a</u> problem	<u>Once in a</u> while	<u>Sometimes a</u> problem	<u>Often a</u> problem	<u>Very often a</u> problem
---------------------------	---------------------------	-------------------------------	---------------------------	--------------------------------

19. I felt I had to give too much personal information to the interventionist

<u>Interventionist</u> was very supportive	<u>Supportive most</u> of the time	<u>Supportive</u>	<u>Sometimes</u> supportive	<u>Interventionist</u> was <u>never</u> supportive
--	---------------------------------------	-------------------	--------------------------------	--

20. Growing Healthy added another stressor to my life

<u>No added stress</u>	<u>Little added</u> stress	<u>Moderate added</u> stress	<u>Good deal</u> added	<u>Great deal</u> added
------------------------	-------------------------------	---------------------------------	---------------------------	----------------------------

21. I felt Growing Healthy did not seem as important as the sessions continued

<u>As</u> important	<u>A little less</u> important	<u>Less</u> important	<u>No longer as</u> important	<u>Not important at</u> all
------------------------	-----------------------------------	--------------------------	----------------------------------	--------------------------------

22. I felt Growing Healthy was more work than expected

<u>Not more work</u>	<u>A little more</u> work	<u>More than</u> expected	<u>Quite a bit more</u>	<u>Very much</u> more
----------------------	------------------------------	------------------------------	-------------------------	--------------------------

23. The atmosphere at the primary care office makes it uncomfortable for appointments

<u>Atmosphere is</u> fine	<u>Little</u> uncomfortable	<u>Uncomfortable</u>	<u>Uncomfortable</u> quite a bit	<u>Very</u> <u>uncomfortable</u>
------------------------------	--------------------------------	----------------------	-------------------------------------	-------------------------------------

24. I did not feel that I had enough to say about what goes on in Growing Healthy

<u>Not a</u> problem	<u>A slight</u> problem	<u>A problem</u>	<u>A big</u> problem	<u>A very big</u> problem
-------------------------	----------------------------	------------------	-------------------------	------------------------------

25. I feel Growing Healthy did not focus on my life and eating and leisure-time activity problems

Related to my problems	A little related	Not really related	Unrelated	Very <u>un</u> related
------------------------	------------------	--------------------	-----------	------------------------

26. The interventionist did not seem confident that Growing Healthy would work for my child

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
-----------------	-----------------	---------------------	-----------------	----------------------

27. The interventionist did not seem confident in my ability to carry out the goals of Growing Healthy

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
-----------------	-----------------	---------------------	-----------------	----------------------

28. My child now has new or different eating and leisure-time activity problems

No new problems	A few new problems	Some new problems	Quite a few new problems	Many new problems
-----------------	--------------------	-------------------	--------------------------	-------------------

29. My child's eating and leisure-time behavior seems to have improved, therefore, Growing Healthy no longer seems necessary

Child has improved a lot	Child has improved	Improved a little	Not improved a lot	Child has <u>not</u> improved at all
--------------------------	--------------------	-------------------	--------------------	--------------------------------------

30. Growing Healthy did not seem to be working

Growing Healthy helped a lot	Growing Healthy helped most of the time	Helped a little	Hardly ever helped	Growing Healthy did not help at all
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31. There was bad weather and this made coming to Growing Healthy a problem

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
-----------------	-----------------	---------------------	-----------------	----------------------

32. I do not feel the interventionist supported me or my efforts

Interventionist was very supportive	Supportive most of the time	Supportive	Sometimes supportive	Interventionist was <u>never</u> supportive
-------------------------------------	-----------------------------	------------	----------------------	---

33. The assigned work for me to do as part of Growing Healthy was much too difficult

Never too difficult	Sometimes too difficult	Too difficult on average	Often too difficult	Very often too difficult
------------------------	----------------------------	-----------------------------	------------------------	-----------------------------

34. I did not have time for the assigned tasks

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
--------------------	--------------------	------------------------	--------------------	-------------------------

35. My child was never home to do the assigned tasks

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
--------------------	--------------------	------------------------	--------------------	-------------------------

36. There was always someone sick in my home

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
--------------------	--------------------	------------------------	--------------------	-------------------------

38. Getting a baby-sitter so I could come to the sessions

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
--------------------	--------------------	------------------------	--------------------	-------------------------

39. Finding a place to park at the primary care office

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
--------------------	--------------------	------------------------	--------------------	-------------------------

40. I had a disagreement with my husband, boyfriend, or partner about whether we should come to Growing Healthy at all

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
--------------------	--------------------	------------------------	--------------------	-------------------------

41. I was too tired after work to come to a session

Never a problem	Once in a while	Sometimes a problem	Often a problem	Very often a problem
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42. My job got in the way of coming to a session

☐ Never a problem	☐ Once in a while	☐ Sometimes a problem	☐ Often a problem	☐ Very often a problem
--	--	--	--	---

43. Growing Healthy took time away from spending time with my children

☐ Never a problem	☐ Once in a while	☐ Sometimes a problem	☐ Often a problem	☐ Very often a problem
--	--	--	--	---

44. I had trouble with other children at home which made it hard to come to Growing Healthy

☐ Never a problem	☐ Once in a while	☐ Sometimes a problem	☐ Often a problem	☐ Very often a problem
--	--	--	--	---

Below are a few situations which make it difficult for some families to come to Growing Healthy. For each one, check all of the answers that apply.

