

EVALUATION OF A CHILDREN'S MEDICAL SERVICES PROGRAM  
FOR OVERWEIGHT CHILDREN AND ADOLESCENTS WITH HYPERINSULINEMIA  
AND TYPE II DIABETES

By

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To Daniel Manry

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# TABLE OF CONTENTS

	<u>page</u>
ACKNOWLEDGEMENTS.....	4
LIST OF TABLES.....	8
LIST OF FIGURES.....	9
ABSTRACT.....	10
CHAPTER	
1 INTRODUCTION.....	12
Overweight Prevalence.....	13
Definition of Overweight.....	14
Risk Factors for Overweight.....	15
Environmental.....	15
Behavioral.....	16
Personal.....	16
Overweight Costs and Implications.....	17
Public Health Policy and Program Interventions.....	18
Children's Medical Services and Program.....	21
Significance of the Study.....	23
2 LITERATURE REVIEW.....	26
Theoretical Perspective of CMS Program.....	26
Major Concepts of Social Cognitive Theory.....	27
Reciprocal Determinism.....	28
Behavioral Capability.....	29
Expectations.....	30
Self Efficacy.....	31
Observational Learning.....	32
Reinforcement.....	34
Summary.....	44
3 METHOD.....	61
Study Aims.....	61
Specific Aim #1.....	61
Specific Aim#2.....	61
Specific Aim #3.....	62
Sample and Sample Size.....	62
Inclusion Criteria.....	62
Exclusion Criteria.....	62

Recruitment .....	63
Procedure .....	64
Part #1: Repeated Measures Retrospective Chart Review .....	64
Part #2: Post-Program Interviews.....	64
Part #3: In-Class Observation.....	64
Human Subjects.....	65
Confidentiality and Legal Minority.....	65
Possible Discomforts and Risks .....	66
Possible Benefits .....	66
Description of Quantitative Analyses: Chart Review.....	66
Descriptive Statistics .....	66
Repeated Measures ANOVA .....	66
General Linear Mixed Model.....	68
Description of Qualitative Analyses: Interviews and In-Class Observations.....	70
Summary.....	72
4 QUANTITATIVE RESULTS .....	73
Chart Review Findings .....	73
Descriptive Analyses.....	73
Repeated Measures ANOVA .....	74
General Linear Mixed Model.....	74
5 QUALITATIVE RESULTS .....	80
Post-Program Interview Findings.....	80
Why Did You Attend the Program?.....	81
What Was the Program Like for You?.....	82
What Did You Like Most about the Program?.....	83
What Did You Like Least About the Program?.....	85
What Do You Suggest For Program Improvement? .....	87
Would You Recommend the Program to Others?.....	88
What Are Your Post-Program Behavioral Changes?.....	89
What Are Your Post-Program Physical Changes?.....	92
What Are the Challenges to Behavioral Changes?.....	93
In-Class Observation Findings .....	96
Session Attendance.....	96
Exercise Activity .....	97
Snack Activity .....	100
Educational Activity.....	102
Theoretical Learning Concepts Used in the Program.....	106
Reciprocal Determinism.....	107
Behavioral Capability.....	108
Expectations and Self-Efficacy .....	109
Observational Learning .....	110
Reinforcement .....	111
Summary.....	111

6	DISCUSSION.....	114
	Discussion of Quantitative Findings.....	115
	Discussion of Qualitative Findings.....	119
	Positive Post-Program Behavior Change .....	119
	Reluctance To Change Post-Program Behaviors .....	120
	Impediments to Engaging Youths .....	121
	Program Service Deficiencies .....	123
	Additional Parent Concerns.....	124
	Implications for Health Policy and Future Research.....	124
	Summary.....	131
APPENDIX		
A	CMS PROGRAM CURRICULUM .....	133
B	INTERVIEW GUIDE.....	143
C	HIPAA IDENTIFYING FACTORS.....	145
D	CHART DATA COLLECTION FORM.....	147
	LIST OF REFERENCES .....	148
	BIOGRAPHICAL SKETCH .....	159

## LIST OF TABLES

<u>Table</u>	<u>page</u>
1-1 Prevalence of overweight among children and adolescents ages 6-19 years: For selected years 1963-65 through 1999-2002.....	25
2-1 Major Learning Concepts in Social Cognitive Theory.....	46
2-2 The Evaluation of Learning Concepts Social Cognitive Theory in Literature.....	47
2-3 Abbreviated Version Table: Outpatient Secondary- and Tertiary-Level Nutrition and Exercise Programs.....	48
2-4 In-Depth Version Table: Outpatient Secondary- and Tertiary-Level Programs.....	50
4-1 Repeated measures ANOVA for BMI using 26 subjects: Within- and between-subjects effects.....	77
4-2 General mixed linear model effects for BMI using 59 subjects.....	77
4-3 General linear model effects for Hb A1c using 59 subjects.....	77

## LIST OF FIGURES

<u>Figure</u>	<u>page</u>
4-1 Chart Review: BMI (BMI1) measurements over 12 months. ....	78
4-2 Chart Review: Hb A1c (A1c1) measurements over 12 months. ....	79

Abstract of Dissertation Presented to the Graduate School  
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EVALUATION OF A CHILDREN'S MEDICAL SERVICES PROGRAM  
FOR OVERWEIGHT CHILDREN AND ADOLESCENTS WITH HYPERINSULINEMIA OR  
TYPE II DIABETES

By

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The tripling of overweight rates among youths in the last 30 years (National Center for Health Statistics, 2005) has engendered a variety of public policy strategies. One such strategy is behavior intervention programs involving diet and exercise behavior modification. In 2002, Tallahassee Children's Medical Services (CMS) implemented a behavior intervention program. Youths, diagnosed with either hyperinsulinemia or type II diabetes, and their parents, were targeted. The purpose of this study was to evaluate the effectiveness of the CMS program by using a three-part, mixed method design.

The evaluation included: 1) a repeated measures retrospective chart review; 2) participant interviews; and 3) in-class observations. Convenience sampling was used. The chart review compared the body mass index (BMI) and the glycosylated hemoglobin (Hb A1c) of the youths at approximately three and six-months before program participation; the first day of the program; and approximately three and six -months after program participation. A qualitative component involved interviewing 11 youths and parents, and observing four class sessions.

Youths' ages ranged from 7 to 18 years ( $M = 13$ ,  $SD = 2.68$ ). A repeated measures ANOVA analysis revealed that BMI measures increased over time ( $df 4$ ;  $F = 4.95$ ;  $P < 0.05$ ). The

findings were then confirmed using a mixed general linear model. In addition, the mixed general linear model revealed that Hb A1c decreased over time ( $df$  4;  $F = 2.80$ ;  $P < 0.05$ ).

All youths and parents reported post-program nutrition and exercise behavioral changes. Five main themes emerged from the interview data and field notes. First, all youths and parents reported positive post-program nutrition and exercise behavior changes. Second, parents reported that the youths were reluctant to change post-program health behaviors. The last three themes revealed areas that the CMS program can use to improve curriculum methodology: 1) the presence of impediments to engaging youths; 2) the existence of program service deficiencies; and 3) additional parent concerns that went beyond the priorities of the program.

While positive health outcomes are the goal of any behavior intervention program, health outcomes are not the sole measure of a success. Positive changes in behavior such as exercise and nutrition are necessary prerequisites to positive health outcomes and, therefore, a valid measure of success toward positive health outcomes. Qualitative findings in this study suggest that the CMS program achieved positive changes in exercise and nutrition that may potentially endure after the conclusion of the program. As the CMS program improves and is further validated, it may be revised and replicated in programs that target similar populations.

## CHAPTER 1 INTRODUCTION

Today more children and adolescents are overweight and presenting with related medical symptoms. National overweight rates among children and adolescents have tripled since 1980 (National Center for Health Statistics (NCHS), 2000).

Tallahassee Children's Medical Services (CMS) is a Florida Title V Program for children with special health care needs. Children with special health care needs are those children under age 21 whose serious or chronic physical, developmental, behavioral or emotional conditions require extensive preventive and maintenance care beyond that required by typically healthy children (Maternal and Child Health Bureau (MCHB), 2006).

In 2002, CMS implemented a nutrition and exercise behavior intervention plan for overweight youths, ages 7 to 18 years old, with type II diabetes or hyperinsulinemia, a precursor to type II diabetes. Nutrition and exercise behavior modification is based on learning concepts of Social Cognitive Theory (Bandura, 1986). Behavior modification is directed at improving the weight, body mass index (BMI), and glycosylated hemoglobin (Hb A1c) of CMS youths.

This study focused on evaluating a program (CMS) for children with special health care needs that are attributable to being overweight or at-risk-for-overweight. The evaluation utilized a mixed-method approach that included both a quantitative and qualitative analysis with three specific aims.

The first aim was to carry out a repeated measures, retrospective chart review comparing CMS program youths' biological measurements of BMI and Hb A1c at approximately three and six-months before program participation; the first day of the program; and approximately three and six-months after program participation. Statistical analysis of the data was intended to reveal changes in BMI and Hb A1c over time.

The second aim was to carry out post-program interviews among youths and parents using an interview guide. Thematic analysis of the data gathered aimed to elucidate salient strengths and weaknesses of the program not measured by the quantitative data.

The third aim was to observe and take field notes during the in-class program sessions. Thematic analysis was intended to enable me to take full account of the interactions between the participants and their potential effects in the social setting of the program.

This chapter provides an overview of: 1) overweight prevalence; 2) a definition of overweight; 3) risk factors for overweight; 4) overweight costs and implications; 5) public health policy and program interventions; 6) CMS services and program; and 7) the significance of the study.

### **Overweight Prevalence**

According to the National Center for Health Statistics (NCHS, 2005), the incidence of overweight in children and adolescents nearly tripled from 1980 to 2000. An estimated 16% of children ages 6 to 12, and adolescents, ages 12 to 19, are overweight<sup>1</sup> (Table 1-1) (NCHS, 2005). Changes in weight are tracked as part of physical examinations given to a sample of the non-institutionalized U.S. population in the National Health and Nutrition Examination Survey (NHANES). The 1999-2000 NHANES estimates suggest that overweight in affected youth has not leveled off or decreased but is increasing to even higher levels (NCHS, 2000).

The data for affected youths is significant for the general population. Children and adolescents who are overweight are at greater risk of becoming overweight and obese adults (He & Karlberg, 1999). Probability charts, based on childhood BMI, predict adult overweight or obesity (He & Karlberg, 1999). About 50% of overweight adolescents with a BMI at or above

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<sup>1</sup> For youths younger than 20 years, overweight is defined as BMI at or above the 85th percentile, meaning that 85% of the population weighs less. Obese is defined as BMI at or above the 95th percentile (NCHS, 2004).

the 95th percentile become obese adults (Dietz, 1998). Approximately 65% of U.S. adults are now obese (NCHS, 2000).

### **Definition of Overweight**

Definitions of "overweight" and "at-risk-for-overweight" (at risk) are based on body mass index (BMI). BMI is a measure of body fat that is calculated by dividing an individual's weight in kilograms by the square of his or her height in meters (National Institute of Health (NIH), 1998).

Ideally, BMI for youths is interpreted by reference to the Age- and Sex-Specific Growth Charts for children ages two to 20 years published by the Centers for Disease Control (CDC, 2005). The CDC chart takes into account changes in percentages of body fat among children and adolescents as they grow. For instance, such changes occur: 1) from ages four to six years, during the occurrence of growth spurts; and 2) during adolescence, when BMI increases secondary to pubertal development (Dietz, 1998). Based on the CDC chart, the proposed study defines the term "overweight" for the study group as BMI at or above the 95th percentile and defines the term "at-risk-for-overweight" as BMI between the 85th and 95th percentiles (at risk) (NCHS, 2000). The following examples elucidate the significance of using age- and gender-specific growth charts. For example, as a boy grows, his BMI changes, yet he remains at the 95<sup>th</sup> percentile BMI-for-age. At age 2, if his BMI is 19.3, he is at the 95<sup>th</sup> percentile. At age 4, if his BMI is 17.8, he is still at the 95<sup>th</sup> percentile. At age 9 years, if his BMI is 21.0 he is at the 95<sup>th</sup> percentile. At age 13, if his BMI is 25.1, he is at the 95<sup>th</sup> percentile. The boy's BMI declines during his preschool years and increases as he gets older (medicinenet.com, 2007).

Additionally, gender differences in fat mass and fat distribution have been found to be obvious in children ages 5 to 7 years of age (Mast, Körtzinger, König and Müller, 1997). For example, Mast et. al (1997) found boys to have increased body weights ( $P<0.05$ ), body mass

indexes (BMI's) ( $P<0.001$ ) and waist/hip ratios (WHRs) ( $P<0.001$ ), and girls to have the % fat mass (as assessed by anthropometric measures such as bioelectrical impedance analysis) (BIA) ( $P<0.05$ ), to be increased.

### **Risk Factors for Overweight**

Excessive weight gain may begin at any age for a variety of reasons (Stark, Atkins, Wolff, & Douglas, 1981). Overweight may be explained by several factors: 1) environmental, 2) behavioral, and 3) personal.

#### **Environmental**

Youths exposed to certain environmental factors are more likely to be overweight. For example, youths are more likely to be overweight and at risk if they live in low-socioeconomic households, (Alaimo, Olson, & Frongillo, 2001), have obese or sedentary parents, or experience parental maltreatment (Johnson, Cohen, Kasen, & Brook, 2002).

Although children from low socioeconomic backgrounds have a greater incidence of overweight, the prevalence of special health needs does not vary substantially based solely on income. The percentage of children with special health needs is approximately 13.6% for children living in poverty and for children living in families with family incomes four times the poverty level or more. Poverty guidelines vary by family size. During 2001, the poverty guideline for a family of four was \$17,650 (MCHB, 2006).

Other environmental factors associated with being overweight and at risk include the heavy marketing of fast-food outlets and micronutrient-poor foods and beverages (World Health Organization (WHO), 2003). Another environmental factor, breastfeeding, is a probable protective etiological factor for being overweight or at-risk-of-overweight (WHO, 2003).

## **Behavioral**

Certain behaviors are also associated with being overweight. These behaviors include watching television for more than two hours a day (Dowda, Ainsworth, Addy, Saunders, & Riner, 2001), maintaining a sedentary lifestyle, consuming high intake of energy-dense, micronutrient-poor foods, or exhibiting either depression or eating disorders (Barlow & Dietz, 1998).

## **Personal**

Personal factors include having certain endocrine disorders that predispose an individual to overweight (Dallas, & Foley, 1996; Leinung & Zimmerman, 1994). Genetics not associated with syndromes may also relate to being overweight. For example, identical twins have similar adiposity, irrespective of the environment in which they are raised (Loos & Bouchard, 2003).

Children with special health needs are vulnerable to factors that place other children at nutritional risk, but also may be susceptible to a myriad of additional biological, environmental, and psychosocial variables. These additional factors may further jeopardize their nutritional status and pose barriers to their development.

A greater proportion of ethnic minority children experience special health needs, and children with special health needs are at a greater risk of overweight. More children with special health needs are Native American/Alaska Native children, multiracial, and non-Hispanic White children. Approximately 14.2% of Hispanic White children, 13% of non-Hispanic Black children, 8.6% of Hispanic children, and 4.4 percent of non-Hispanic Asian children have special health needs (MCHB, 2006).

Whatever the contributing factors to overweight are, being overweight poses serious health risks. Overweight-related health conditions significantly increase the need for health care and the costs required for such care.

## Overweight Costs and Implications

U.S. overweight-associated hospitalizations among children and adolescents have tripled since 1979 (Wang & Dietz, 2002), and cost estimates for medical problems related to overweight have reached 92.6 billion dollars (Finkelstein, Fiebelkorn, & Wang, 2003).

According to Dietz (1998 and 2004), immediate and long-range health complications of being overweight include hyperinsulinemia and type II diabetes (Dietz, 1998), orthopedic disorders (Dietz, Gross, & Kirkpatrick, 1982), sleep apnea (Silvestri et al., 1993), and cardiovascular disease including hypertension and hyperlipidemia (Freedman, Dietz, Srinivasan, & Berenson, 1999). Psychosocial consequences include discrimination, isolation, stigma, and low self-esteem (Richardson, Goodman, Hastorf, & Dornbusch, 1961; Stunkard, & Burt, 1967; Eisenberg, Neumark-Sztainer, & Story, 2003).

Type II diabetes may cause coronary and peripheral vascular disease, nephropathy, retinopathy, and neuropathy (Hardy, Harrell, & Bell, 2004). Similar health risks are associated with individuals who have hyperinsulinemia, or impaired glucose tolerance, a condition marked by higher than normal plasma insulin and glucose levels that are too low to be considered diagnostic for diabetes (Raskin et al., 1994).

While previous research findings suggest that Hb A1c values improve *with* weight loss of about 10 lb or five percent of body weight (Wing, Marcus, Epstein, & Salata, 1987), other research findings suggest that elevated Hb A1c values may improve *without* weight loss but from increasing activity alone (American Diabetes Association (ADA), 2006).

Lifestyle modifications to improve diet and exercise continue to represent the cornerstone of therapy for hyperinsulinemia and type II diabetes (ADA, 2006). Dietetic and exercise programs often target Hb A1c values because Hb A1c values greater than 6.5 to 7.0 represents poor glucose control and lead to poor health outcomes (Barclay and Vega, 2006).