45. I moved to another house or apartment during the time my child was in Growing Healthy

☐ Yes	☐ No
------------------------------	-----------------------------

47. I moved too far away from my child's primary care office to come to Growing Healthy sessions (out of the area)

☐ Yes	☐ No
------------------------------	-----------------------------

48. My family changed in size (another baby or someone moved in or out of the home)

☐ Yes	☐ No
------------------------------	-----------------------------

49. I lost my job or had a change in income

☐ Yes	☐ No
------------------------------	-----------------------------

50. I got a job or changed jobs

☐ Yes	☐ No
------------------------------	-----------------------------

51. There was an alcohol or drug problem in my family

☐ Yes	☐ No
------------------------------	-----------------------------

52. There was physical or sexual abuse in my family

☐ Yes ☐ No

53. A close friend or relative got very sick or died during Growing Healthy

☐ Yes ☐ No

54. My child moved out of the home

☐ Yes ☐ No

55. My child was put into an inpatient program or residential program

☐ Yes ☐ No

56. I had legal problems (arrest, driving violations, etc.)

☐ Yes ☐ No

57. My child changed schools during Growing Healthy

☐ Yes ☐ No

58. I got separated or divorced

☐ Yes ☐ No

Comments About Coming to Growing Healthy

Thank you for completing this form

Appendix B.12: Evaluations Questionnaires for Each Condition

Office Use Only
Reference #:
Assessment #:

Growing Healthy Caretaker Evaluation

We want to learn your thoughts about the value of the Growing Health Program and how you recommend that it is improved. Please answer each of the following questions. Thank you for your time!

Question 1. Please circle the number that best describes you. For example, "1" means "strongly disagree," "3" means neither disagree/or agree," and "5" means "strongly agree."

1. How useful was the Growing Healthy program?

	Strongly Disagree (1)	Disagree (2)	Neither Disagree/or Agree (3)	Agree (4)	Strongly Agree (5)
a) Growing Healthy provided me with important information about my child's health.	1	2	3	4	5
b) The information provided to me by Growing Healthy was easy to understand.	1	2	3	4	5

Questions 2-5. Please complete each of the following questions about your experiences during Growing Healthy by blackening either "yes" or "no." Then, if you answer "yes," please write-in your answer to the question.

2. Did you receive additional nutrition-related health services or health professionals after joining Growing Healthy for your child?

① No ② Yes → What or who did you seek out? _____

How often did you have contact with the health service or health professional? _____

3. Did you receive additional physical activity-related health services or health professionals after joining Growing Healthy for your child?

① No ② Yes → What or who did you seek out? _____

How often did you have contact with the health service or health professional? _____

Office Use Only
Reference #:
Assessment #:

4. Not counting visits to your child's primary care office related to Growing Healthy, did you visit your child's pediatrician in the last 6 months?

① No

② Yes

How many times did you have contact with your child's pediatrician in the last 6 months? _____

At how many of these visits was your child weighed? _____

At these visits what type of information did the pediatrician provide you with related to nutrition or physical activity? _____

5. Did your child have his or her growth monitored (height and weight) by a medical professional other than your child's pediatrician or at school during the last 6 months?

① No

② Yes

How many times did your child have his or her growth monitored in the past 6 months (not as part of Growing Healthy)? _____

Questions 6-8. Please tell us what you think about the Growing Healthy program by writing in your answer to each question. For question 9, please rate the Growing Healthy program.

6. What did you like most about the Growing Healthy program?

7. What did you like least about the Growing Healthy program?

8. What would you change/improve in the Growing Healthy program?

Office Use Only
Reference #:
Assessment #:

9. Overall, how would you rate the Growing Healthy program?

- ① Poor ② Fair ③ Good ④ Very Good ⑤ Excellent

Comments:

Office Use Only
Reference #:
Assessment #:

Growing Healthy Caretaker Evaluation

We want to learn your thoughts about the value of the Growing Health Program and how you recommend that it is improved. Please answer each of the following questions. Thank you for your time!

Question 1. Please circle the number that best describes you. For example, "1" means "strongly disagree," "3" means neither disagree/or agree," and "5" means "strongly agree."

1. How useful was the Growing Healthy program?

	Strongly Disagree (1)	Disagree (2)	Neither Disagree/or Agree (3)	Agree (4)	Strongly Agree (5)
a) Growing Healthy provided me with important information about my child's health.	1	2	3	4	5
b) The information provided to me by Growing Healthy was easy to understand.	1	2	3	4	5

Questions 2. Please circle the number that best describes how working toward the goals of Growing Healthy was for you and your child. For example, "1" means "not at all easy," "3" means "easy," and "5" means "extremely easy."