Many federal health agencies and private organizations have issued public health guidelines for reducing overweight and overweight health risks. The federal health and private organizational guidelines focus primarily on environment and individual behavioral change (Nestle & Jacobson, 2000).

### **Public Health Policy and Program Interventions**

As early as 1952, the public health organization, the American Heart Association, began identifying diet and exercise as a modifiable risk factor of cardiovascular disease. However, when rising rates of overweight emerged in the 1980's and 1990s, the prevention of overweight in individuals and among population groups became an explicit goal of national public health policy (Nestle & Jacobson, 2000).

For example, Healthy People 2000, made the issue of overweight status and the need for exercise a national priority. Their objective was to reduce overweight among adolescents to 15 percent, and to increase physical activity and fitness (U. S. Department of Health and Human Services (DHHS), 2000).

Currently, Healthy People 2010 seeks to reduce overweight among children and adolescents to five percent. Healthy People 2010 includes specific obesity-related objectives (U. S. DHHS, 2000). The objectives include increased physical activity, consumption of more healthful diets, increased use of nutrition labels, reduced sources of unnecessary calories, increased nutrition and physical education in schools, and improved access to community recreational facilities (U. S. DHHS, 2000).

Programmatic interventions and policies of local governments have focused primarily on what researchers describe as a "toxic environment" that has evolved in public schools; an environment that provides students with non-nutritious foods and minimal exercise (Ebbeling, Pawlak, & Ludwig, 2002). About 60 % of the middle schools and high schools in the United

States sell soft drinks from vending machines (Fried & Nestle, 2002). Many meals prepared under the National School Lunch Program include excessive amounts of saturated fats (Carter, 2002). Only 28 percent of high-school students participate in daily physical education (CDC, 2004).

Local governments are attempting to improve the public school environment. Efforts include policies intended to reduce the availability of foods that are not nutritious and to increase physical activity (National Conference of State Legislatures, 2006). New legislation restricts competitive food sales, such as non-nutritious snacks and beverages that compete with school lunch programs. The beverage industry has recently adopted guidelines designed to curtail vending machine sales by 2010 (American Beverage Association, 2006). Closed-campus policies are intended to keep students at school for lunch so students will not be able to go to local stores and restaurants and purchase non-nutritious foods.

However, since the federal government has not established minimum standards for nutrition and exercise interventions in public schools, for most public schools, closed-campus policies are a moot point. Additionally, the federal government has not promulgated any rules regulating the sale of competitive foods in public schools (Institute of Medicine (IOM), 2005).

Prevention programs for affected youth seek to propagate future informed adults who can advocate for healthful diets and exercise in health centers, communities, workplaces, schools, and many other venues (IOM, 2005). Many of these venues are subject to federal and other governmental regulations that can be modified to enhance healthful diet and exercise.

Higher education can be modified to require curricula for health care providers to include the benefits of healthful diet and exercise patterns, the risks for obesity, counseling methods that effectively modify behavior, efficacious health promotion campaigns for health care agencies,

research agenda focused on behavioral as well as metabolic determinants of weight gain and maintenance, and the most cost-effective methods for promoting healthful diet and activity patterns (Nestle & Jacobson (2000). Medicare and Medicaid reimbursement regulations can be modified to adequately reimburse health care providers for nutrition and obesity counseling and other interventions that meet specific standards of cost and effectiveness.

Healthy People 2010 addresses the role of healthcare providers. Appropriate clinical practice includes preventive services nutrition screening and assessment, counseling, and referrals to qualified nutrition professionals for nutrition assessment, education, counseling on behavioral change, diet modification, and specialized nutrition therapies represents (U. S. DHHS,2000). Many of these clinical practices are crucial elements of program interventions for affected youth.

According to Gonzalez and Gilmer (2006), the most cost-effective method of approaching the obesity epidemic is through education of health professionals. As part of an "Obesity Prevention in Pediatrics" curriculum, postgraduate-year (PGY)-2 residents first observed and then participated in the dietary evaluation and counseling of pediatric patients and their families. Following participation in the curriculum, study residents' knowledge tended to improve, as did their level of comfort in counseling obese and at-risk children, adolescents and their parents. The "Obesity Prevention in Pediatrics" curriculum appeared to improve participants' knowledge base as well as their skills and level of personal comfort in the recognition, evaluation and management, including counseling, of both obese and at-risk pediatric patients and their families. Additionally, nutrition counseling by registered dietitians is found to be cost effective for patients with hyperlipidemia (McGehee et al., 1995) and type 2 diabetes mellitus (Franz et

al.,1995). This is because dietetic education promotes behavioural change in patients that, in turn, prevents future costly health care for health complications.

Prevention programs for affected youth implement policies of pediatric health providers. For example, pediatric health providers advocate the use of age- and sex-specific BMI for early identification of weight gain, dietary and exercise interventions, and more advocacy and research (American Academy of Pediatrics,2003).

The National Institute of Health (NIH) (2004) distinguishes primary, secondary, and tertiary programs based on disease stage. The disease prevention model is not new. As early as 1957, the Commission on Chronic Illness used the disease prevention model to classify prevention programs based on the stage of the disease process (Nestle & Jacobsen, 2000),

Primary programs aim to prevent inappropriate weight gain in youths currently at a healthy weight (BMI less than the 85th percentile). Secondary programs aim to prevent further weight gain in youths currently at risk of overweight (BMI greater than or equal to the 85th percentile to less than the 95th percentile). Tertiary programs target interventions at youths already overweight (BMI greater than or equal to the 95<sup>th</sup> percentile) (NIH, 2004).

### **Children's Medical Services and Program**

The CMS program addresses dietetic and exercise behaviors of overweight youths ages 7 to 18 years old, diagnosed with type II diabetes or hyperinsulinemia, a precursor of type II diabetes. It is categorized as a tertiary program because its interventions target youths already overweight.

As previously mentioned, CMS is a Florida Title V Program for children with special health needs. CMS implemented the intervention program for overweight members in 2002. CMS is one of several programs funded by the Federal-State Title V Block Grant Partnership

Budget.<sup>2</sup> The purpose of Title V is to improve the health of all mothers and children, including children with special health needs (MCHB, 2006).

Nationally, about 963, 634 children and adolescents participate in services for children with special health needs (12.8% of child and adolescent population). Services for children with special health needs account for more than half of all child-related health care costs (Van Dyck, Kogan, Merle, McPherson, Weissman, & Newacheck, 2004). Florida serves about 64, 992 children with special health needs, and 40.8 percent of the total 2006 Florida Title V budget is allocated to health services for those children (MCHB, 2006).

The CMS program provides children with special health needs with a family- centered, managed system of care. CMS provides a comprehensive continuum of medical and supporting services to medically and financially eligible children and high-risk pregnant women. The continuum of care includes prevention and early intervention programs, primary care, medical and therapeutic specialty care and long-term care.

CMS is a program of the Florida Department of Health (DOH) and is directed by the Deputy Secretary for CMS. The CMS Program is divided into two divisions: the Division of CMS Network and Related Programs; and the Division of Prevention and Intervention. There are 22 CMS arranged in eight regional offices throughout the State of Florida (CMS, 2006).

CMS serves about 2,000 children in the northwest region of Florida comprised of 8 counties: Franklin, Leon, Jefferson, Liberty, Madison, Taylor, Wakulla, and Gadsden. Leon County (Tallahassee) accounts for 50 percent of CMS clients; Gadsden County accounts for

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<sup>2</sup> The Title V includes Federal funds, State funds, local funds, and program income. Each year, States report how their Title V budget is allocated among pregnant women, infants, children ages 1-22, children with special health care needs, all others, and administration.

nearly 25 percent of CMS clients; the remaining outlying counties account for 25 percent of CMS clients (CMS, 2006).

In 2002, the CMS initiated a nutrition and exercise program in response to increased numbers of overweight children and adolescents presenting to the Diabetic and Endocrine Clinics with type II diabetes or hyperinsulinemia. The program consists of four 1½-hour sessions for youths and parents, and emphasizes healthy dietetic and physical behaviors.

Research shows that overweight children and adolescents benefit from comprehensive dietetic and exercise education (Dreimane et al., 2006; Eliakim, A. et al., 2002; Monzavi, R. et al., 2006; Savoye et al., 2004; Speith, L. et al., 2000; & Taylor et al., 2005). CMS is in a position to contribute to disease prevention strategies among overweight youths, offer information about what occurs within a program, and to report progress on health outcomes.

### **Significance of the Study**

Despite many efforts in health care, overweight prevalence rates continue to rise among youths (NCHS, 2005). Being overweight poses serious health risks and significantly increases the need for health care and the costs required for such care (Bandura, 2004).

By managing health habits, youths can have longer and healthier lives (Bandura, 2004). Disease prevention programs can assist youths to consistently practice healthy lifestyle choices through a variety of behavioral interventions.

In a time of guarded public health budgets, economic reality necessitates efficient resource allocation. Intervention programs for affected youth that prevent or reduce the cost of disease treatment appeal to health providers, the public, and policymakers (Frick, Milligan, White, Serwint, & Pugh, 2005).

Prevention holds significant promise for overweight and overweight-related health complications because prevention programs work (Dreimane et al., 2006; Eliakim, A. et al.,

2002; Monzavi, R. et al., 2006; Savoye et al., 2004; Speith, L. et al., 2000; Taylor, Mazzone, & Wrotniak, 2005). Public behavioral intervention programs, such as the CMS program, demonstrate a growing commitment toward the integration of research and practice in disease prevention activities for vulnerable individuals and their families. Public health nurses comprise an important component of this collective effort and play a unique role within public health programs that creatively utilize research to strengthen program practices, including those involved in addressing the issues of overweight.

The findings of this study will be used to suggest ways to improve the CMS program and develop further study of the program. In the future, agencies similar to the CMS may want to replicate the program in order to improve the diet and activity behaviors of their patients because improved health behaviors lead to improved health outcomes.

Table 1-1. Prevalence of overweight among children and adolescents ages 6-19 years: For selected years 1963-65 through 1999-2002.

Age (years)	NHANES 1963-65 1966-70 <sup>3</sup>	NHANES 1971-74	NHANES 1976-80	NHANES 1988-1994	NHANES 1999- 2002	Fro m Cent ers for
6-11	4%	4%	7%	11%	16%	
12-19	5%	6%	5%	11%	16%	

Disease Control and Prevention (CDC), National Center for Health Statistics, National Health Nutrition Examination Survey (NHANES) (2005).

<sup>3</sup> Data for 1963-65 are for children 6-11 years of age; data for 1966-70 are for adolescents 12-17 years of age, not 12-19 years.

## CHAPTER 2 LITERATURE REVIEW

The Children's Medical Services (CMS) program is based on Social Cognitive Theory (Bandura, 1986) because the theory provides a basis for promoting healthy dietetic and exercise behavior change among youths in intervention programs. Following the theory background for this study, major health organization recommendations for overweight youths and out patient intervention programs are reviewed.

### **Theoretical Perspective of CMS Program**

By applying Social Cognitive Theory to intervention programs, how individuals acquire and effectuate behavior, the process for changing behavior, and the effects on behavior caused by external influences may be explained (National Institute of Health (NIH), 2003). Health is influenced by lifestyle behaviors. By managing lifestyle behaviors, people can have longer and healthier lives (Bandura, 2004).

Albert Bandura (1997) elucidates that behavior is influenced by the interplay of 1) personal factors, 2) behavioral factors, and 3) environmental factors. This three-part interplay is identified as triadic reciprocity or reciprocal determinism. Within the triad, cognition is critical for individuals to construct reality, self-regulate, encode information, and perform behaviors (Pajares, 2002). Social Cognitive Theory is often referred to as Social Learning Theory.

A personal-behavior interaction involves bi-directional influences between an individual's thoughts, emotions, biological properties, and actions (Bandura, 1997). For example, an individual's expectations and goals regarding their weight give shape to behavior. In turn, new dietetic and exercise behaviors affect thoughts and emotions. Biological personal factors include sex, ethnicity, temperament, and genetic predisposition and the influences they have on behavior.

An environmental-personal interaction involves bi-directional influences between an individual's environment and personal characteristics (Bandura, 1997). An individual's expectations and cognitive competencies regarding health are affected by social influences and physical structures within the environment. For example, the home environment conveys information and activates emotional reactions about nutrition and exercise through factors such as persuasion, modeling and instruction (Bandura, 1986). An individual may receive different reactions from her social environment depending on the individual's size, age, race, sex and appearance.

A behavior-environmental interaction involves bi-directional influences between an individual's thoughts, emotions, biological properties and their environment (Bandura, 1997). Behavior influences environment, such as when a parent stops bringing high-calorie, low-nutrient foods into the home for children and adolescents to consume. This new environment in the home, may contribute to what forms of a child's behavior are developed and activated (Bandura, 1989).

Beyond this three-part interplay of reciprocal determinism, there are other major concepts of Social Cognitive Theory that explain how behavior may be influenced. This study used the theoretical concepts of Bandura's Social Cognitive Theory to observe and describe how the CMS behavioral intervention program taught content and which learning behaviors were targeted. The following elucidates those concepts.

### **Major Concepts of Social Cognitive Theory**

Behavior may be influenced by the following: 1) reciprocal determinism; 2) behavioral capability; 3) expectations; 4) self-efficacy; 5) observational learning; and 6) reinforcement (NIH, 2003) (Table 2-1). For example, behavioral change results from an interaction between an individual and the environment (reciprocal determinism), and knowledge and skills create the

precondition for change (behavioral capability). Individuals anticipate how their choices will affect their health outcomes (expectations) and have the confidence to change their behavior (self-efficacy). Individuals can learn healthy lifestyle choices by watching the appropriate actions of others (observational learning), and by enjoying the benefit of positive reinforcement from others in their endeavors (reinforcement) ((NIH, 2003; Bandura, 1997).

Using the theoretical concepts, teaching may be guided and learning behaviors may be targeted. Social Cognitive Theory and its concepts are inherently linked to the measurement of health behavior (Redding, Rossi, Rossi, Velicer, & Prochaska, 2000).

In this study, Social Cognitive Theory was used as a guide to observe and describe how the CMS behavioral intervention program was teaching content and which learning behaviors were targeted. Following this premise, if the CMS program utilized the theoretical concepts, youths should expect positive behavioral changes, followed by improved BMI and Hb A1c measurements.

The following is a description of the concepts. A review of health promotion literature is also provided to elucidate how the utilization of a particular learning concept elicits behavioral changes among the youths.

### **Reciprocal Determinism**

Reciprocal determinism is the dynamic, reciprocal interaction between three key factors identified as personal, environmental, and behavioral. These factors act as determinants of each other. That is, a change in one of these factors impacts on the other two.

There is considerable research interest concerning how personal and environmental factors interact to influence children's nutrition and exercise behavioral patterns. For example, schools that provide lower fat content in their lunches and greater opportunities in physical exercise

improve the dietetic and exercise behaviors of children (Luepker et al., 1996; Rinderknecht & Smith, 2004; Trevino et al., 1998).

Children's weekly television viewing hours significantly correlate with their requests for purchases of food advertised on television (Taras, Sallis, Patterson, Nader, and Nelson, 1989). When children are told that their mothers will be monitoring their food choices, children choose fewer non-nutritious foods than they choose in the absence of that 'threat' (Klesges, Stein, Eck, Isbell, and Klesges (1991).

According to Bandura (1989), interactions between factors differ based on the individual, the particular behavior being examined, and the specific situation in which the behavior occurs. Research suggests that environmental factors may influence children's health behaviors more than personal ones. For example, children less than age 9 are not worried about health outcomes, and health is not a priority for them (Gochman, 1987). Thus, cognizance of the diet-disease relationship may have less influence than environmental factors on healthy behavior in younger children.

### **Behavioral Capability**

The concept of behavioral capability is defined as having the knowledge and ability to perform a behavior or sequence of behaviors. Most intervention programs improve an individual's behavioral capability through instructional and skills training. Behavioral skill training may be (ReCapp, 2006):

- interpersonal, including communication, negotiation, and setting limits;
- intrapersonal, such as values clarification, analyzing situations, and self-talk;
- resource-related, focusing on locating information from adults, agencies, and the internet; and
- product-related, such as teaching use of condoms and contraceptives.

Parcel et al. (1989) reported that classroom health education and environmental changes in school lunch and physical education were implemented to foster healthful diet and exercise among elementary school children. Cognitive measures that included behavioral capability were evaluated using self-reported diet and exercise behavior questionnaires at baseline and following intervention. Statistically significant changes were observed for diet behavioral capability, self-efficacy, and behavioral expectations, use of salt, and exercise behavioral capability (fourth grade), self-efficacy (fourth grade) and frequency of participation in aerobic activity. The program impacted learning outcomes and student behavior.

Individual behavior can have an important impact on disease prevention. However, it is important to note that Social Cognitive Theory emphasizes that learning is influenced not only cognitively in the learning of skills but within the complexity an individual's environment, thoughts, emotions, and biological properties.

### **Expectations**

An individual's expectations are defined as an individual's approximation that the performance of certain behaviors will lead to attainment of a particular goal. For example, "If I will eat a healthy diet and exercise regularly, I will lose weight." Factors that motivate an individual's expectations as they go through the process of setting goals for themselves include self-efficacy, feedback, and the anticipated time to goal attainment (Bandura, 1986; 1989).

First, if an individual feels s/he is capable of achieving the goal (self-efficacy), s/he is likely to work hard and not give up. Second, if an individual is provided feedback, she is more able to adjust her goals to be feasible and realistic. Feedback, in turn, improves self-efficacy. Third, short-term goals are more effective than long-term goals because short-term goals are less daunting for an individual to work toward than long-term goals (Stone, 1998).

In health promotion literature, expectations are frequently evaluated with self-efficacy by comparing pre- and post-questionnaires. For example, in Resnicow et al. (1997), the impact of a self-administered, computer-based intervention on nutrition behavior, self-efficacy, and outcome expectations among supermarket food shoppers was evaluated. The intervention, housed in kiosks in supermarkets, used tailored information and self-regulation strategies delivered in 15 brief weekly segments. Treatment led to higher levels of nutrition-related self-efficacy, physical outcome expectations, and social outcome expectations. Logistic regression analysis determined that the treatment group was more likely than the control group to attain goals for reduced fat and increased fiber and fruits and vegetables at post-test and to attain goals for reduced fat at follow-up. Latent variable structural equation analysis revealed self-efficacy and physical outcome expectations mediated intervention effects on nutrition. In addition, physical outcome expectations mediated the effect of self-efficacy on nutrition outcomes.

### **Self Efficacy**

According to Bandura (2004), self-efficacy is the most important concept that explains behavioral change. Individuals with perceived self-efficacy set high personal goals for themselves, expect favorable outcomes from their efforts, have an ability to recover from setbacks, and are able to maintain the achieved habit (Bandura, 2004, Rinderknecht & Smith, 2004, Benight & Bandura, 2004 ).

Bandura (2006) has written a monograph entitled *Guide for Constructing Self-Efficacy Scales*. The monograph deals with issues of domain specification, gradations of change, content relevance, phrasing of items, response scale, item analysis, minimizing biases in responding, assessing collective efficacy, and validation. A number of useful instruments are available online, such as those from the National Institute of Nursing Research. For over 20 years,

researchers have been developing, adapting, and testing self-efficacy scales for research subjects with chronic diseases (Bandura, 2006).

The concept of self-efficacy has guided program interventions for improving behaviors in diet, physical exercise, and diabetic self-care (Allen, 2004). Dietary self-efficacy is the perceived capability to choose more healthful foods and has been associated with improved nutritional behavior among youth (Cusatis & Shannon, 1996) and adults (Van Duyn, Kristal, & Dodd, 2001). Evidence underscores the importance of self-efficacy in metabolic control (Ludlow & Gein, 1995), coping and problem solving (Anderson et al., 1995), diet adherence (Miller, Edwards, Kissling, & Sanville, 2002), and maintaining healthy blood glucose (Skellley, Marshall, Haughey, Davis, Dunford, 1995).

According to Bandura (2004), necessary components of a program to effectuate self-efficacy include: 1) information regarding the desired behavior; 2) the development of social and self-management skills; 3) building a resilient sense of efficacy such as supporting the exercise of control in the face of difficulties and setbacks in everyday life; and 4) enlisting and creating social supports for desired personal change such as enlisting participants' caregivers in the effort. In Margolis & McCabe (2004), additional strategies for improving self-efficacy for individuals in programs include: 1) establishing small, incremental goals for participants; 2) reinforcing effort and persistence; 3) emphasizing modeling; and 4) providing feedback through record-keeping.

### **Observational Learning**

Bandura (1977) wrote that learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform their choices. Behavior can be learned observationally through modeling.

Modeling occurs when individuals observe others, form ideas regarding how the behaviors are to be performed, and then act out the behaviors. Individuals are more likely to adopt a

modeled behavior if behavior change results in outcomes they value, and if the model is: 1) similar to the observer, 2) has admired status, and 3) has functional value (Bandura, 1977).

Among children, observational learning often outweighs verbal instruction as an influence on the internalization of standards (Bandura, 1989). Thus, dietetic and exercise programs are encouraged to incorporate learning strategies that go beyond lectures, and include opportunities to observe and model healthy behaviors, attitudes, and emotional reactions provided by program instructors, parents/significant caretakers, and participant peers. Thus, experiential opportunities used by the CMS program such as exercise sessions, grocery store tours, group food preparation sessions, and sampling of healthy snacks may be beneficial.

A study by Carroll and Bandura (1987), examined the role of two forms of visual guidance in facilitating the translation of cognitive representations into action. Subjects matched a modeled action pattern either concurrently with the model or after the modeled display. The subjects then either did or did not visually monitor their actions during tests of production accuracy in the model's absence. Acquisition of the cognitive representation was assessed periodically. Concurrent matching of modeled actions and visual monitoring of productions both increased the level of observational learning. The more accurate the cognitive representation, the more skilled were subsequent reproductions of the modeled actions. After acquiring proficiency in converting cognition to action, subjects maintained their level of performance accuracy even though modeled and visual-monitoring guidance were withdrawn. These results are consistent with the theory that cognitive representation mediates response production and that corrective adjustments through visual guidance aid in the translation of conception into action.

In another study, researchers examined the effects of televised safety models on children's willingness to take physical risks and their ability to identify injury hazards in common situations

(Potts & Swisher, 1998). Exposure to the safety educational videotape decreased children's willingness to take physical risks and increased their identification of injury hazards. Findings are interpreted as evidence of observational learning related knowledge by the television stimuli (Potts & Swisher, 1998).

### **Reinforcement**

Reinforcement is said to occur when a reward, that is made contingent on an individual's behavior, increases or decreases the chances of the individual repeating that behavior (Hendy, Williams, & Camise, 2005). Reinforcement has been frequently used in health promotion programs to improve behavioral outcomes.

In Hendy, Williams and Camise (2005), The "Kids Choice" school lunch program used token reinforcement, food choice, and peer participation to increase children's fruit and vegetable consumption. Rewards included jump ropes, water bottles, and graduation certificates. Consumption increased for fruit and for vegetables and the increases lasted throughout reinforcement conditions. Two weeks after the program, preference ratings showed increases for fruit and for vegetables. Seven months later, fruit and vegetable preferences had returned to baseline levels, suggesting the need for an ongoing intervention program to keep preferences high.

In another study by DeVahl, King, and Williamson (2005), researchers sought to determine whether a greater academic incentive would improve the effectiveness and adherence of university students to a 12-week voluntary exercise program designed to decrease body fat. The group with the greater reward structure showed better exercise adherence and lost more body fat than those without the additional incentive. These findings suggest that an academic incentive can increase overall student adherence to a voluntary exercise program and can boost the effectiveness of the program in a university environment (DeVahl, King, & Williamson, 2005).

Robles et al. (2005) carried out an intervention that involved women living with their children in a residential substance abuse treatment facility. The intervention consisted of exposure to an educational video and a smoking cessation workbook, brief individual support meetings, and an escalating schedule of voucher-based reinforcement of abstinence. Throughout the study, three daily breath samples were collected Monday through Friday to determine carbon monoxide (CO) concentration. In addition, urine cotinine (COT) was assessed weekly to monitor weekend tobacco use. Participants received vouchers of escalating value for CO-negative breath and COT-negative urine samples. Positive samples reset the voucher value. Significantly more negative tests were submitted during the intervention than during baseline and follow-up. The intensive behavioral intervention evaluated in this study produced a substantial reduction in cigarette smoking, and 25 percent of participants remained abstinent two weeks after the intervention was suspended. In this within-subjects repeated measures study, a one-week baseline was followed by a four-week intervention and a two-week follow-up (same as the baseline).

In Rowan-Szal, Joe, Chatham, & Simpson (1994), clients in a community-based methadone treatment program earned stars for attending counseling sessions and for providing clean urines. The stars were later redeemed for contingent rewards (food or gas coupons or bus tokens) according to one of three randomly assigned reward schedules, including high reward (eight stars per prize), low reward (four stars per prize), or delayed reward (those who had to wait three-months to earn a prize). Those clients in the high-reward condition showed a pattern of increasing the number of stars earned for group sessions and clean urines across the three-month intervention. All clients, independent of reward condition, attended significantly more group counseling sessions during the months that contingent reinforcers were available than in

the months prior to, and after, the intervention. Finally, urinalysis data indicated that, in the post intervention period, high-reward clients had fewer dirty urines than did low-reward or delayed-reward clients. This study suggests that a simple system of recognizing client progress with stars and modest prizes for performing specific behaviors can be an effective tool in increasing clinic attendance rates and reduced positive urines (Rowan-Szal, Joe, Chatham, & Simpson, 1994).

### **Recommendations for Overweight**

Major health organizations such as the U. S. Department of Health and Human Services (2004) address the potential health-pitfalls of overeating and under activity for children and adolescents. Health recommendations include discouraging the consumption of energy-dense, high sugar/high-fat foods, the amount of time spent on television, video games, and the Internet; and encouraging the consumption of a healthy array of foods and more daily physical activity.

In Florida, the "Governor's Task Force on Obesity," has made recommendations to deal with being overweight. Public health care providers are encouraged to promote lifelong nutrition and physical activity by implementing programs that promote healthier lifestyles and disease management for overweight-related illnesses such as diabetes and hyperinsulinemia (Florida Department of Health, 2004).

Recommendations for short-term program goals for overweight youths include the maintenance of weight, or a decrease of weight by about 1 pound per month. A long-term goal is to reduce BMI to below the 85th percentile (Barlow & Dietz, 1998 (current as of 2005). Over time, the maintenance of weight leads to a BMI decline as height continues to increase. Programs for overweight children and adolescents often evaluate both weight and BMI because incremental weight loss may not impact BMI measurements. A subtle weight-loss of a few pounds would not be revealed in a BMI calculation.

Recommendations for program goals for overweight youths with type II diabetes or hyperinsulinemia include the reduction of Hb A1c. Glycosylated hemoglobin is a measure of long-term glucose homeostasis (Goldstein, Parker & England, 1982), and is a way to monitor long-term serum glucose regulation (Fajans, 1990). Increased Hb A1c measurements are associated with being overweight (Plourde, 2002) and indicate the beginning or existence of hyperinsulinemia (Hanna, & Howard, 1994). A healthful diet and regular exercise may prevent the development of diabetes among persons who are overweight regardless of weight loss (Sheaves et al, 1997; Manson et al., 1992). However, other research findings suggest that Hb A1c values improve with weight loss of about 10 lb or five percent of body weight (Wing, Marcus, Epstein, & Salata, 1987).

Previous agency programs for overweight children and adolescents at the primary, secondary, and tertiary levels of the disease prevention model have been modestly successful in maintaining or decreasing weight and in reducing other biological measures such BMI and Hb A1c associated with overweight health complications (Saelens, et. al., 2002; Dietz, 1998; Dietz, 2004).

This chapter examines intervention programs aimed at secondary and tertiary levels of disease.<sup>1</sup> Research reveals that outpatient, healthcare-based, weight-intervention programs, that use major health organization recommendations for diet and exercise, elicit weight-reduction among children and adolescents (Saelens, Sallis, Wilfley, Patrick, Cella, & Buchta, 2002). The prevention programs examined are primarily aimed toward improving diet and increasing physical activity (Dreimane et al., 2006; Eliakim et al., 2002; Lazzer et al., 2005; Monzavi et al.,

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<sup>1</sup> Primary prevention programs commonly occur in schools and childcare settings than in health settings. Classroom and physical education curricula, changes in school meals, vending machines, cafeterias, and after-school programs may increase physical activity and improve dietary patterns (Daniels et al., 2005).

2006; Reinehr et al., 2003; Saelens et al., 2002; Savoye et al., 2004; Spieth et al., 2000; Taylor, Mazzone, & Wrotniak, 2005; Woo et al., 2004). Many of the programs include behavioral therapy and reduction in sedentary behavior.

Secondary-level prevention programs target youth at-risk-for-overweight, referred to hereinafter as "early-disease." These programs are particularly interested in preventing the BMI percentile from increasing (Jain, 2004).

Tertiary-level programs seek to limit illnesses associated with being overweight and to rehabilitate those who are overweight (Murphy, 2004), hereinafter referred to as "late-disease." Tertiary level illnesses include hyperinsulinemia, also known as impaired glucose tolerance (IGT), a condition marked by higher than normal plasma insulin and glucose levels that are too low to be considered diagnostic for type II diabetes.

### **Review of Programs**

The following is a descriptive review of nine outpatient secondary and tertiary prevention programs for affected youths (Tables 2-1 and 2-2). The review includes a description of: 1) study size and ages of participants; 2) parental participation; 3) program frequency and duration; 4) outcomes; and 5) limitations. All nine programs were primarily aimed toward improving diet and increasing physical activity. Diet and exercise together, rather than diet alone, are associated with significantly improved health outcomes (Woo et al., 2004).

#### **Study Size and Ages of Participants**

Study sizes range from 25 to 264 participants, and ages range from 6-17 years. The studies were conducted in clinical settings, and most of the studies were conducted in the United States. The researchers of the programs were registered nurses, pediatricians, public health experts, registered dietitians, and physical therapists.

## **Parental Participation**

All studies included parents or legal guardians of the child or adolescent participants with the exception of Saelens et al. (2002). According to Jain (2004), interventions that include the parents or significant caretakers of the participants have greater effect on weight loss than those that do not include parents or significant caretakers. In addition, children and adolescents do better when treated in the same classroom rather than treated separately (Jain, 2004). Children without parental overweight have significantly greater decreases in BMI compared to children with obese parents (Eliakim et al., 2002).

## **Program Frequency and Duration**

Programs ranged in duration from eight weeks to one year. Class sessions occurred as infrequently as twice monthly and as frequently as five times a week. Program frequency and duration was not necessarily associated with better weight and BMI outcomes. For example, in Spieth et al. (2000), the program was about four months in duration, and included only one primary session and four follow-up visits. Both weight and BMI significantly improved among participants.

However, in Reinehr et al. (2003), where the program was one year in duration and met at least once weekly for exercise sessions, the BMI measures did not significantly improve among participants.

## **Outcomes**

Overall, the programs were modestly successful in maintaining or decreasing weight and BMI. Six of the nine studies showed a statistically significant, short-term decrease in weight or BMI (Dreimane et al., 2006; Eliakim, A. et al., 2002; Monzavi, R. et al., 2006; Savoye et al., 2004; Spieth, L. et al., 2000; Taylor, Mazzone, & Wrotniak, 2005). Three of the nine studies did

not show statistically significant, short-term decrease in weight or BMI (Zador et al. (2006); Woo et al. (2004); Saelens et al. (2002). However, the study of Zador et al. (2006) showed significant short-term decreases in Hb A1c, and the study of Woo et al. (2004) showed significant short-term decreases in lab values such as low-density lipoprotein (Tables 2-3 and 2-4).

With the exceptions of Savoye et al. (2004) and Woo et al. (2004), program evaluations were followed for less than one year. Savoye et al. (2004), a one-year-long program, demonstrated significant decreases in BMI at the end of their program – which was the end of one year. However, those decreases in BMI were no longer significant (BMI from pre-program baseline was primarily maintained) in the following year. At two-years post-program, the two dietary approaches taught to participants during the program were compared. The group that had been taught how to make better food choices, and not given a structured diet plan, further improved BMI ( $P=.006$ ), while the dieting group's BMI reverted back to pre-program baseline.

Monzavi et al. (2006), a 12-week-long program, also demonstrated significant improvements in post-program BMI, systolic and diastolic blood pressures, lipids (total, low-density lipoprotein cholesterol, and triglycerides), postprandial glucose, and leptin levels at the end of the program (or three weeks after the end of the program). It is not known whether the participants in Monzavi et al. (2006) enjoyed long-term positive outcomes.

Programs exhibited varied success at improving biological measures associated with overweight-related illnesses. In Woo et al. (2004), children were randomly assigned to a dietary modification program or a diet and exercise modification program. After 6 weeks, both groups significantly decreased waist-hip ratio and cholesterol level and improved arterial endothelial

function. In Zador et al. (2006), Hb A1c was significantly improved by the completion of the program.

In Eliakim et al. (2002), physical endurance significantly increased following the three-month intervention. Affected youth that continued the program for another three-months, further improved their endurance. Taylor, Mazzone, and Wrotniak (2005) evidenced significant improvements beyond BMI. Waist and hip girth, blood pressure, resting heart rate, immediate heart rate after exercise, and heart rate five-minutes after exercise were significantly improved at post-test.

Outcomes did not vary markedly between genders. According to Eliakim et al. (2002), in their study of 177 participants, gender, pubertal status, and the degree of obesity had no influence on BMI changes.

Reinehr et al. (2003) used multiple regression to relate factors to post-program weight loss. Factors included the participant's willingness to change behavior (changes in weight status, number of attempts at therapy, participation in exercise groups), somatic characteristics (BMI of children and family members, gender, and age), socioeconomic status (level of education of the children and their parents, working mother), exercise and dietary habits, and dietary intake, as well as the quality of dietary records. The only significant difference between the children who lost weight and the children who did not lose weight was that the children that lost weight had previously taken part in regular exercise before the program began. Improvements in emotional well-being and behavior correlated positively with weight loss (Dreimane et al., 2006).

### **Limitations**

Identification of effective intervention methods utilized in various disease prevention programs enables other health providers to replicate and improve successful intervention

methods and facilitates their generalization and application to broader population groups.

Alternatively, review of disease prevention programs may uncover intervention methods that are successful for distinct population subsets even if those methods have limited utility for broader populations.