2. How easy was it for you to work toward the Growing Healthy goals of:

	Not at All Easy (1)	Slightly Easy (2)	Easy (3)	Very Easy (4)	Extremely Easy (5)
a) Monitoring your child's <u>height</u> monthly	1	2	3	4	5
b) Monitoring your child's <u>weight</u> monthly	1	2	3	4	5
c) Using the BMI wheel to find out your child's <u>BMI</u> monthly	1	2	3	4	5
d) Plotting your child's <u>BMI-for-age</u> monthly	1	2	3	4	5

Office Use Only
Reference #:
Assessment #:

Questions 3-6. Please complete each of the following questions about your experiences during Growing Healthy by blackening either “yes” or “no.” Then, if you answer “yes,” please write-in your answer to the question.

3. Did you receive additional nutrition-related health services or health professionals after joining Growing Healthy for your child?

① No

② Yes

What or who did you seek out? _____

How often did you have contact with the health service or health professional? _____

4. Did you receive additional physical activity-related health services or health professionals after joining Growing Healthy for your child?

① No

② Yes

What or who did you seek out? _____

How often did you have contact with the health service or health professional? _____

5. Not counting visits to your child’s primary care office related to Growing Healthy, did you visit your child’s pediatrician in the last 6 months?

① No

② Yes

How many times did you have contact with your child’s pediatrician in the last 6 months? _____

At how many of these visits was your child weighed? _____

At these visits what type of information did the pediatrician provide you with related to nutrition or physical activity? _____

Office Use Only
Reference #:
Assessment #:

6. Did your child have his or her growth monitored (height and weight) by a medical professional other than your child's pediatrician or at school during the last 6 months?

① No

② Yes



How many times did your child have his or her growth monitored in the past 6 months (not as part of Growing Healthy)? _____

Questions 7-9. Please tell us what you think about the Growing Healthy program by writing in your answer to each question. For question 10, please rate the Growing Healthy program.

7. What did you like most about the Growing Healthy program?

8. What did you like least about the Growing Healthy program?

9. What would you change/improve in the Growing Healthy program?

10. Overall, how would you rate the Growing Healthy program?

① Poor

② Fair

③ Good

④ Very Good

⑤ Excellent

Comments:

Office Use Only
Reference #:
Assessment #:

Growing Healthy Caretaker Evaluation

We want to learn your thoughts about the value of the Growing Health Program and how you recommend that it is improved. Please answer each of the following questions. Thank you for your time!

Question 1. Please circle the number that best describes you. For example, "1" means "strongly disagree," "3" means neither disagree/or agree," and "5" means "strongly agree."

1. How useful was the Growing Healthy program?

	Strongly Disagree (1)	Disagree (2)	Neither Disagree/or Agree (3)	Agree (4)	Strongly Agree (5)
a) Growing Healthy provided me with important information about my child's health.	1	2	3	4	5
b) The information provided to me by Growing Healthy was easy to understand.	1	2	3	4	5

Questions 2-3. Please circle the number that best describes how working toward the goals of Growing Healthy was for you and your child. For example, "1" means "not at all easy," "3" means "easy," and "5" means "extremely easy."

2. How easy was it for you to work toward the Growing Healthy goals of:

	Not at All Easy (1)	Slightly Easy (2)	Easy (3)	Very Easy (4)	Extremely Easy (5)
a) Monitoring your child's <u>height</u> monthly	1	2	3	4	5
b) Monitoring your child's <u>weight</u> monthly	1	2	3	4	5
c) Using the BMI wheel to find out your child's <u>BMI</u> monthly	1	2	3	4	5
d) Plotting your child's <u>BMI-for-age</u> monthly	1	2	3	4	5
e) Increasing your physical activity	1	2	3	4	5
f) Decreasing your television viewing time	1	2	3	4	5
g) Increasing your fruit and vegetable intake	1	2	3	4	5
h) Decreasing your sweetened beverage intake	1	2	3	4	5

3. How easy was it for your child to work toward the Growing Healthy goals of:

	Not at All Easy (1)	Slightly Easy (2)	Easy (3)	Very Easy (4)	Extremely Easy (5)
a) Increasing his or her physical activity	1	2	3	4	5
b) Decreasing his or her television viewing time	1	2	3	4	5
c) Increasing his or her fruit and vegetable intake	1	2	3	4	5
d) Decreasing his or her sweetened beverage intake	1	2	3	4	5

Office Use Only
Reference #:
Assessment #:

Question 4. Please circle the number that best describes the usefulness of the Growing Healthy goals. For example, "1" means "not at all useful," and "6" means "did not try."

4. How useful were the following things to help your child meet the Growing Healthy goals?

	Not at All Useful (1)	Slightly Useful (2)	Useful (3)	Very Useful (4)	Extremely Useful (5)	Did not try (6)
a) Daily meetings with your child about Growing Healthy	1	2	3	4	5	6
b) Recording physical activity time with your child	1	2	3	4	5	6
c) Recording television viewing time with your child	1	2	3	4	5	6
d) Recording fruit and vegetable intake with your child	1	2	3	4	5	6
e) Recording sweetened drink intake with your child	1	2	3	4	5	6
f) Modeling being more physically active	1	2	3	4	5	6
g) Modeling watching less television	1	2	3	4	5	6
h) Modeling eating fruits and vegetables	1	2	3	4	5	6
i) Modeling drinking fewer sweetened drinks	1	2	3	4	5	6
j) Keeping reminders for physical activity visible	1	2	3	4	5	6
k) Removing reminders that encouraged TV watching	1	2	3	4	5	6
l) Keeping fruits and vegetables in the house	1	2	3	4	5	6
m) Keeping sweetened drinks out of the house	1	2	3	4	5	6
n) Praising your child for meeting goals	1	2	3	4	5	6

Office Use Only
Reference #:
Assessment #:

Question 5. Please circle the number that best describes how often you did the following tasks as part of Growing Healthy. For example, "1" means "never," "3" means "3-4 times per week" and "5" means "everyday."

5. Over the past month (on average) how often did you:

	Never (1)	1-2 Times per week (2)	3-4 Times per week (3)	5-6 Time per Week (4)	Everyday (5)
a) Have daily meetings with your child about Growing Healthy	1	2	3	4	5
b) Record physical activity time with your child	1	2	3	4	5
c) Record television viewing time with your child	1	2	3	4	5
d) Record fruit and vegetable intake with your child	1	2	3	4	5
e) Record sweetened drink intake with your child	1	2	3	4	5
f) Model being more physically active	1	2	3	4	5
g) Model watching less television	1	2	3	4	5
h) Model eating fruits and vegetables	1	2	3	4	5
i) Model drinking fewer sweetened drinks	1	2	3	4	5
j) Keep reminders for physical activity visible	1	2	3	4	5
k) Remove reminders that encouraged TV watching	1	2	3	4	5
l) Keep fruits and vegetables in the house	1	2	3	4	5
m) Keep sweetened drinks out of the house	1	2	3	4	5
n) Praise your child for meeting goals	1	2	3	4	5

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Reference #:
Assessment #:

Questions 6-9. Please complete each of the following questions about your experiences during Growing Healthy by blackening either "yes" or "no." Then, if you answer "yes," please write-in your answer to the question.

6. Did you receive additional nutrition-related health services or health professionals after joining Growing Healthy for your child?

① No

② Yes

What or who did you seek out? _____

How often did you have contact with the health service or health professional? _____

7. Did you receive additional physical activity-related health services or health professionals after joining Growing Healthy for your child?

① No

② Yes

What or who did you seek out? _____

How often did you have contact with the health service or health professional? _____

8. Not counting visits to your child's primary care office related to Growing Healthy, did you visit your child's pediatrician in the last 6 months?

① No

② Yes

How many times did you have contact with your child's pediatrician in the last 6 months? _____

At how many of these visits was your child weighed? _____

At these visits what type of information did the pediatrician provide you with related to nutrition or physical activity? _____

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Assessment #:

9. Did your child have his or her growth monitored (height and weight) by a medical professional other than your child's pediatrician or at school during the last 6 months?

① No

② Yes

→ How many times did your child have his or her growth monitored in the past 6 months (not as part of Growing Healthy)? _____

Questions 10-12. Please tell us what you think about the Growing Healthy program by writing in your answer to each question. For question 13, please rate the Growing Healthy program.

10. What did you like most about the Growing Healthy program?

11. What did you like least about the Growing Healthy program?

12. What would you change/improve in the Growing Healthy program?

13. Overall, how would you rate the Growing Healthy program?

① Poor

② Fair

③ Good

④ Very Good

⑤ Excellent

Comments:

Appendix C

Table C-1. Demographic Characteristics of Children at Baseline

	N n = 8	N+GM n = 7	N+GM+BC n = 7	p-value
Age, yrs (M ± SD)	7.3 ± 1.8	8.6 ± 1.8	8.2 ± 1.8	ns
Sex (% female)	37.5%	85.7%	85.7%	ns
Race (%)				
Asian	0.0%	0.0%	14.3%	ns
Black or African American	12.5%	0.0%	0.0%	ns
White	62.5%	85.7%	71.4%	ns
Two or more races	25.0%	14.3%	14.3%	ns
Ethnicity (%)				
Hispanic or Latino	0.0%	14.3%	14.3%	ns
Weight Status (% obese ^a)	62.5%	100%	100%	p<0.05

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; ^a obese is defined as ≥ 95th percentile for BMI-for-age