Optimal design for evaluating a particular program minimizes potential bias and maximizes general application to the extent permitted by practical limitations such as time constraints, cost, ethics, and other limitations. Since it is evident that long-term program adherence is difficult, further long-term evaluation of outcomes is necessary to identify which program interventions result in positive outcomes that endure.

Evaluation results may be influenced by various factors. For example, youths may be motivated just long enough to complete the program and revert back to their original lifestyles at the completion of the program. Youths may be trying to please evaluators or to be overly eager, making a program appear more effective than would normally be expected. Ideally, a study should last for 6 months or longer.

In those programs that show no effect on weight or BMI, the results of the programs may be disproportionate to their endeavors. However, because in most instances, pre-program knowledge of patterns of weight gain is not obtained, program outcomes may be shown to be more successful than they appear if they were compared to weight gain in previous years. Also, the intervention effect may not occur until several weeks after the end of the program. In this situation, a post-test at the end of the treatment would show no impact, but a post-test a month later might show an impact.

Programs are costly, making the use of control groups and adequate sample sizes difficult. If a control group is available, it may be ethically inappropriate not to offer an alternative

program. Because in most instances, small- to moderate- sized convenience samples are utilized, there is the risk of the researcher making a Type II error (concluding the treatment caused no change when it actually did cause a change).

Different study outcomes may be found among members of different ages, adversely affecting the ability of the outcomes to be generalized to all ages. To control for this, a few of the studies accounted for age in the statistical regression analyses.

It is not possible to know all the events, other than those planned in the program, that occur during the course of the program, and such external events may affect study outcomes. It is unknown whether successful biological outcomes occurred because of the programs, or because of other environmental, personal, or behavioral factors. For example, some children and adolescents may begin to be involved in physical education at school when they begin a behavioral intervention program.

Some validity risks are inherent in any program evaluation. A test is reliable to the extent that whatever is measured, is measured consistently. The program studies described their data collection procedures well, including the assessment of their equipment such as weight scales. However, there is always the potential for inconsistent performance during the collection of the biological measurements and the fluctuation of measurements if taken at different times of the day.

Overall, descriptions of the program evaluations were provided so that they could be accurately replicated in other studies. In addition, nearly all the studies prevented a catalyst effect by excluding participants who were participating in another program. Health professionals implementing and participating in a program want the program to be effective.

Caution should be utilized in generalizing study findings either to broader population groups or over time. Conditions for programs efficacy work change over time. In addition, the external experiences of participants in different programs may vary. For example, some may receive physical education class once a week at school, while others may receive it four times a week at school.

Quantitative methods lose utility when the subject of the study is difficult to measure or quantify. Each of the programs studied may have benefited from eclectic use of quantitative and qualitative methods.

Program studies can potentially inform public policy and analysis in several ways. Through these studies public policy may identify and classify interventions as either: successful in the targeted populations; effective for broader populations or distinct population subsets; or ineffective and not appropriate for further public expenditure.

### **Summary**

Effective strategies to promote self-management of health habits are more important than ever. Research shows that overweight children and adolescents benefit from comprehensive dietetic and exercise education (Saelens, Sallis, Wilfley, Patrick, Cella, & Buchta, 2002).

The review of these nine outpatient secondary and tertiary prevention programs for overweight youth (Tables 2-1 and 2-2) revealed that diet and exercise together, rather than diet alone, are associated with significantly improved health outcomes such as improved BMI and Hb A1c values. Program studies suggest that weight-loss success is associated with interventions that include the participants' parents (Jain, 2004), and the participant's willingness to change behavior, somatic characteristics, socioeconomic status, exercise and dietary habits, and dietary intake, as well as the quality of dietary records (Reinehr et al., 2003). Improvements in

emotional well-being and behavior also correlated positively with weight loss (Dreimane et al., 2006).

Interventions that have a greater frequency and duration of program sessions were not necessarily associated with better weight and BMI outcomes. According to Eliakim et al. (2002), gender, pubertal status, and the degree of obesity had no influence on BMI changes.

Overall, the programs were modestly successful in maintaining or decreasing weight and BMI. Six of the nine studies showed statistically significant, *short-term* decrease in weight or BMI (Dreimane et al., 2006; Eliakim, A. et al., 2002; Monzavi, R. et al., 2006; Savoye et al., 2004; Speith, L. et al., 2000; Taylor, Mazzone, & Wrotniak, 2005). Savoye et al. (2004) was the one study that showed statistically significant, long-term outcomes. At two-years post-program, the decrease in BMI from pre-program baseline was primarily maintained.

Program studies can potentially inform public policy and analysis in several ways. Through these studies public policy may identify and classify interventions as either: successful in the targeted populations; effective for broader populations or distinct population subsets; or ineffective and not appropriate for further public expenditure.

CMS health providers are actively pursuing the integration of research and practice within their agency. This program evaluation is in the position to contribute to the integration of research and practice among overweight child and adolescents, offer information about what occurs within the CMS program, and to report progress on health outcomes. Additionally, knowledge gained through the use of Social Cognitive theory in behavior intervention programs may be used to further educate individuals and their families how to manage, in part, their own wellness and live healthier lives.

Table 2-1. Major Learning Concepts in Social Cognitive Theory

Concept	Definition	Application
Reciprocal Determinism	Change is bi-directional; behavior changes result from interaction between person and environment	Involve the individual and relevant others; work to change the environment, if warranted
Behavioral Capability	Knowledge and skills to influence behavior	Provide information and training about action
Expectations	Beliefs about likely results of action	Incorporate information about likely results of action in advice
Self-Efficacy	Confidence in ability to take action and persist in action	Point out strengths; use persuasion and encouragement; approach behavior change in small steps
Observational Learning	Beliefs based on observing others like self and/or physical results	Point out others' experience, physical visible changes; identify role models to emulate
Reinforcement	Responses to a person's behavior that increase or decrease the chances of recurrence	Provide incentives, rewards, praise; encourage self-reward; decrease possibility of negative responses that deter positive changes

From U.S. National Institutes of Health (NIH): National Cancer Institute (2005). 'Theory at a Glance: A Guide for Health Promotion Practice' National Institutes of Health, National Cancer Institute. Retrieved Sept 24, 2005 at [/redirect.cgi?r=http://www.cancer.gov/cancerinformation/theory-at-a-glance](http://www.cancer.gov/cancerinformation/theory-at-a-glance)

Table 2-2. The Evaluation of Learning Concepts Social Cognitive Theory in Literature

Concept	Examples of Concept Measurement in Literature
Reciprocal Determinism	School environmental changes elicit dietetic and exercise behavioral changes (Luepker et al.,1996; Rinderknecht & Smith, 2004; Trevino et al., 1998) Home environmental changes elicit dietetic behavior changes (Taras et al., 1989; Klesges et al,1991)
Behavioral Capability	A community-based diabetes education program improves participants' behavioral capability in diet and diabetes as evidenced in pre- and post-knowledge tests (Chapman-Novakofski & Karduck, 2005)
Expectations	A computer-based intervention on nutrition among supermarket food shoppers associated with improved outcome expectations (Resnicow et al.1997)
Self-Efficacy	Per self-efficacy scales: Self-efficacy associated with more healthy foods choices in youth (Cusatis & Shannon, 1996) and adults (Van Duyn, Kristal, & Dodd, 2001) Self-efficacy associated with improved metabolic control (Ludlow & Gein, 1995), quality of life (Rose, Fliege, Hildebrandt, Schirop, & Klapp, 2002), coping and problem solving (Anderson et al., 1995), diet adherence (Miller, Edwards, Kissling, & Sanville, 2002), and blood glucose testing (Skelley, Marshall, Haughey, Davis, Dunford, 1995)
Observational Learning	Cognitive representation mediates response production and that corrective adjustments through visual guidance aid in the translation of conception into action (Carroll and Bandura,1987) The effects of televised safety models decreased children's willingness to take physical risks and their ability to identify injury hazards in common situations (Potts & Swisher, 1998)
Reinforcement	The "Kids Choice" school lunch program used token reinforcement and increases children's fruit and vegetable consumption (Hendy, Williams and Camise (2005) Academic incentives improve the effectiveness and student adherence to a 12-week voluntary exercise program designed to decrease students' percentage of body fat (DeVahl, King, & Williamson, 2005). A voucher-based reinforcement intervention improves smoking cessation among women in a residential substance abuse treatment facility (Robles et al.,2005) Individuals in a community-based methadone treatment program who earn stars for attending counseling sessions as scheduled and for providing clean urines have improved outcomes (Rowan-Szal, Joe, Chatham, & Simpson, 1994).

Table 2-3. Abbreviated Version Table: Outpatient Secondary- and Tertiary-Level Nutrition and Exercise Programs

AUTHOR	PROGRAM	SUBJECTS		OUTCOME IMPROVEMENTS:		
		N	Age	Wt	BMI	Other
Dreimane, D. et al. (2006).	Duration: 8 or 12 weeks of 90-minutes Parental Involvement: Yes	264	7-17y	*	*	Perceived Health*
Eliakim, A. et al. (2002).	Duration: 3- or 6-months (4 lectures, dietician once/mos, & exercise 1 hr twice weekly) Parental Involvement: Yes	177	6-16y	*	*	Endurance Time*
Monzavi, R. et al. (2006)	Duration: 12 weeks of 90-minutes Parental Involvement: Yes	109	8-16y	NS	*	Systolic BP * 2-hr glucose * TC & LDL * TG & Leptin *
Reinehr, T. et al. (2003)	Duration: 1 year (exercise weekly, other) Parental Involvement: Yes	75	7-15y	NS		
Saelens, B. E. et al. (2002)	Duration: 4-months (computer interaction, physician counseling, & telephone/mail counseling) vs. a single physician counseling) Parental Involvement: Yes	44	12-16y	NS	NS	Higher eating & other skill than non-program group*
Savoie, M. et al. (2004)	Duration: 1 year (two 30-minute exercise/week; one 45-minute class each week) Parental Involvement: Yes	25	13.3± 0.6y	*		1 yr: Body fat: * Self-concept: * 2 year: Neither *
Speith, L. et al. (2000)	Duration: About 4-months (one primary session, then about 4 follow-up visits); one group on low-glycemic diet & others on low fat diet Parental Involvement: Yes	107	10-14y	*	*	(low (both -fat groups) group)
Taylor, M. J. et al. (2005)	Duration: 8 weeks of twice-weekly 60-minute sessions Parental Involvement: Yes	41	10.5y (mean)	Lower (*)	*	Waist & hip girth* SBP, DBP, & RHR:*
Woo, K. S. et al (2004)	Duration: 1) 6 wks/diet & exercise twice weekly (1/2 of group diet modification, 1/2 of group diet & exercise). 2) After 6 weeks to 1 year, 1/2 in diet & exercise group attend weekly exercise, & others continue twice-monthly diet monitoring program Parental Involvement: Yes	82	9-12y	NS	NS	6 wks: TG (both)* LDL (exercise)* FG (exercise gr.)* EDD (both gr.)* 1 y: Body fat* IMT (both)* LDL (exercise)*
Zador, I. et al. (2006)	Duration: 12 weeks of once-a-week Parental Involvement: Yes	17	7-15.8y	N/E	NS	Hb A1c: S Hip-to-Waist: S

Note: This chart is an overview. Please see articles for extensive outcome results.\* = Statistically significant; 5minHR = Heart rate 5 minutes after exercise; EDD = Endothelium-dependent dilation; BMI = Body mass index; FG = Fasting glucose; gr. = Group; Hb A1c = Glycosylated hemoglobin; HRfinish = Immediate post-exercise heart rate; Ht = Height; IMT = Intima-media thickness; LDL = Low density lipoprotein; N = Number of subjects; NS = Not significant; RHR = Resting heart rate; NS: Not statistically significant; TC = Total cholesterol; Wt = Weight

Table 2-4. In-Depth Version Table: Outpatient Secondary- and Tertiary-Level Programs