Table C-2. Demographic Characteristics of Caretakers at Baseline

	N n = 8	N+GM n = 7	N+GM+BC n = 7	p-value
Age, yrs (M±SD)	35.4 ± 5.9	42.1 ± 12.8	39.3 ± 3.1	ns
Sex (% female)	100%	85.7%	71.4%	ns
Relationship to child (%)				ns
Mother	100%	57.1%	71.4%	
Father	0.0%	14.3%	28.6%	
Grandparent	0.0%	28.6%	0.0%	
Race (%)				ns
American Indian or Alaskan Native	0.0%	14.3%	0.0%	
Black or African American	12.5%	0.0%	0.0%	
White	75.0%	85.7%	100%	
Two or more races	12.5%	0.0%	0.0%	
Ethnicity (%)				ns
Hispanic or Latino	0.0%	0.0%	14.3%	
Education (%)				ns
High school	0.0%	14.3%	14.3%	
Vocational training	0.0%	28.6%	0.0%	
Some college (less than 4 years)	37.5%	14.3%	57.1%	
College/university degree	62.5%	28.6%	14.3%	
Graduate/professional education	0.0%	14.3%	14.3%	
Income (%)				ns
Under \$10,000	12.5%	0.0%	14.3%	
\$20,000-29,999	0.0%	14.3%	0.0%	
\$30,000-39,999	25.0%	14.3%	28.6%	
\$40,000-49,999	12.5%	14.3%	0.0%	
\$50,000-74,999	25.0%	14.3%	28.6%	
\$75,000-99,999	0.0%	28.6%	14.3%	
\$100,000-150,000	0.0%	14.3%	14.3%	
Marital status (%)				ns
Married	25.0%	85.7%	85.7%	
Separated/divorced	50.0%	0.0%	14.3%	
Widowed	0.0%	14.3%	0.0%	
Never married	12.5%	0.0%	0.0%	
Weight Status (%)				ns
Normal weight (BMI 18.5 to 24.9 kg/m ²)	25%	0.0%	0.0%	
Overweight (BMI 25.0 to 29.9 kg/m ²)	25%	42.9%	28.6%	
Obese (BM I≥30kg/m ²)	50%	57.1%	71.4%	

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; $M \pm SD$ = mean $\pm$ standard deviation; ns = not significant; BMI = body mass index

Table C-3. Anthropometric Characteristics of Children by Condition at Baseline and 6 Months (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Height (inches)				ns	p < 0.001	ns
Baseline	51.47 ± 4.71	54.43 ± 5.78	53.50 ± 5.12			
6 Months	52.88 ± 5.07	55.78 ± 5.88	54.86 ± 5.08			
Weight (lbs.)				ns	p=0.001	ns
Baseline	97.0 ± 38.2	120.0 ± 31.4	120.2 ± 40.5			
6 Months	101.3 ± 38.7	126.3 ± 34.5	127.1 ± 46.6			
BMI percentile				ns	ns	ns
Baseline	96.1 ± 3.0%	98.3 ± 1.0%	98.4 ± 1.13%			
6 Months	96.6 ± 2.8%	98.1 ± 0.9%	97.1 ± 3.7%			
z-BMI				ns	p=0.036	ns
Baseline	2.21 ± 0.66	2.39 ± 0.34	2.45 ± 0.36			
6 Months	2.14 ± 0.54	2.31 ± 0.26	2.29 ± 0.55			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; BMI = body mass index; M ± SD = mean ± standard deviation; ns = not significant; baseline values were carried forward for missing data at 6 months

Table C-4. Anthropometric Characteristics of Caretakers by Condition at Baseline and 6 Months (M $\pm$ SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Height (inches)						
Baseline	64.06 $\pm$ 2.81	65.78 $\pm$ 4.88	65.62 $\pm$ 3.83	ns	n/a	n/a
6 Months	n/a	n/a	n/a			
Weight (lbs.)						
Baseline	179.9 $\pm$ 42.2	215.8 $\pm$ 73.2	220.0 $\pm$ 54.2	ns	ns	ns
6 Months	182.1 $\pm$ 45.7	212.6 $\pm$ 66.4	218.3 $\pm$ 56.0			
BMI (kg/m²)						
Baseline	30.9 $\pm$ 7.0	34.2 $\pm$ 6.5	35.6 $\pm$ 6.9	ns	ns	ns
6 Months	31.2 $\pm$ 7.6	33.7 $\pm$ 5.7	35.3 $\pm$ 7.1			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; BMI = body mass index; M $\pm$ SD = mean $\pm$ standard deviation; n/a = not applicable; ns = not significant; baseline values were carried forward for missing data at 6 months

Table C-5. Estimated Average of Total Program Cost per Participant if Delivered by Various Medical Professions (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	p-value
Registered Dietitian	\$15.43 ± 0.00 ^a	\$82.56 ± 5.24 ^b	\$132.39 ± 9.99 ^c	p < 0.001
Health Educator	\$15.43 ± 0.00 ^a	\$79.06 ± 4.52 ^b	\$125.07 ± 8.55 ^c	p < 0.001
Medical Assistant	\$15.43 ± 0.00 ^a	\$71.05 ± 2.92 ^b	\$108.32 ± 5.25 ^c	p < 0.001
Licensed Practicing Nurse	\$15.43 ± 0.00 ^a	\$76.50 ± 4.00 ^b	\$119.71 ± 7.49 ^c	p < 0.001
Registered Nurse	\$15.43 ± 0.00 ^a	\$87.95 ± 6.35 ^b	\$143.68 ± 12.23 ^c	p < 0.001
Physician	\$15.43 ± 0.00 ^a	\$135.92 ± 16.39 ^b	\$244.04 ± 32.14 ^c	p < 0.001

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; superscripts different from each other are significant between conditions