Publication	Program	Subjects	Evaluation
<p>Dreimane, D. et. Al (2006). Feasibility of a hospital-based, family-centered intervention to reduce weight gain in overweight and adolescents. Diabetes and Research and Clinical Practice.</p>	<p>Name/Location: Kids N Fitness in an out-patient setting                      Description: Up to twelve 90-minute sessions (8 week program vs 12 week program); interactive nutrition &amp; exercise sessions with behavior modification                      Personnel: Registered dietitians, physical therapists, physicians, other health professionals                      Parental Involvement: Yes</p>	<p>Description: Overweight                      N: 264                      Gender: 127 boys &amp; 137 girls                      Age: 7-17 y (mean 11.5±2.1y)                      Ethnicity: 73% Hispanic, 12% African American, 8% Caucasian, &amp; 7% Other                      IC/EC: No physical limitations, attendance &gt; 50% of sessions, undergoing rigorous physical therapy, overweight per CDC growth chart, age 7-17y</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Wt, Ht, and BMI, &amp; child health questionnaire evaluated at pre- and post-program. Subjects also recorded daily dietary &amp; exercise activity during the 1st, 4th, &amp; 7th week of program. Outcomes of participants in the 8-week vs. 12- week program were compared.</li> </ul> <p>Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: In whole study population, Wt velocity decreased from 0.726±0.980 to 0.193kg/month (p&lt; 0.001)</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: In whole study population BMI velocity decreased from 0.228±0.452 to -0.061±0.548kg/m<sup>2</sup> (p &lt;0.001); BMI z-score rate (change in z-score per month) improved from 0.011±0.042 to -0.001±0.003 z-score/month (p = 0.006)</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: Subjects in 12-week program compared to those in 8-week program had significantly reduced Wt gains and BMI losses which did not correlate with age, gender, or ethnicity. Females more likely to attend more sessions. Significant improvements in child's perceived health and physical function in 8-week group.</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Eliakim, A. et al. (2002). The effect of a combined intervention on body mass index and fitness in obese children and adolescents - a clinical experience. <i>Eur J Pediatr</i>, 161, 449-454.</p>	<p>Name/Location: Child Health &amp; Sports Centre, Mier General Hospital, TelAviv University            Description: All participated in the 3-month program (4 evening lectures, meet with the dietician once a month, &amp; weekly exercise for 1 hour twice a week); 65 completed the 6-month intervention            Personnel: Physicians, dieticians            Parental Involvement: Yes</p>	<p>Description: Obese            N: 177            Gender: 90 boys &amp; 87 girls (3-month intervention group); 10 boys &amp; 15 girls (control)            Age: 6-16y            Ethnicity: 128 Ashkenazi, 33 Sepharadic, 16 mixed (3-month intervention)            IC/EC: Without organic cause of obesity &amp; not taking medication that would interfere with growth or weight control</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Wt, BMI, &amp; fitness were evaluated at baseline, &amp; after the 3 and 6 months interventions. Also utilized a control group of 25 subjects (had nutritional counseling once every 3 months and encouraged to exercise 3 times a week)</li> </ul> <p>Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: At 3 months, significant decrease from 55.8±1.2 kg to 54.9 kg. In contrast, a significant increase in wt among the control group. At 6 months, significant decrease - 0.5±0.55 kg (mainly due to loss in 1st 3 months).</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: At 3-months, significant decrease from 26.1±0.3 kg/m<sup>2</sup> to 25.4±0.3 kg/m<sup>2</sup>. In contrast, a significant increase in wt among the control group. At 6 months, significant decrease -1.07±0.23 kg/m<sup>2</sup> (mainly due to loss in 1st 3 months).</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: At 3 months, changes in wt &amp; BMI not significantly affected by gender, pubertal status, degree of obesity, &amp; parental overweight status. Endurance time increased significantly.</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Lazzer, S. et al. (2005). Longitudinal changes in activity patterns, physical capacities, energy expenditure, and body composition in severely obese adolescents during a multidisciplinary weight-reduction program. <i>International Journal of Obesity</i>, 29, 37-46.</p>	<p>Name/Location: Pediatrics Department of the Clermont-Ferrand Hospital, France            Description: 5 days/week for 9 months.            Consists of nutrition education, endurance resistance training, &amp; regular physical activity.            *Inpatient.            Personnel: Physicians, physical trainers, research assistant, dietician, psychologist            Parental Involvement: Yes</p>	<p>Description: Severely obese            N: 27            Gender: 13 boys &amp; 14 girls            Age: 12-16y (mean 14y)            Ethnicity/Race: Not available            IC/EC: Ill health, in prior wt program, taking regular medications or medications that influence metabolism</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Comparison of pre- and post-program physical characteristics (age, pubertal stage, wt, ht, BMI, VO2) &amp; body composition (FFM, FM, BMC, BMD of total body; FFM &amp; FM of arms, legs and trunk)</li> </ul> <p>Outcomes*:</p> <ul style="list-style-type: none"> <li>▪ Wt: Loss of 18.4 kg and 15.7 kg, (s.e.m = 1.27 kg, P&lt;0.001) in boys &amp; girls respectively</li> <li>▪ Ht: Increased 4.5 cm &amp; 1.4 cm (s.e.m. = 0.24, P&lt;0.001) in boys &amp; girls, respectively.</li> <li>▪ BMI: Decreased by 8.1 kg/m<sup>2</sup> &amp; 6.3 kg/m<sup>2</sup> (s.e.m. = 0.38 kg/m<sup>2</sup>, P&lt;0.001) in boys &amp; girls, respectively.</li> <li>▪ Hb A1c: N/A</li> <li>▪ Other: Waist &amp; hip circumferences decreased significantly for boys &amp; girls; FM also decreased significantly for these groups. FFM decrease significantly for girls but not for boys. BMC &amp; BMD increased significantly for both groups. VO2max (l/min) did not vary significantly, but strength &amp; fitness were improved (P&lt;0.001). Time and EE spent at sedentary activities decreased significantly (P&lt;0.001) to the benefit of moderate (recreational) activities and total physical activities (P&lt;0.001).</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Monzavi, R. et al. (2006). Improvement in risk factors for metabolic syndrome and insulin resistance in overweight youth who are treated with lifestyle intervention. <i>Pediatrics</i>,117(6), e1111-e1118.</p>	<p>Name/Location: Fun 'n Fitness/Children's Hospital Los Angeles Description: 90 minutes per week for 12 weeks. Consists of nutrition and physical activity modification activities Personnel: Physicians, dieticians, social work Parental Involvement: Yes</p>	<p>Description: Overweight N: 109 pre- program &amp; 43 post-program Gender: 60 boys &amp; 49 girls Age: 8-16y (11.5y) Ethnicity/Race: 85% Hispanic; Other 15% IC/EC: /History of diabetes, inability to ambulate, medical conditions or taking medications (i.e. glucocorticoids, insulin sensitizers, or psychotropics), no physician approval.</p>	<p>Procedures: Metabolic syndrome risk factors were calculated at 3 weeks pre-program, &amp; at or within 3 weeks after the end of the final session. Data (factors) collected included: BMI, BMI SD, BP, TG, FPG, serum insulin, c-peptide, total cholesterol, HDL &amp; LDL cholesterol, leptin, Hb A1c; repeat sampling for FGP and serum insulin 2 hrs after ingestion of 75g of Glucola.</p> <p>Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: Before program mean 78.23±3.69 kg; after program mean 78.31±3.64 kg; paired t-test not significant; CI -0.72 to 0.54.</li> <li>▪ Ht: Before program 151.1±1.6 cm; after program 152.2±1.6 cm; paired t-test &lt;0.005; CI -1.4 to -0.9.</li> <li>▪ BMI: Before program 33.65±1.15 kg/m<sup>2</sup>; after program 33.19±1.12 kg/m<sup>2</sup>; p&lt;0.005; CI 0.2 to 0.7. BMI SDS before program 2.39± 0.05; after program 2.34± 0.06; p&lt;0.005; CI 0.016 to 0.076</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: Prior to the program, 49% of the subjects had prevalence of risk factors for metabolic syndrome. The overall prevalence of risk factors for metabolic syndrome was 55% in Hispanic and 27% in black participants. There were significant changes (pre- and post-program) regarding SBP, 2-hr glucose, cholesterol, LDL, TG, and Leptin. See article for further results.</li> <li>▪ Qualitative Component: Informal telephone surveys (8 questions) for 39 families that didn't complete the program. Indicated transportation, language barrier, and program time requirements were main reasons for dropping out.</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Reinehr, T. et al. (2003). Predictors to success in outpatient training in obese children and adolescents. International Journal of Obesity, 27(9), 1087-1092.</p>	<p>Name/Location: "Obeldicks" Description: 1 year &amp; divided into 3 phases: 1) 1st 3 months is intensive phase (6 nutrition/eating sessions for 1.5 h each); 2) next 6 months is establishing phase (individual psychological family therapy sessions); 3) last 3 month is further individual care. Exercise therapy is once weekly for one year. Consists of nutrition &amp; exercise education, &amp; behavior therapy Personnel: Pediatricians, dieticians, psychologists, &amp; exercise psychologists Parental Involvement: Yes</p>	<p>Description: Obese N: 75 subjects Sex: 39 boys &amp; 36 girls Age: 7-15y (mean y) Ethnicity/Race: Not addressed IC/EC: Two-time presence in the obesity ambulance &amp; to fill-in a questionnaire according to exercise &amp; dietary habits; primary disease excluded</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Data collection included subjects' willingness to change behavior (changes in wt status, number of attempts at therapy, participation in exercise), somatic characteristics (BMI of children &amp; family members, children &amp; their parents, working mother), exercise &amp; dietary habits, the quality of dietary records. This data was r/t the SDS-BMI using multiple regression. Comparison of SDS-BMI occurred at 3-months pre-program, at beginning of program, and 3-months post-program.</li> </ul> <p>Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: Not evaluated</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: For 63% of subjects, there was a median wt loss of 0.4 SDS-BMI (range – 0.2 to –1.1). 37% of subjects were unsuccessful after treatment.</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: The only significant difference (P&lt;0.0001) between the successful &amp; unsuccessful ones was that they had taken part in the exercise groups before the program began.</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Saelens, B. E. et al. (2002). Behavioral weight control for overweight adolescents initiated in primary care. <i>Obesity Research</i>, 10, 22-32.</p>	<p>Name/Location: Healthy Habits (HH)/2 pediatric primary care clinics in southern California            Description: 4-months; consists nutrition of exercise instruction; subjects randomly assigned to either HH program (includes computer interaction, physician counseling &amp; telephone-&amp; mail-based behavioral counseling) or a single session of physician weight counseling            Personnel: Physicians, those with a degree in nutrition or psychology            Parental Involvement: No (subjects encouraged to implement changes on own or with the help of their families)</p>	<p>Description: Overweight            N: 44            Gender: 26 boys &amp; 18 girls            Age: 12-16y (mean 14.2y)            Ethnicity/Race:            IC/EC: 20 to 100% above the median (50<sup>th</sup> percentile) for BMI for sex &amp; age; interested in weight control; not currently engaged in another weight control program; otherwise healthy as determined by pediatrician</p>	<p>Procedures: Wt, ht, dietary intake, physical activity, sedentary behavior, and problematic weight-related and eating behaviors and beliefs were assessed before and after the treatment, and at a 3-month follow-up. Subject satisfaction &amp; behavioral skills use were measured            Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: No significant decrease for HH or TC groups from baseline to post-treatment.</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: Program led to modest decrease in weight status for HH (about -0.05 in BMI z score) &amp; increase in weight status for TC (about 0.06 BMI z score).</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: At post-treatment, HH reported higher overall &amp; eating behavioral skills than TC group. (P&lt;0.01). HH report greater satisfaction for mailed materials versus computer interaction (P&lt;0.01).</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Savoie, M. et al. (2004). Anthropometric and psychosocial changes in obese adolescents enrolled in a weight management program. <i>Journal of the American Dietetic Association</i>, 105(3), 364-370.</p>	<p>Name/Location: Bright Bodies Weight Management Program/Yale New Haven Hospital            Description: 1 year; each week two 30-minute exercise sessions and one 45-minute nutrition or behavioral modification class. Consists of nutrition, exercise, and behavior modification; given either a structured meal plan (SMP) or taught to make better food choices (BFC)            Personnel: Dieticians, social workers, &amp; exercise physiologists            Parental Involvement: Yes</p>	<p>Description: Overweight            N: 25            Gender: 8 males &amp; 17 females            Age: 13.3±0.6 (SMP); 13.6 ±0.3 (BFC)            Ethnicity/Race: 8 White (SMP); 7 White, 7 Black, &amp; 3 Hispanic (BFC)            IC/EC: Major health or psychological condition, medications for weight management, or involved in a concurrent weight control program</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ BMI, body fat percent, and self –concept were measured at 0, 1, and 2 years.</li> <li>▪ Outcomes were analyzed for the entire group and by diet method groups.</li> </ul> <p>Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: Not evaluated</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: At 1 year, entire group had a decrease in BMI z scores from 2.49± 0.10 to 2.3± 0.10(P=0.004) (i.e. a 7.7% decrease or a decrease in absolute BMI from 40.10 to 37.7±2.08, P &lt; or = .0001). At 2 years, decrease in BMI from baseline was maintained (2.29± 0.10, P=.03), or an absolute BMI decrease to 39.3±2.08, P .</li> <li>When comparing dietary approaches, the SMP group showed more favorable short-term results for BMI (P=0.11), but by year 2, the BFC further improved BMI (P=.006), while the dieting group reverted back to baseline. See article for further results.</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: At 1 year body fat percent decreased from 45.76%± 1.65% to 40.79%± 1/66% (P=0.002), &amp; self-concept increased (P&lt;0.001). At 2 years body fat (P=0.15) &amp; self-concept (P=0.10) were not significantly higher than baseline (P=0.10).</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Spieth, L. et al. (2000). A low-glycemic index diet in the treatment of pediatric obesity. Arch Pediatr Adolesc Med, 154(9), 947-951.</p>	<p>Name/Location: Optimal Weight for Life Program; Children's Hospital, Boston, Massachusetts            Description: About 4-months/one primary session &amp; then about 4 follow-up visits. Consists of a primary counseling session that included dietary instruction (assigned either low glycemic index diet (low-GI) instruction or low fat diet instruction &amp; physical activity recommendations; follow-up appointment once monthly for 4 months; some received problem-focused behavior therapy with a program psychologist            Personnel: Pediatrician, dietician, pediatric nurse practitioner, program psychologist            Parental Involvement: Yes</p>	<p>Description: Obese            N: 107 (64 low-GI &amp; 43 low fat diet)            Gender: boys (30 low-GI &amp; 19 low fat diet) &amp; girls (34 low-GI &amp; 24 low fat diet)            Age: 10.6±4.0 y (low-GI) &amp; 10.2±3.1 (low fat diet)            Ethnicity/Race: 10 Black/Hispanic &amp; 54 White (low-GI) &amp; 20 Black/Hispanic &amp; 23 White (low-fat diet)            IC/EC: Cushing's syndrome, hypothyroidism, hypothalamic, diabetes, or obesity-associated genetic syndrome, or concurrent energy diet</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Changes in BMI and wt from first to last clinic visit were evaluated; the 2 groups were compared. Outcomes:</li> <li>▪ Wt: -2.03 kg [95% confidence interval -3.19 to -0.88] in the low-glycemic index group vs. +1.31 kg [-0.11 to + 2.72], P&lt;.001) in the reduced fat group</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: -1.53 kg/m<sup>2</sup> [95% confidence interval, -1.94 to -1.12] in the low-GI group vs. -0.06 kg/m<sup>2</sup> [-0.56 to + 0.44], P&lt;.001) in the low fat group. Significantly more patients in the low-GI group experienced a decrease in BMI of at least 3 kg/m<sup>2</sup> (11 kg/m<sup>2</sup> [17.2%] vs. 1 kg/m<sup>2</sup> [2.3%], P = .03).</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: In multivariate models, these differences remained significant (P&lt;.01) after adjustment for age, sex, ethnicity, BMI or baseline weight, participation in behavioral modification sessions, and treatment duration</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Taylor, M. J., Mazzone, M., Wrotniak, B. H. (2005). Outcome of an exercise and educational intervention for children who are overweight. <i>Pediatric Physical Therapy</i>, 17(3), 180-188.</p>	<p>Name/Location: Western New York State            Description: Consecutive 8 weeks. Twice weekly for 60-minute sessions; consists of exercise and educational components            Personnel: Physical therapists; physicians, registered dietitians, nutritionists, nurse clinicians, an occupational therapist, &amp; a sports psychologist            Parental Involvement: Yes</p>	<p>Description: At-risk-for-overweight or overweight            N: 41 (52 started – excluded d/t E.C.) sessions)            Gender: 18 boys; 23 girls            Age: (mean 10.5y)            Ethnicity/Race: Not stated            I.C./E.C: Age between 8-15y, BMI &gt;'er 85%, stable vital signs, adequate balance and coordination to sit on a therapy ball, sufficient attention to follow instructions in a group setting, and medical consent to participate/missed &gt;'er 4 classes</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Data collection of 2 baseline, pretest measures (separated by 1 week) &amp; a single posttest measure (1 week after program completion). Data included BMI, waist &amp; hip girth, BP, resting heart rate (RHR), immediate post-exercise heart rate (HRfinish), five-minute recovery heart rate (5minHR), &amp; distance walked in six minutes.</li> </ul> <p>Outcomes:</p> <ul style="list-style-type: none"> <li>▪ Wt: Difference between pre- (mean 139 lbs) &amp; post-program (mean 140 lbs)</li> <li>▪ Ht: Difference between pre- (mean 57 inches) &amp; post-program (mean 58 inches)</li> <li>▪ BMI: Significant difference between pre- &amp; post-program. (p =0.0001). Mean BMI decreased by 0.4. 27% of subjects decreased BMI by 1 point or more (corresponds approximately to 4-pound weight loss).</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: Significant difference between pre- &amp; post-program included waist girth (p&lt;0.0001), hip girth (p&lt;0.0001), SBP (p=0.0006), DBP (p=0.0181), RHR (p=0.0115), HRfinish (p=0.0298), &amp; 5minHR (p=0.0255). No significant difference across time for waist-to-hip ratio or in the 6-minute walk. See article for further and post hoc results.</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued.

Publication	Program	Subjects	Evaluation
<p>Woo, K. S. et al. (2004). Effects of diet and exercise on obesity-related vascular dysfunction in children. <i>Circulation</i>, 109, 1981-1886.</p>	<p>Name/Location: Not available (Recruited from 13 primary schools)            Description: 1) 6 weeks/diet &amp; exercise twice weekly (1/2 of group received diet modification only; 1/2 of group received diet &amp; exercise). 2) After 6 weeks, for 1 year, 1/2 of those in the diet &amp; exercise group continue weekly exercise program for a year, all of the others continue 2-monthly diet monitoring program.            Personnel: Trained physiotherapists; dieticians, others not stated            Parental Involvement: Yes</p>	<p>Description: Overweight or obese            N: 82            Gender: 54 boys &amp; 28 girls            Age: 9-12y            Ethnicity/Race: Not available            IC/EC: No known medical illnesses or alternative cause for obesity, no family history of premature cardiovascular disease, no regular medications or vitamins, &amp; have resting brachial artery diameter &gt;2.5 mm</p>	<p>Procedures:</p> <ul style="list-style-type: none"> <li>▪ Physical assessment (BMI, hip-waist ratio, body fat content), blood tests (cholesterol, lipid profiles, glucose levels), and arterial reactivity studies (ultrasound-derived endothelial function (EDD) of brachial &amp; thickness of carotid artery) were compared pre-program, &amp; post-program at 6-weeks &amp; 1-year. Also, multivariate analysis done.</li> </ul> <p>Outcomes</p> <ul style="list-style-type: none"> <li>▪ Wt: Not evaluated</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: No significant decrease at 6 weeks or 1 year post-program.</li> <li>▪ Hb A1c: Not evaluated</li> <li>▪ Other: After 6-week intervention, no significant change in body fat content, fat-free mass. A significant decrease in total cholesterol in both groups &amp; LDL in the exercise group. Fasting glucose (P&lt;0.002) reduced in the exercise group. An improvement in EDD but not NGT of brachial artery after 6 weeks' intervention in both groups, but significantly greater with exercise (P=0.01). Exercise training (<math>\beta=0.54;P=0.02</math>) &amp; changes in LDL (<math>\beta=0.54;P=0.03</math>). For other &amp; 1 year results see article.</li> <li>▪ Qualitative Component: No</li> </ul>

Table 2-4. Continued

Publication	Program	Subjects	Evaluation
Zador, I. et al. (2006). Hemoglobin A1c in obese children and adolescents who participated in a weight management program. <i>Acta Paediatrica</i> , 95(1), 105-107.	Name/Location: Marshfield Clinic/North-Central Wisconsin Description: Once-a-week for 12 weeks. Consists of nutrition, exercise, and behavioral component Personnel: Exercise physiologist, registered dietician, medical social worker, & a nurse practitioner Parental Involvement: Yes	Description: Obese, non-diabetic N: 17 Gender: 10 boys & 7 girls Age: 7-15.8y (mean 10.8y) Ethnicity/Race: All Caucasian IC/EC: Not stated. Subjects received a history, physical & psychological exam prior to program participation.	Procedures: <ul style="list-style-type: none"> <li>▪ Comparison of pre- and post-post Hb A1c &amp; BMI.</li> </ul> Outcomes: <ul style="list-style-type: none"> <li>▪ Wt: Not evaluated</li> <li>▪ Ht: Not evaluated</li> <li>▪ BMI: At the outset of the weight management program was 34.3±6.4 kg/m<sup>2</sup> (mean±1 SD). BMI at the end of the program was 33±6.6 kg/m<sup>2</sup> (p&lt;0.05). Mean BMI in five patients (29%) actually increased by the end of the program but their HbA<sub>1c</sub> values decreased.</li> <li>▪ Hb A1c: At the beginning, Hb A1c was 5.3±0.3%. HbA<sub>1c</sub> at the end of the program was 5±0.2% (p&lt;0.05). There was no significant difference in HbA<sub>1c</sub> change between the prepubertal &amp; pubertal subgroups of children (p=0.59). No significant correlation between changes in BMI &amp; changes in Hb A1c. No significant correlation between changes in waist-to-hip ratio and changes in Hb A1c.</li> <li>▪ Other: Waist-to-hip ratio at program completion was 0.96±0.09(mean ±1SD). Waist-to-hip ratio at program completion was 0.97±0.11 (p=0.411).</li> <li>▪ Qualitative Component: No</li> </ul>

Note. ABMI = Adjusted Body Mass Index; ANOVA = Analysis of Variance; BMI = Body mass index; BM SDS = Body mass index standard deviation score; BW = Body Weight; DABMI = Difference in Adjusted Body Mass Index; DXA = Dual-energy X-ray Absorption; EC = Exclusion Criteria; EE = Energy Expenditures; FM = Fat Mass; FFM = Fat-free Mass; FPG = Fasting Plasma Glucose; Hemoglobin Glycosylated Hemoglobin = Hb A1c; HDL = High density lipoprotein; Ht = Height; IC = Inclusion criteria; LDL = Low Density Lipoprotein; PE = Physical Exercise; SD = Standard Deviation; SDS-BMI = Standard Duration Scores of Body Mass Index; s.e.m. = Least-squares means and standard errors; SPSS = Statistical Product and Service Solutions software; TG = Triglycerides; VO2 max = Maximal Oxygen Uptake; V02 – 170 = Oxygen Consumption at Heart Rate of 170 bpm; Wt = Weight

## CHAPTER 3 METHOD

Using a mixed-methods approach, an evaluation of the Children's Medical Services (CMS) behavior intervention program, initiated in 2002, was carried out utilizing a repeated measures retrospective chart review, interviews with youths and parents, and in-class observations. The CMS program was comprised of four, 1.5 hour weekly sessions for children and adolescents (herein referred to as "youths") and their parents. Although the program curricula (Appendix A) remained constant throughout the program, it was implemented by a rotation of instructors that included Registered Nurses, Registered Dietitians, and dietitian students. The study evaluated those youths' outcomes that attended the CMS program between October 1, 2002, and September 30, 2006.