Table C-6. Average of Total Program Cost per Participant per 0.1 Change in Average z-BMI by Condition if Delivered by Various Medical Professions (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	p-value
Registered Dietitian	\$20.36 ± 0.69 ^a	\$99.71 ± 6.32 ^b	\$84.65 ± 6.39 ^c	p < 0.001
Health Educator	\$20.36 ± 0.69 ^a	\$95.48 ± 5.46 ^b	\$79.97 ± 5.46 ^c	p < 0.001
Medical Assistant	\$20.36 ± 0.69 ^a	\$85.81 ± 3.53 ^b	\$69.26 ± 3.35 ^c	p < 0.001
Licensed Practicing Nurse	\$20.36 ± 0.69 ^a	\$92.39 ± 4.83 ^b	\$76.54 ± 4.79 ^c	p < 0.001
Registered Nurse	\$20.36 ± 0.69 ^a	\$106.22 ± 7.67 ^b	\$91.87 ± 7.82 ^c	p < 0.001
Physician	\$20.36 ± 0.69 ^a	\$164.16 ± 19.80 ^b	\$156.04 ± 20.55 ^b	p < 0.001

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; superscript different from each other are significant between conditions

Table C-7. Daily Dietary Intake of Children by Condition at Baseline and 6 Months (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
FVs (servings)				ns	ns	ns
Baseline	3.2 ± 2.2	3.2 ± 1.5	2.1 ± 1.0			
6 Months	3.4 ± 1.5	2.5 ± 1.5	2.9 ± 1.6			
SSB (servings)				ns	p=0.017	ns
Baseline	1.9 ± 0.9	1.4 ± 0.7	1.7 ± 1.1			
6 Months	1.6 ± 1.7	0.7 ± 0.6	0.8 ± 1.3			
Energy (kcal)				ns	ns	ns
Baseline	1891.9 ± 936.9	1703.9 ± 534.9	1760.5 ± 518.8			
6 Months	1689.7 ± 265.0	1450.8 ± 253.2	1761.0 ± 583.4			
%kcal of fat				ns	ns	ns
Baseline	30.2 ± 8.4	32.2 ± 4.8	34.6 ± 4.1			
6 Months	31.5 ± 6.7	30.1 ± 4.8	35.8 ± 4.6			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; FVs = servings of fruits and vegetables; SSBs = servings of sugar-sweetened beverages; kcal = kilocalories; M ± SD = mean ± standard deviation; ns = not significant; baseline values were carried forward for missing data at 6 months

Table C-8. Daily Leisure Time Behaviors of Children by Condition at Baseline and 6 Months (M $\pm$ SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
%MVPA				ns	ns	ns
Baseline	9.5 $\pm$ 7.1	9.4 $\pm$ 3.6	11.2 $\pm$ 1.5			
6 Months	14.4 $\pm$ 8.0	13.1 $\pm$ 5.8	14.2 $\pm$ 10.3			
TV time (hrs/day)				ns	ns	ns
Baseline	2.2 $\pm$ 1.8	2.2 $\pm$ 1.2	1.0 $\pm$ 0.5			
6 Months	1.9 $\pm$ 1.0	2.5 $\pm$ 2.7	1.4 $\pm$ 0.7			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; MVPA = moderate to vigorous physical activity; hrs = hours; M $\pm$ SD = mean $\pm$ standard deviation; ns = not significant; baseline values were carried forward for missing data at 6 months

Table C-9. Parent Feeding Behaviors by Condition at Baseline and 6 Months (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Perceived responsibility				ns	ns	ns
Baseline	4.5 ± 0.5	4.3 ± 0.5	4.0 ± 0.3			
6 Months	4.2 ± 0.4	4.2 ± 0.6	4.1 ± 0.7			
Perceived parent weight				ns	ns	ns
Baseline	3.6 ± 0.5	3.7 ± 0.6	3.6 ± 0.6			
6 Months	3.6 ± 0.5	3.6 ± 0.5	3.6 ± 0.6			
Perceived child weight				ns	ns	ns
Baseline	3.4 ± 0.5	3.1 ± 0.4	3.1 ± 0.4			
6 Months	3.5 ± 0.6	3.0 ± 0.8	3.2 ± 0.4			
Concerns for child weight				ns	ns	ns
Baseline	3.8 ± 1.3	3.9 ± 0.7	4.0 ± 0.6			
6 Months	3.9 ± 0.9	3.8 ± 0.3	4.0 ± 0.7			
Restriction				ns	ns	ns
Baseline	4.1 ± 0.6	3.8 ± 0.5	3.7 ± 0.9			
6 Months	3.8 ± 0.5	3.7 ± 0.7	3.8 ± 0.7			
Pressure to eat				ns	ns	ns
Baseline	3.5 ± 0.5	3.1 ± 0.2	3.2 ± 0.7			
6 Months	3.3 ± 0.6	2.9 ± 0.7	2.9 ± 0.7			
Monitoring				ns	ns	ns
Baseline	2.6 ± 0.7	2.3 ± 0.5	2.4 ± 0.9			
6 Months	2.4 ± 0.7	2.3 ± 0.4	2.3 ± 0.3			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; higher numbers indicate greater values on each factor; baseline values were carried forward for missing data at 6 months

Table C-10. Parent Reported Child Eating Styles by Condition at Baseline and 6 Months as Measured by the Child Eating Behavior Questionnaire (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Food responsiveness				ns	ns	ns
Baseline	17.8 ± 5.4	16.7 ± 3.0	17.6 ± 4.0			
6 Months	17.5 ± 5.2	15.7 ± 5.5	15.4 ± 5.2			
Enjoyment of food				ns	ns	ns
Baseline	15.6 ± 4.1	15.3 ± 1.8	17.0 ± 3.0			
6 Months	15.0 ± 3.7	15.0 ± 2.0	17.0 ± 2.9			
Emotional overeating				ns	ns	ns
Baseline	9.3 ± 3.9	10.0 ± 1.6	10.4 ± 4.5			
6 Months	8.8 ± 4.0	9.4 ± 1.8	11.1 ± 4.2			
Desire to drink				ns	ns	ns
Baseline	8.0 ± 2.5	6.7 ± 1.4	9.1 ± 3.5			
6 Months	7.5 ± 2.0	6.6 ± 1.6	7.6 ± 3.6			
Satiety responsiveness				ns	ns	ns
Baseline	11.0 ± 3.7	11.4 ± 2.9	11.6 ± 2.1			
6 Months	12.1 ± 3.6	11.9 ± 2.5	12.3 ± 3.6			
Slowness in eating				ns	ns	ns
Baseline	9.5 ± 2.3	8.3 ± 2.6	7.9 ± 2.7			
6 Months	9.5 ± 3.5	8.6 ± 1.4	10.1 ± 3.5			
Emotional undereating				ns	ns	ns
Baseline	8.6 ± 2.6	11.3 ± 2.8	9.7 ± 1.5			
6 Months	9.3 ± 3.5	10.6 ± 3.7	10.0 ± 2.1			
Fussiness				ns	p=0.001	ns
Baseline	18.1 ± 6.8	17.1 ± 5.5	16.7 ± 6.8			
6 Months	16.9 ± 6.8	15.7 ± 4.8	13.3 ± 6.0			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; higher numbers indicate greater values on each factor; baseline values were carried forward for missing data at 6 months

Table C-11. Parent Eating Styles by Condition at Baseline and 6 Months as Measured by the Three Factor Eating Questionnaire (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Hunger				ns	ns	ns
Baseline	18.4 ± 2.3	17.7 ± 2.1	18.3 ± 2.7			
6 Months	19.3 ± 2.5	18.0 ± 2.8	18.6 ± 2.2			
Restraint				ns	ns	ns
Baseline	23.5 ± 1.8	24.1 ± 4.0	23.3 ± 2.6			
6 Months	23.9 ± 2.2	23.9 ± 2.4	24.4 ± 2.4			
Disinhibition				ns	ns	ns
Baseline	20.5 ± 2.6	21.0 ± 3.7	19.9 ± 3.1			
6 Months	22.0 ± 2.7	20.6 ± 3.6	20.9 ± 3.2			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; higher numbers indicate greater values on each factor; baseline values were carried forward for missing data at 6 months

Table C-12. Parenting Styles by Condition at Baseline and 6 Months (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Authoritative				ns	ns	ns
Baseline	109.6 ± 14.6	104.7 ± 8.8	105.4 ± 12.2			
6 Months	109.0 ± 15.9	104.6 ± 10.3	109.9 ± 11.3			
Authoritarian				ns	ns	ns
Baseline	36.4 ± 8.1	37.6 ± 6.5	41.3 ± 9.7			
6 Months	36.4 ± 6.8	35.9 ± 9.6	40.0 ± 5.7			
Permissive				ns	ns	ns
Baseline	28.8 ± 6.5	28.9 ± 4.3	32.1 ± 11.6			
6 Months	26.6 ± 8.6	27.7 ± 3.5	32.9 ± 12.1			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; higher numbers indicate greater values on each factor; baseline values were carried forward for missing data at 6 months

Table C-13. Parent Motivation by Condition at Baseline and 6 Months (M ± SD)

	N n = 8	N+GM n = 7	N+GM+BC n = 7	condition	time	condition x time
Desire				ns	p=0.026	ns
Baseline	29.6 ± 4.0	30.1 ± 2.3	31.6 ± 2.1			
6 Months	27.1 ± 5.8	27.7 ± 3.4	29.9 ± 3.9			
Readiness				ns	p=0.001	ns
Baseline	64.9 ± 6.3	61.4 ± 6.8	65.0 ± 4.9			
6 Months	60.1 ± 9.8	57.1 ± 6.6	63.0 ± 5.4			
Ability				ns	ns	ns
Baseline	17.0 ± 3.2	17.4 ± 1.1	17.6 ± 1.5			
6 Months	16.3 ± 2.5	16.1 ± 1.3	18.0 ± 2.0			

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; higher numbers indicate greater values on each factor; baseline values were carried forward for missing data at 6 months

Table C-14. Barriers to Treatment by Condition at 6 Months (M ± SD)