### **Study Aims**

#### **Specific Aim #1**

A repeated measures, retrospective chart review was used to compare CMS youths' biological measurements of body mass index (BMI) and glycosylated hemoglobin (Hb A1c) at approximately three and six-months before program participation; the first day of the program; and approximately three and six-months after program participation.

#### **Specific Aim#2**

Post-program interviews were conducted with youths and parents using an interview guide (Appendix B). Thematic analysis of the data gathered elucidates salient strengths and weaknesses of the program.

### **Specific Aim #3**

In-class sessions were observed. Field notes were recorded and analyzed for themes. Thematic analysis enabled the researcher to take full account of the many interactions of youths and parents and their potential effects in the social setting of the program.

### **Sample and Sample Size**

A retrospective chart review, interviews, and in-class observations were obtained using convenience sampling. Given a 0.75 effect size, as determined using the means and standard deviation from Eliakim et al. (2002) (mean one: 26.1; mean two: 25.4; sd 0.6), a minimum sample size of 44 will achieve 0.80 power (alpha 0.05) for repeated measures designs with five levels (Maxwell & Delaney, 1990).

The sample consisted of: 1) 59 youths for the repeated measures, retrospective chart review; 2) four youths and five parents for the interview portion of the study; and 3) six youths, seven parents, and four program instructors for the in-class observations.

### **Inclusion Criteria**

1. Met CMS eligibility requirements.<sup>1</sup>
2. Client of the CMS Metabolic Clinic.
3. Age 7-18 years old.
4. Diagnosed as overweight.
5. Completed the CMS behavior intervention program in its entirety.

### **Exclusion Criteria**

1. Youths that dropped-out of the CMS program.

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<sup>1</sup>Under age 21 with medical, behavioral, or other health conditions that have lasted or are expected to last at least 12 months. Economic requirements include Medicaid eligible (Title XIX) Children's State Health Care Network, Florida KidCare State Children's Health Insurance Program (Title XXI) eligible with age up to 19 years with family incomes up to 200% of the federal poverty level, Children's State Health Care Network with family incomes over 200% of the federal poverty level through spend-down to Medicaid levels Children's State Health Care Network as defined in Title V of the Social Security Act, and high risk pregnant female eligible for Medicaid (CMS, 2006).

2. Diagnosed with a cognitive impairment that could affect the youth's comprehension of the CMS program intervention.

## **Recruitment**

**Part #1: Repeated measures, retrospective chart review.** Institutional Review Board (IRB) permission was granted to conduct statistical and scientific research of abstracted youth information without the necessity of written consent from the patient pursuant to Section 456.057(5) (a), Florida Statutes (2006). The data collection procedure complied with relevant requirements of the University of Florida and the Florida Department of Health IRBs by redacting from the youth information provided to the PI all of the 18 HIPAA identifiers (Appendix C). Fifty-nine youths were utilized for this portion of the study because that was the number of youths that had completed the program when data collection began on October 1, 2006.

**Part #2: Post-program interviews.** Children's Medical Services Registered Nurses or Registered Dietitians informed CMS youths of the study by telephone or in person. The youths called or emailed the researcher if they were interested in participating in study interviews. The researcher arranged interviews at CMS or in the interviewee homes. Informed written consent from the parents, and assent of the youths, were obtained. Four youths and five parents enrolled for this portion of the study.

**Part #3: In-class observations.** The CMS nurse provided the researcher with a schedule of the CMS program and the researcher attended a full program that consisted of four sessions. At the beginning of each class, the researcher informed the class that she would observe the program and collect non-identifiable data regarding the description of the room, the instructors, and the participants, via note-taking. The University of Florida Institutional Review Board

(IRB) and the Florida Department of Health IRB granted a “Waiver of Documentation of Informed Consent” for this portion of the study.

## **Procedure**

### **Part #1: Repeated Measures Retrospective Chart Review**

A CMS Licensed Practical Nurse (LPN) collected and recorded pertinent information from 59 CMS youths using the IRB-approved, attached data collection form (Appendix D). Pertinent data included age, ethnicity, and gender. Data also included youths’ BMI and Hb A1c values across five data collection points. The points were approximately six- and three-months pre-program, day of program, and approximately three- and six-months post-program.

Inter-rater reliability was assessed by having the LPN photocopy eight of the 59 CMS youths’ charts and having her to black out all 18 HIPAA identifiers. Then, the researcher recollected the data. There was 100% inter-rater reliability between 18 items for eight subjects.

### **Part #2: Post-Program Interviews**

The informal interviews were tape-recorded. The interviews occurred in the CMS agency sitting room, with the exception of one interview that occurred at a parent’s home. Youths and parents were interviewed separately. The researcher used an interview guide (Appendix B) and encouraged youths and parents to talk about their perspectives.

The evening of the interview session, the researcher transcribed the tapes into typed scripts. At a later date, the transcripts were entered into the Nvivo 2.0 program where they were organized and eventually coded for themes.

### **Part #3: In-Class Observation**

The researcher observed one, four-week program session that consisted of four, 1.5-hour classes. After the researcher informed the class that she would observe the session, the

researcher sat apart from the participants – usually in a chair against a wall at the side of the room.

The researcher observed the entire setting which included a description of the room, the activity, the time, the instructors, and the participants. The researcher observed and monitored verbal and nonverbal cues, and used concrete, unambiguous, descriptive language during the note-taking procedure. The data was collected in a manner that did not identify instructors or participants.

The evening of the session, the researcher typed the hand-written notes. At a later date, the notes were entered into the Nvivo 2.0 software program (QSR International, 2002) where they were organized and eventually coded for themes.

## **Human Subjects**

### **Confidentiality and Legal Minority**

To maintain confidentiality and anonymity of youths for the chart review, a code key was developed for each youth by the CMS LPN. Only the youths' identification numbers appeared on the chart review data collection tool that the researcher received back from the LPN. Interview and in-class observation data was collected, stored, and locked in the researcher's office. After the interviews were transcribed without identifiable data, the audiotapes were destroyed.

It is important to include youths in research. However, youths in research require special considerations because of limitations on autonomous decision-making and requirements for additional risk protections (they may not be able to protect themselves). Two ethical issues relevant to youths involved in research include 1) autonomy, also known as the process of informed *consent/assent*, and 2) whether the proposed research involves *minimal risk* to the

subjects. For this study, the researcher obtained informed written consent from the parents and assent from the youths.

### **Possible Discomforts and Risks**

There was no risk to youths or parents (physical, psychological, social, or economic). The interviews took about 30 to 45 minutes. The researcher met youths and parents at CMS or their houses at their convenience.

### **Possible Benefits**

A direct benefit to the youths and parents is that they each received a \$15.00 gift certificate to a department store for participation in the interviews. It is expected that the youths and parents will eventually benefit from an improved program.

## **Description of Quantitative Analyses: Chart Review**

### **Descriptive Statistics**

As a preliminary step, summary statistics of the group's age, gender, ethnicity and physiological measurements were computed. These statistics included means, ranges, and standard deviations.

### **Repeated Measures ANOVA**

The next step in evaluation of the data involved an exploratory analysis using a repeated measures analysis of variance (ANOVA) to compare group means on a dependent variable across repeated measures of time (Krueger and Tian, 2004). Time is often referred to as the with-in subjects factor, whereas a fixed or non-changing variable (i.e. ethnicity) is referred to as the between-subjects factor (Huck, Cormier, & Bounds, 1974). In this study, one-way repeated measures ANOVA was used to compare differences in BMI and Hb A1c (dependent variable) across time (within-subjects factor) by gender and ethnicity (between-subjects factors).

Since the data was on the same variables over time, they were considered to be *dependent observations*. Thus, in this case, standard ANOVA was not appropriate because it fails to take into account the correlation between the repeated measures and the assumption of independence in ANOVA would have been violated (Davis, 2002; Kuehl, 2000).

Repeated measures ANOVA analyses are a special case of “randomized block” designs that account for the correlation in measurements (Davis, 2002; Kuehl, 2000). The purpose of “blocking” is to isolate variation due to a particular grouping variable (Davis, 2002, Kuehl, 2000). Generally, the null hypothesis of no block effect (no subject differences between the two blocks) is rejected. Blocking also reduces mean sum of squares of error (MSE), so that the effects of a treatment may be better detected such as changes over time. For the purpose of this exploratory analysis, each subject was treated as a block. This controlled for the variation between different subjects so that the trend over time was the main focus (Davis, 2002; Kuehl, 2000).

The assumptions of repeated measures ANOVA include: 1) independence of observations; 2) multivariate normality; and 3) sphericity. To meet the assumption of sphericity, it is required that correlations across all pairs of time periods are constant (Kuehl, 2000). In this study, there were missing Hb A1c data points, and the repeated measures ANOVA dropped 54 of the 59 subjects for Hb A1c analysis. Data collection points were approximately every three months over the course of one year. If a youth was missing BMI and Hb A1c measures at just one of the data collection points, the ANOVA dropped that youth’s entire data set. If there had been a complete data analysis set, the repeated measures ANOVA would have accurately reported whether or not the assumptions held (Kuehl, 2000). Thus, the general linear mixed model was used as the final step in evaluating the data.

## General Linear Mixed Model

The final step in analyzing data was the use of the general linear mixed model because of its ability to handle multiple missing data points (Cary, 1989; Dilorio, 1991). In addition, the general linear mixed model can be used to describe nonlinear relationships across time in a longitudinal database with multiple missing data points (Krueger and Tian, 2004).

The general linear mixed model models for group means as fixed effects while simultaneously modeling for individual subject variables as random effects (Krueger and Tian, 2004). One of the advantages of using the general linear mixed model is it can accommodate missing, random data because the modeling of the individual subject variables allows for the accommodation (Little et al., 1995; Edwards, 2000).

The usual linear model  $y = X\beta + \epsilon$  usually assumes that  $\epsilon$  is Normal  $(0, \sigma^2 I)$  (Edwards, 2000). For example, the errors are independent Normal with zero means and constant variances  $\sigma^2$ . The mixed model is an extension of the general linear model. It gives us more flexibility while specifying the covariance matrix of epsilon (Edwards, 2000). This allows the researcher to include both correlation and heterogeneous variances while assuming normality (Edwards, 2000).

The mixed model is written as  $y = X\beta + Z\gamma + \epsilon$  where  $\beta$  and  $\gamma$  are normally distributed with  $E[\beta] = 0$ ,  $E[\gamma] = \mu$ ; while the  $\epsilon$ 's have a covariance matrix  $G$  and the  $\gamma$ 's have a covariance matrix which is given by  $R$  (Little, 1995). In SAS, the PROC MIXED implements two likelihood-based methods to estimate the model parameters  $(\beta, \gamma, G, R)$  (Little, 1995). The PROC MIXED uses maximum likelihood (ML) and restricted/residual maximum likelihood (REML) estimation methods (Little, 1995). A favorable theoretical property of ML and REML is that they accommodate data that are missing at random (Little, 1995).

For models with fixed-effects involving class variables, such as gender and ethnicity, there are more design columns in  $X$  constructed than there are degrees of freedom for the effect. Thus, there are linear dependencies among the columns of  $X$ . In this event, all of the parameters are not estimable (Little 1995).

There are an infinite number of solutions to the mixed model equations. The PROC MIXED uses a generalized ( $g_2$ ) inverse to obtain values for the estimates (Searle, 1971). The PROC MIXED handles missing level combinations of classification variables by deleting fixed-effects parameters corresponding to missing levels in order to preserve estimability. However, the PROC MIXED does not delete missing level combinations for random-effects parameters because linear combinations of the random-effects parameters are always estimable (Searle, 1971). In this study's data set, there were only missing values on the repeated measures of BMI and Hb A1c and not on the classification variables of gender and race. So all the effects were estimable.

A variety of within-subject covariance matrix structures like Compound Symmetry, Autoregressive Heterogeneous (ARH (1)), Unstructured, and others, are allowed in the mixed model. It uses restricted maximum likelihood to estimate the parameters of the covariates (Little, 1995). For the purposes of this study, the researcher tried to fit the same model under different assumptions, otherwise called Model Selection. For the BMI values, the researcher fit the models under Compound Symmetry (which was not violated). Although it was determined that it was appropriate to use Compound Symmetry, the researcher also assessed whether other assumptions would do better. The Model Selection assisted the researcher to pick the best model in terms of both the model fit as well as how parsimoniousness of the model. Between the three models, it was determined that the Unstructured Covariance Matrix was the best fit.

In the same way as within-subjects can be specified, the between subjects covariance matrix structure may also be specified. For example, if we assume for  $\Sigma_u$  Compound Symmetry, ARH(1), Unstructured, and others, then under the above model the  $E(BMI_{ij}) = \mu + \beta_1 TIME_{ij} + \beta_2 Male_j + \beta_3 White_j$  is the population averaged model (Little et al., 1994). In order to decide which covariance structure to use, models can be fitted under different covariance assumptions and then selected using some model selection criteria like BMI and Hb A1c.

The mixed model also allows the effect of time and the intercept to vary between subjects and includes them as random effects in the model (Little, 1995). The mixed model is capable of treating time as either a continuous variable or a categorical variable or both (Krueger and Tian, 2004). The analysis was performed treating time as a continuous variable using the Random statement.

### **Description of Qualitative Analyses: Interviews and In-Class Observations**

The researcher interviewed participants and observed in-class sessions in order to go beyond what the chart review data would allow; to have a deeper understanding of the CMS program. According to Weinreich (2005), qualitative methods immerse the researcher in the situation, enable the researcher to interact with study subjects, and thereby generate a rich context for understanding health behavior, the meaning people assign to phenomena, and the mental processes underlying their behavior.

The researcher used the method of ethnography – by seeking to answer central questions concerning the ways of life of the program participants. Ethnographic questions are generally concerned with the link between culture and behavior and/or how cultural processes develop over time (Hall, 2007). Ethnographies are usually extensive descriptions of the details of social life or cultural phenomena in a small number of cases (Hall, 2007). For the purpose of this

study, the interview questions and in-class observations provided a wide range descriptive data concerning participants' program experiences. The researcher spent a considerable amount of time interviewing participants and observing program classes. The researcher sought to gain what is called an "emic" perspective; that is to say the program participants' perspectives.

Initially, using the Nvivo 2.0 program software, the transcribed interview data was coded according to the interview guide questions in order to facilitate the grouping of answers from the participants. For example, "Why did you attend the CMS program?" was an initial code. The in-class observation field notes was coded according to the sequence of activities that occurred in the program – snack, exercise, or lecture activity. Those preliminary codes are presented in chapter five.

Lastly, the entire text of chapter five was hand-coded into five major themes as discussed in chapter six. Themes are described as the conceptual linking of expressions (Ryan & Bernard, 2003). The researcher knew that she had found a theme from the organized data when she was able to answer the question, "What is this expression an example of" (Ryan & Bernard, 2003)?

Thus, scrutiny of the interview and in-class observation data occurred when the interview tapes were transcribed and in-class notes read and reread. Examination of the data continued after the transcribed text was entered into the Nvivo 2.0 program for organization and coding analysis. The entire process facilitated analysis of the transcripts for emerging themes.

In 1945, anthropologist Morris Opler (Ryan & Bernard, 2003) defined themes as dynamic affirmations that control behavior or stimulate activity. Themes come from the data (an inductive approach) and from the investigators prior theoretical understanding of the phenomenon under study (a priori approach) (Ryan and Bernard, 2003). The researcher

identified themes mostly by recognizing topics that reoccurred in the program setting, activities, and among the participants.

### **Summary**

The CMS program was comprised of a four, 1.5 hour weekly sessions for overweight youths ages 7 to 18 years. The mixed-method design included three parts: 1) a repeated measures, retrospective chart review of 59 CMS youths' BMI and Hb A1c measures from six months before the program to six months after the program; 2) nine post-program interviews among youths and parents; and 3) in class observation of the program.