	N n = 7	N+GM n = 7	N+GM+BC n = 6	condition
Competing activities/life stressors	24.7 ± 2.7	28.3 ± 5.1	28.3 ± 6.1	ns
Relevance of treatment	15.4 ± 6.3	14.3 ± 4.6	10.3 ± 2.3	ns
Relationship to interventionist	5.4 ± 1.1	5.4 ± 0.8	5.3 ± 0.5	ns
Treatment issues (logistics)	9.3 ± 2.1	9.9 ± 2.7	9.5 ± 1.4	ns
Critical events	13.4 ± 0.5	13.3 ± 0.5	14.3 ± 2.0	ns

N = Newsletter Condition; N+GM = Newsletter and Growth Monitoring Condition; N+GM+BC = Newsletter and Growth Monitoring plus Behavioral Counseling Condition; M ± SD = mean ± standard deviation; ns = not significant; higher numbers indicate greater values on each factor

Table C-15. Ease of Working toward Dietary and Leisure-time Activity Goals for Child and Caretaker in the N+GM+BC Condition (n=6)

	Not at all easy/ Slightly Easy	Easy	Very Easy/ Extremely Easy
Caretaker increasing PA	50.0%	33.3%	16.7%
Caretaker decreasing TV time	16.7%	50.0%	33.4%
Caretaker increasing FVs	33.3%	33.3%	33.4%
Caretaker decreasing SSBs	0.0%	33.3%	66.7%
Child increasing PA	16.7%	50.0%	33.4%
Child decreasing TV time	33.3%	33.3%	33.4%
Child increasing FVs	16.7%	66.7%	16.7%
Child decreasing SSBs	0.0%	16.7%	83.4%

PA = physical activity; TV = television time; FVs = fruits and vegetables; SSBs = sugar-sweetened beverages

Table C-16. Caretaker Reported Usefulness of Behavioral Strategies to Assist the Child in the N+GM+BC Condition (n=6) Reach Dietary and Leisure-time Activity Goals

	Not at all Useful/ Slightly Useful	Useful	Very Useful/ Extremely Useful	Did not Try
Daily meetings	0.0%	66.7%	16.7%	16.7%
Self-monitoring PA	0.0%	50.0%	50.0%	0.0%
Self-monitoring TV	0.0%	66.7%	33.4%	0.0%
Self-monitoring FVs	0.0%	33.3%	66.6%	0.0%
Self-monitoring SSBs	16.7%	16.7%	66.6%	0.0%
Modeling PA	33.3%	33.3%	33.4%	0.0%
Modeling less TV	33.3%	33.3%	33.4%	0.0%
Modeling eating FVs	16.7%	33.3%	50.0%	0.0%
Modeling drinking fewer SSBs	50.0%	0.0%	50.0%	0.0%
Adding cues for PA	33.3%	33.3%	16.7%	16.7%
Removing cues for TV	33.3%	16.7%	16.7%	33.3%
Keeping FVs in the house	16.7%	0.0%	83.4%	0.0%
Removing SSBs from the house	16.7%	0.0%	83.4%	0.0%
Praising for meeting goals	0.0%	0.0%	100%	0.0%

PA = physical activity; TV = television time; FVs = fruits and vegetables; SSBs = sugar-sweetened beverages

Table C-17. Caretaker Reported Frequency of Using Behavioral Strategies in the N+GM+BC Condition (n=6)

	≤2 Times per Week	3-4 Times per Week	5-7 Times per Week
Held daily meetings	83.3%	0.0%	16.7%
Self-monitored PA with child	66.7%	16.7%	16.7%
Self-monitored TV with child	66.7%	16.7%	16.7%
Self-monitored FVs with child	66.7%	16.7%	16.7%
Self-monitored SSBs with child	50.0%	33.3%	16.7%
Modeled PA	33.3%	33.3%	33.4%
Modeled watching less TV	16.7%	16.7%	66.6%
Modeled eating FVs	16.7%	16.7%	66.6%
Modeled drinking fewer SSBs	0.0%	0.0%	100%
Added cues for PA	33.4%	16.7%	50.0%
Removed cues for TV	50.0%	0.0%	50.0%
Kept FVs in the house	0.0%	0.0%	100%
Removed SSBs from the house	16.7%	0.0%	73.3%
Praised child for meeting goals	0.0%	16.7%	73.3%

PA = physical activity; TV = television time; FVs = fruits and vegetables; SSBs = sugar-sweetened beverages

Vita

Shannon Looney grew up in Old Lyme, Connecticut, a small town on the shoreline. She is the daughter of Michael and Mary Looney, and sister to Ben and Ryan. In Old Lyme, Shannon began school at Lad and Lassie Nursery School and graduated in 2003 from Lyme-Old Lyme High School. She began her career in Nutrition and Dietetics at the University of Delaware in Newark. Upon receiving her Bachelors of Science in Nutritional Sciences and Dietetics she attended the University of Tennessee, Knoxville. Here she received her Registered Dietitian credential and Masters of Public Health prior to her Doctorate of Philosophy in Nutrition Science. For five of her six years at the University of Tennessee, Shannon was a funded Maternal and Child Health Trainee.