Statistical analyses for the chart review included summary statistics and a preliminary analysis using repeated measures ANOVA. The repeated measures ANOVA, which requires a complete array of data, could not accommodate (dropped any subject that was missing as few as one data point) for the missing Hb A1c data points in the study. Therefore, the general linear mixed model was utilized because the mixed model can accommodate a dataset with a large portion missing (Krueger and Tian, 2004).

Qualitative interview and observation data was collected to supplement and interpret the quantitative component of the study. Thematic analysis of the interview data gathered aimed to elucidate salient strengths and weaknesses of the program. Class observation data was collected to describe the program setting, activities, and participants.

## CHAPTER 4 QUANTITATIVE RESULTS

This chapter provides the quantitative results of the chart review. The quantitative findings include the use of descriptive statistics, repeated measures ANOVA for preliminary analysis, and the general linear mixed model.

### **Chart Review Findings**

#### **Descriptive Analyses**

The 59 youths' ages ranged from 7 to 18 years ( $M = 13$ ,  $SD = 2.68$ ). The percentage of female participants (69.5%) was greater than that of male participants (30.5%). The ethnicities of the members were as follows: African American (64.4%); Caucasian (22%); and Unknown ethnicity (13.6%).

At each of three-month data collection intervals across 12 months, BMI measures were as follows: six-months pre-program ranged from 22.8 to 50.9 ( $M = 34.9$ ,  $SD = 6.64$ ); three-months pre-program ranged from 22.6 to 58.0 ( $M = 36.8$ ,  $SD = 8.56$ ); day of program ranged from 22.4 to 59.8 ( $M = 37.4$ ,  $SD = 8.83$ ); three-months post-program ranged from 21.9 to 60.6 ( $M = 36.4$ ,  $SD = 8.43$ ); and six-months post-program ranged from 22.2 to 62.2 ( $M = 37.0$ ,  $SD = 9.15$ ) (Figure 4-1).

At each of the three-month data collection intervals across 12 months, Hb A1c measures were as follows: six-months pre-program ranged from 4.5% to 13.5% ( $M = 5.67\%$ ,  $SD = 1.8$ ); three-months pre-program ranged from 4.7% to 12.4% ( $M = 5.8\%$ ,  $SD = 1.57$ ); day of program ranged from 4.2% to 13.9% ( $M = 5.5$ ,  $SD = 1.5$ ); three-months post-program ranged from 4.4% to 11.9% ( $M = 5.69$ ,  $SD = 1.26$ ); and six-months post-program ranged from 4.4% to 7.9% ( $M = 5.35$ ,  $SD = 0.65$ ) (Figure 4-2).

## **Repeated Measures ANOVA**

Repeated measures ANOVA analysis requires a complete set of data; therefore, the repeated measures ANOVA was performed as a preliminary analysis for only the BMI datasets and not the Hb A1c datasets. As formerly mentioned in Chapter three, the incomplete Hb A1c datasets led to the use of the general linear mixed model in order to accommodate for the multiple missing data points. Only five of the 59 Hb A1c datasets were complete, therefore, the repeated measures ANOVA for Hb A1c was not included in results.

The total number of BMI datasets used in this repeated measures ANOVA analysis was 26 as compared to 59 BMI datasets used for the general linear mixed model analyses. This was because 33 BMI datasets were incomplete. This analysis revealed a significant increase in BMI measurements for the group over time ( $df\ 1; F = 4.7; P < 0.05$ ) (Table 4-1). No significant within-subject effects were noted for BMI or changes across time (Table 4-1).

## **General Linear Mixed Model**

The purpose of the general linear mixed model analysis was to describe changes in BMI and Hb A1c. The BMI dataset was previously analysed using a preliminary analysis using repeated measures ANOVA. Since both the Hb A1c and BMI datasets were incomplete, the researcher decided to use the mixed model to analyze both BMI and Hb A1c datasets. The general linear mixed model analysis accommodated for 59 BMI datasets and 59 Hb A1c datasets.

The primary fixed effects in the model were gender, ethnicity, and time. The mixed model analysis allowed the researcher to model for higher order, nonlinear changes in the dependent measures (BMI and Hb A1c) across time. As previously explained in chapter three, the Unstructured Covariance Model yielded the best model for both BMI and Hb A1c.

The effect of time on BMI was significant ( $df\ 4; F = 4.95; P < 0.05$ ) (See Table 4-2). This finding was the same as the preliminary repeated measures ANOVA finding for BMI; that

youths' BMI measures *increased* rather than *decreased* over time. The effects of gender and ethnicity on BMI measurements were not significant (Table 4-2).

The effect of time on Hb A1c was significant ( $df$  4;  $F = 2.80$ ;  $P < 0.05$ ) (See Table 4-3); that youths' Hb A1c measures *decreased* over time. The effects of gender and ethnicity on Hb A1c measurements were not significant (Table 4-3).

### Summary

For the chart review, 59 youths' ages ranged from 7 to 18 years ( $M = 13$ ,  $SD = 2.68$ ). Since the repeated measures ANOVA required a complete set of data, the repeated measures ANOVA was performed for only 26 of the 59 BMI datasets. It was not performed on the the Hb A1c datasets. This analysis revealed a significant increase in BMI measurements for the group over time ( $df$  1;  $F = 4.7$ ;  $P < 0.05$ ) (Table 4-1). No significant within-subject effects were noted for BMI or changes across time (Table 4-1).

The researcher used the mixed model to analyze both BMI and Hb A1c datasets. The mixed method accommodated for 59 BMI datasets and 59 Hb A1c datasets. The primary fixed effects in this model were gender, ethnicity, and time. The effects of gender and ethnicity on BMI measurements were not significant (Table 4-2). The effect of time on BMI was significant ( $df$  4;  $F = 4.95$ ;  $P < 0.05$ ) (Table 4-2). This finding is the same as the repeated measures ANOVA finding for BMI; that members' BMI measures *increased* rather than *decreased* over time. The effects of gender and ethnicity on Hb A1c measurements were not significant (Table 4-3). The effect of time on Hb A1c was significant ( $df$  4;  $F = 2.80$ ;  $P < 0.05$ ) (Table 4-3); that youths' Hb A1c measures *decreased* over time.

The quantitative data provided a general understanding of how the program was affecting youths' biological measures such as BMI and Hb A1c. The following chapter will add content to

the statistical results by exploring youths' and parents' views and program experiences more in depth (Ivankova, Creswell, & Stick, 2006). Qualitative results are especially useful when unexpected findings, such as youths' higher post-program BMI values and lower post-program Hb A1c values, arise from quantitative findings (Ivankova, Creswell, & Stick, 2006).

Table 4-1. Repeated measures ANOVA for BMI using 26 subjects: Within- and between-subjects effects.

Source	<i>df</i>	Sum Square	Mean Square	<i>F</i>	
Within					
BMI	1	0047.50	47.50	4.730	*
BMI x gender	1	0002.62	02.62	0.260	
BMI x ethnicity	8	0024.50	03.06	0.762	
Error (BMI)	24	0241.00	10.00		
Between					
Gender	1	0573.00	573.00	0.186	
Ethnicity	2	0015.40	007.71	0.776	
Error	24	7415.00	309.00		

\*p<0.05

ANOVA = Analysis of Variance

BMI = Body Mass Index

Table 4-2. General mixed linear model effects for BMI using 59 subjects.

Effect	<i>df</i>	<i>F</i>	
Time	4	4.95	*
Gender	1	0.02	
Race	2	0.15	

\*p<0.05

BMI = Body Mass Index

Table 4-3. General linear model effects for Hb A1c using 59 subjects.

Effect	<i>df</i>	<i>F</i>	
Time	4	2.80	*
Gender	1	0.64	
Race	2	0.85	

\*p<0.05

Hb A1c = Glycosylated hemoglobin

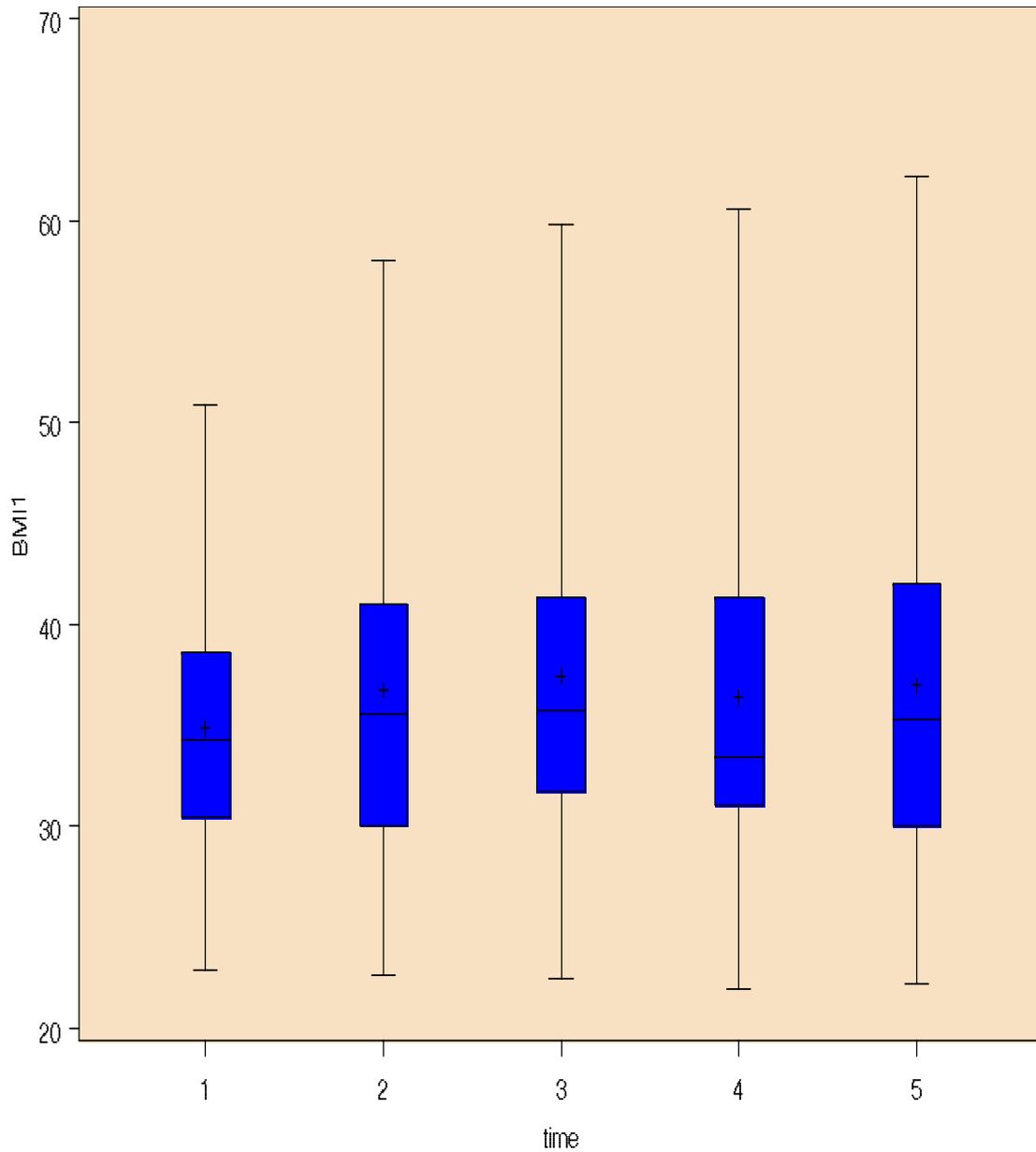


Figure 4-1: Chart Review: BMI (BMI1) measurements over 12 months. The 5 data collection points are 3 months apart. Data collection points 1 through 3 are pre-program measurements, and data collection points 4 and 5 are post-program measurements. BOX PLOT: The two major lines are the minimum and maximum values. The three lines that make up the main box are the three quartiles. Quartiles divide the data into 4 equal parts in terms of the number of observations you have (not the magnitude) the second quartile is also called the median (the middle most observation). The plus sign is the position of the mean. In data that has outliers or is skewed the mean gets pulled in the direction of the skew or the outliers. The dots are the outlying points.

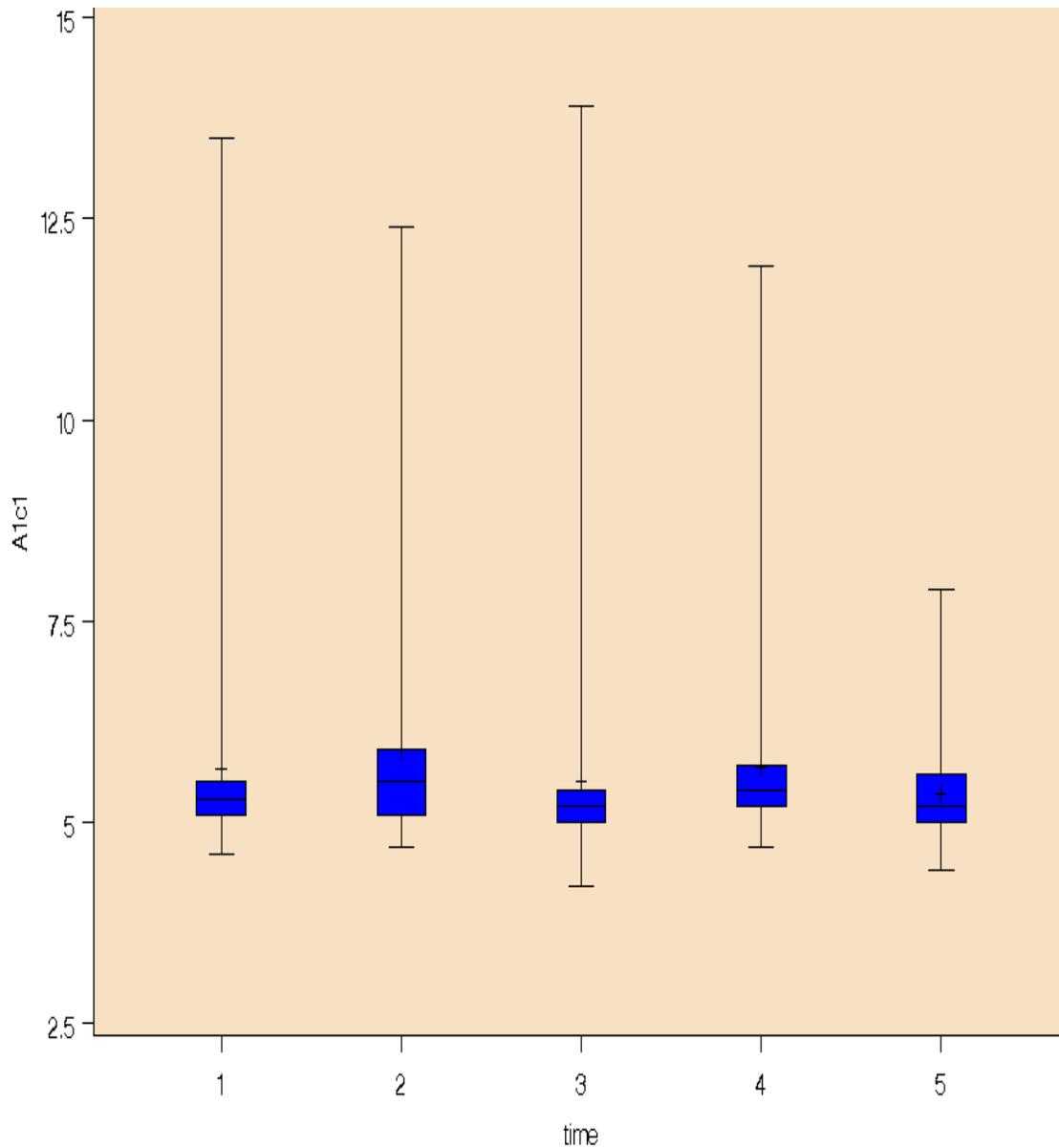


Figure 4-2: Chart Review: Hb A1c (A1c1) measurements over 12 months. The 5 data collection points are 3 months apart. Data collection points 1 through 3 are pre-program measurements, and data collection points 4 and 5 are post-program measurements. BOX PLOT: The two major lines are the minimum and maximum values. The three lines that make up the main box are the three quartiles. Quartiles divide the data into 4 equal parts in terms of the number of observations you have (not the magnitude) the second quartile is also called the median (the middle most observation). The plus sign is the position of the mean. In data that has outliers or is skewed the mean gets pulled in the direction of the skew or the outliers. The dots are the outlying points.

## CHAPTER 5 QUALITATIVE RESULTS

This chapter provides the qualitative results of the interviews and in-class observations<sup>1</sup>. In this chapter, the transcribed interview data were organized according to the interview guide questions in order to facilitate the grouping of answers from the youths and parents. The in-class observation field notes were organized according to the sequence of activities that occurred in the program. Using the Nvivo 2.0 software program, the data was then coded for the grouping of answers and observations. Later, the organized data was categorized into five main themes by hand (as discussed in chapter six).

### **Post-Program Interview Findings**

Three of the four youths were female, and three were African American. The male youth (M-1) was the sole graduating member of the program that I observed for this study. The ages of the four youths ranged from 12 to 16. Each youth had at least one sibling living at home.

The five parents were female, and four were African American. The ages of the parents ranged from 33 to 55. The highest education level was two years of college.

I organized the interview findings using the format of the interview guide. This allowed the findings to be organized so that they could be later analyzed for themes. The major data groupings that I identified from the post-program interview questions were: 1) the program is mandatory (for CMS Endocrine Clinic youths); 2) parents were fonder of the program than youths; 3) youths enjoyed exercise and snack activities the most; 4) the parents enjoyed the camaraderie of fellow parents; 5) youths were challenged with the skill-level required for

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<sup>1</sup> This chapter is presented in “first person.” First person is acceptable for qualitative work because the researcher in qualitative is the tool and needs to take responsibility directly for the work.

aerobics and uncomfortable by parental presence; 6) youths want more games; 7) parents want a greater variety snacks and want to be as accountable to the CMS program as the youths (To paraphrase a parent, “Take my BMI and Hb A1c too.”); 8) youths and parents had positive post-program physical changes; 9) youths and parents have made positive diet and exercise changes; 10) there are many challenges to healthy behavior change; and 11) youths and parents would recommend the program to others (Table 5-1). The grouped data was later organized into nine main themes.

### **Why Did You Attend the Program?**

When asked why they attended the program, youths and parents responded that program participation was mandatory and that the CMS endocrinologist referred them to the program because of they were overweight and had elevated Hb A1c levels. One youth stated he was referred to the program by his pediatrician but was scheduled to see a CMS endocrinologist. All parents interviewed appeared to be overweight. Many of the parents stated that they too have type II diabetes.

Parent statement:

I attended because it was mandatory for my daughter to attend. She, like myself, is very much overweight. Struggles with overeating. Struggles with food addiction. Mainly, our food choices . . . junk food, sugar. So it was mandatory. And for her, her sake, we agreed to go because we want what’s best for her.

Overall, parents were positive about the program and appreciated the support. Parents saw it as a resource for both the youths and their families.

Parent statement: The endocrine specialist here at CMS, referred us to the . . . program as a way to implement some better and healthier changes . . . To see if it would help my daughter lower her bad cholesterol, and get her Hb A1cs down . . . And just as a resource for our whole family, so we can transition together. And not just leave her out in no man’s land with this blood level stuff and no way to help her diet and you know, no education about what she could do to help herself basically.

## What Was the Program Like for You?

Parents had fond recollections of the program. Parents expressed enthusiasm when they talked about the program.

Parent statements:

I thought that was great. I thought the whole program was very upbeat. There is nothing at all negative about it. Nothing at all boring about it. You could tell the people were well prepared . . . they did their homework.

Enjoyed everything about it!

I liked it. I hated when it was done.

So we came and we had a good time. .

. . . When I talked to Ms. RD [Referring to the dietician], I said, “You all want us to do it again? I want to do it again!” I enjoyed it and wanted to keep going. I want to go back.

Well . . . for one I enjoyed myself because I love exercise [Laugh].

Youths’ feedback was more difficult to elicit. The youths generally expressed disinterest in the program. Their responses as to whether or not they enjoyed the program ranged from “no” to “it was ok.”

Parents also had difficulty eliciting feedback from youths. When asked whether their children enjoyed the program, parents did not know what to say.

Parent statements:

A: She didn’t say. I enjoyed it. [Laugh]

Q: You enjoyed it but you’re not sure she did.

A: I can’t say.

I don’t remember her saying anything positive. But I don’t remember her saying anything negative either. Maybe she said something like she didn’t need it. Because like I said, we’ve always tried to be healthy. But again, it was reinforcement for me. And it was great that my husband was there because he learned a lot.

In two instances, parents mistakenly said their children enjoyed the program.

Parent statement:

PI: How did your child like the program?

Mother: Well, she loved it.

Youth statement:

PI: Do you think the program was fun?

Daughter: It was ok.

PI: Was it something you looked forward to coming to?

Daughter: No, not really.

Q: Ok. So, it was ok, it wasn't really fun, you didn't really look forward to coming to it . . .

Daughter: I had to come.

Parent statement:

Mother: I think that she did enjoy it and she loves to dance. That was a big thing for her. Oh it was wonderful for us . . . it was a lot of fun because the parents and the kids got to participate.

Youth statement:

PI: Would you say the program was fun?

Daughter: No.

### **What Did You Like Most about the Program?**

With the exception of one youth, exercise and snacks were the youths' favorites.

Youth statements:

I like the exercising that we did. We danced every time we came . . . Just the dancing.

The individual, against-the-wall, exercises . . . we put our backs against the wall and tried to see how long we can stay on our backs. And then we had to switch and hold the cans of peaches or pears like that. [Demonstrates]

The hula-hoops. That's it.

Parent statement:

Um, she liked making, um, pizzas.

The exception was the youth whose favorite program activity was the food pyramid exercise. The youths were given a copy of the food pyramid and asked to identify how many servings of each food group they should consume each day.

Youth statement:

The part I liked the most was when we were in the back room and started talking. Then she gave us like a photo, and asked us how many servings we should have . . . and I guessed the most right.

What parents liked about the program was that it was family-based and not just youth-specific.

Parent statements:

Well, I liked the fact that I was allowed to include my family and not just \_\_\_\_ [Referring to daughter]. I think that is so important, especially when you're dealing with a child that is in the CMS program for whatever reason. They are already marked because of whatever disability or chronic illness of whatever they have. So, the ability to include the family in this part of her journey is important to me.

What I really liked about it was it incorporated the whole family and it gave my husband a chance to learn about healthy eating. He's never had a weight problem and between just \_\_\_\_ [Refers to daughter participant] and I trying to lose weight, it was always hard because he would always have all this junk food. And what I really liked about it was that it brought the whole family together . . . that is what I liked about it. That my husband was able to come and we were able to work on the problem as a couple. Not just me trying to feed this guy brown rice and wheat bread. You know, I had a lot of years that he fought me on that you know [Laugh]. That's what I really enjoyed about it. That is was a family affair.

Other parental favorites included: 1) the variety of snacks; 2) the live aerobic exercising; 3) the camaraderie with other parents; the 4) peer support for their children; and 5) the end-of-program graduation certificates.

Parent statements:

I thought it was wonderful the way they offered the children there a variety of new kinds of snacks.

We'd have our workout clothes on and exercise and get a snack here that was nutritious.

I like the fact that they made the exercise fun and the snacks that they put out for us were . . . there where choices and you could make it the way that you wanted to make it . . . the way you like. And it wasn't just, you know, a pre-made thing that you had to try. You could do it this way or that way. So there was a choice. Umm, which I think is also important with children.

We had a FSU student that would come and she taught us dances and you know, steps as part of physical activity and that was our exercise for the day. It was a lot of fun because the parents and the kids got to participate. And my other two children were allowed to participate as well so it was really good for us.

It was the exercising. It wasn't way they did this one . . . she brought in some, you know, the updated music and I guess, the fitness instructor. You know, they taught us a dance step and to go along with it.

Just to listen to other parents talk about their struggles . . . they go, this is how I did it . . . so you sort of form a friendship . . . you just hated it ending.

She was with her peers. And so, I guess it kind of is not like Charlie Brown's teacher, "Wha wha wha wha . . ." It's not what they hear. They actually can know that other people are doing it too that are their age and it is ok.

And I like the fact that there was a reward [a graduation certificate] for participating because I think that shows the children that their time is valued.

Parents appreciated convenient program schedules.

Parent statements:

The times were ok . . . We're in a church and on Wednesdays . . . you know with me coming with her . . . we got out . . . she met friends . . .

It worked out that, because D [Referring to daughter] is in middle school, she gets out . . . she has a late release time. So I would pick-up my younger children from school after two o'clock, get them a snack, get some homework done, and then pick D [Referring to daughter] up and come to CMS. The program was on Wednesday. I attend church on Wednesday evening. So, it got over just in time for us to leave and go to church. So, it worked out really good for us.

### **What Did You Like Least About the Program?**

Youths and parents did not openly share what they liked the least about the program.

Youth statements:

I can't think of anything.

Q: Is there anything about the program that you didn't like as much?

A: No.

Q: Were there any parts of the program that you didn't like?

A: No.

Parent statements:

But to think about anything I disliked, I maybe can't remember.

Nothing I didn't like.

One female youth spoke of an experience with an aerobics instructor. She shared that the instructor was impatient and demanding.

Youth statement:

Q: Were there any parts of the program that you really didn't enjoy?

A: Well, the aerobics . . . because she was like kinda getting frustrated with us. I'm a hard learner. I'm a really hard learner and you have to like, sit down, and be a little more patient with me. So, she couldn't get me to get it and she got frustrated with me. That could have been better. Plus, she kept messing up on the aerobics so I couldn't follow her.

Parents shared that their children were embarrassed when performing the exercises and were also embarrassed to be with their parents.

Parent statements:

Well I guess I was the class clown. The dancing thing . . . we got very . . . you know when we had to introduce ourselves. You know, she wasn't motivated at first but I guess you know kids don't like to be embarrassed. She was like, you stay in the back or whatever. You know, at first the exercising was kind of challenging to her and you know, being a teenager but . . . I told her, if you get out there and just show that . . . even if you don't like it . . . just do it. So I think, by the time we completed . . . learned the dance she started to like it. But at first, it was just like, oh my god exercise. I think being heavy and you know, overweight, she thought, "I gotta move?"

They put us in groups and we had to do the whole dance thing with the group so she didn't want to be in my group. She wanted to show that her group was better. But that was probably the only thing that I perceived that she didn't like.

One parent shared her daughter's dissatisfaction with the journal-writing activity that requires members' to record their dietary consumption during the day.

Parent statement:

Dislike is a strong word but . . . [one] thing that she didn't like . . . the journal writing. Writing down what she ate. It was, you know, to somebody who is a preteen, it is pointless. "Why would I write it down?" "Well, because this is a way for you, and the doctors, and nurses, to see what you're putting in your body so that they can help you maintain this." But you know, I think her thing was, on top of all the writing you have to do you still have to do your homework. And it was a weekly thing you know. So I think for her all that writing and remembering you know, and trying to keep up at that age you don't want to be so anal about . . . you don't really care.

One parent shared that her daughter was tired from school at the end of the day, making attendance at the program stressful.

Parent statement:

. . . You know coming straight from school and having your brain picked all day was probably . . . and a lot of the kids, including D [Referring to daughter] would drag. It's just that time of day where they are tired and worn-out . . .

### **What Do You Suggest For Program Improvement?**

Only one youth had a suggestion to improve the program. She shared that it could be more interesting if the program includes games.

Youth statement:

I would put more games into the program. Games that would make it more fun and where you could do exercise at the same time. Or if games so you just wouldn't have to just sit in a room.

The parents' suggestions ranged from "no suggestions" and "keep it the way you had it" to 1) have a greater variety of snacks, especially regarding vegetable choices; 2) make the parents as accountable as the members in the program.

Parent statements:

I think they need to keep it the way they had it. I thought everything was great. thought it was an excellent . . . it's an awesome program. I don't know where they could make any changes.

I would say to really go out of the norm of what people think they wouldn't like. The carrots and the broccoli . . . try something different. Because I know there's a restaurant, I can't think of the name of the restaurant right now, but they have a salad that I go there and

they have the fresh squash and zucchini cut up and it's not cooked but in the salad. So you know, just integrate something like that . . . I don't know what they've done lately. But that would be really good. But other than that they had some very nutritious snacks.

But in fact, there is nothing wrong with all of us making the changes to eat the food pyramid the way that it's designed. And so, if there was a way to keep parents on that same accountability level, I think that would be a big way to ensure more success for more people.

### **Would You Recommend the Program to Others?**

Youths and parents unanimously articulated that they would recommend the program to other members and their parents (if they needed it).

Youth statements:

Yes. But I don't think I have any friends like me. But if I did, I would.

Q: Do you think your friends would like the program?

A: Yes.

Q: So you would recommend this program to other kids if they needed it?

A: If they needed it, yes.

Parent statements:

Oh yes, definitely. Definitely. I've even had some friends, you know that their children are now looking at D [Referring to daughter] and saying, "What has she done?" Well, she was recommended by the doctor . . . if you're concerned about your child's health or weight, they can . . . refer you to it . . . because that is how we got to it - by referral . . . I would definitely recommend it.

Q: Would you recommend this program?

A: Absolutely.

Q: Would you recommend this program to other parents or children?

A: Sure.

Q: Would you recommend the program to other parents and children?

A: Yes. Yes. Absolutely.

## What Are Your Post-Program Behavioral Changes?

Youths shared that they were eating more fruits and vegetables, and exercising more since participating in the program.

Youth statements:

Well, eating more salads. Eating more fruits and vegetables.

At my school, I do PE as much as possible . . . And I do aerobics at home. I turn on the music and I just dance to the music.

And I do crunches and sit-ups. I dance for 30 minutes and do jumping jacks when I turn on the CD. We have this channel called “Fit TV.” They do aerobics, exercises, it’s all day . . . you can do it all day if you want to. I do it until I get tired. [Laugh]

Q: Umm . . . do you exercise every day?

A: I try to but . . . [Unintelligible]

Q: So how long every day do you exercise?

A: Umm . . . at school it’s like 55 minutes?

Q: Do you have PE every day at school?

A: Yeah. It’s the only time we get exercise . . . softball . . . baseball . . . football . . . basketball . . . and we have warm-up where we do lunges and things like that.

Parents talked about changes they made after the program regarding: 1) grocery shopping; 2) beverages; 3) junk food; 4) portion sizes; 5) salt, sugar, and fat intake; 6) cooking methods; 7) fruit and vegetable consumption; 8) whole grains; 9) reading food labels; and 10) exercise.

**Grocery shopping changes.** I shop now with a list versus, you know, at least that way if I have a list I don’t have to go down every aisle. And I try to stop first at the fruits and vegetables so that I don’t fill my buggy up with all the other stuff and then . . . where am I going to put these, you know, the fruits and vegetables.

**Beverage changes.** For one, cokes, I don’t buy cokes.

Our biggest problem was soft drinks.

We don’t do soft drinks any more. We love, I know I’m advertising, Crystal Light.

We do water more than anything. If we do soft drinks...trying to get used to the diets. It's hard to get used to the diets because my body is a Pepsi person. But I mean, it's just if we do get a regular drink, that's you know not a diet, we portion what we drink. We only drink just a serving.

[After the interview the mom had continued talking and said they were drinking a lot of mint tea now . . . ]

She opts for water over soda a lot of the time . . . and fat-free milk.

The nurse stressed that if [she] would just get off the sugar sodas and just drink water and diet soda . . . that within weeks [she] would lose weight. And she did. She lost 7 lbs in 2 weeks. And that's all she did different.

**Cutting out junk food.** We don't bring as much of the junk food in the house.

She's very, very disciplined about the food choices that she makes. She watches the carbs that she puts into her body. She's very . . . if we eat out, she will choose a vegetable over the French fries.

**Practicing portion control.** We watch our portions. They talked a lot about portions, portion sizes. It just really helped me in my portion control . . . and like food wasn't really bad if you could just watch your portion control. You can have some candy. But you know, try the small, bite-sized candy bars and not the biggies. Or not a bag of butter fingers. Get small. You don't have to deprive yourself. You still can have what you want as long as you check portion control. So the portion control issue helped me because I'm you know . . .

And I say, you can't have that today. But I tell them, when they're hungry when they get home . . . you can have A sandwich, not a Dagwood piled up with meat. You can have A sandwich. [Unintelligible] I tell them just because your not full doesn't mean there is nothing in there.

But I don't want to deny them. I give the candy, the cookies, all the temptations and stuff, um; they do it so they are in little containers. And he knows that, one container a day. If you eat it during school, don't ask for it after school.

For me it was to learn how to portion food. You can eat what you want but it just comes in portions.

Now, we're eating better, but it's portions of what they're eating . . . I'm not going to say it wasn't hard. But once you get into that habit . . . and we've kept it. And I think it's been more than a year.

**Decreasing salt and sugar intake.** You know . . . I put a lot of salt in my food and I don't do that now for one. I say well, what I am doing to her I am doing to myself. And so I say, I didn't say a thing, but put less sugar in tea, kool-aid, and other stuff like that so . . . I say we do this together.

**Decreasing fat intake.** We have transitioned as a family to . . . fat-free milk.

I switched from whole milk to 2% milk.

And I tell her . . . I bought the light mayonnaise, you know. I hadn't done that a lot, you know, earlier. But I tell her she can have some of the mayonnaise, but just use a little bit. I told her, and tell her often, just use a little bit. Don't use a lot. If you want mayonnaise, just use a little bit.

I get chips now and then. But there again I go for the baked chips and I go low fat everything as much as I can.

**Improving cooking methods.** If you season them right you could never tell they were vegetables, you would think it was a meat. Because I've got my children on . . ."Oh, what kind of meat is this? Oh, it's chicken."

**Increasing fruit and vegetable consumption.** And to say that canned foods are the very last thing that you use... We've totally changed things a lot now. We're totally eating fresh vegetables. Totally straight from a garden . . . tomatoes, the cucumbers, the zucchini, the butter squash, just everything, I mean even the spinach.

But you know I stopped buying all the snacks, although, I buy fruits and vegetables. I still give them the chips and cookies and stuff but I do more fruits and vegetable and stuff than I was, and they eat them. Apples, oranges, bananas . . . And they eat them. They love grapes.

**Changing to whole grains.** We have transitioned as a family to whole grain and whole wheat as opposed to white breads and pastas.

**Reading food labels.** And I think the one thing that she came away from it with was learning how to read the labels.

**Increasing exercise.** And I have bicycle at home and sometime, uh, I say, you and I can do this together. What else do we do? We walk together sometime...we don't do it all the time. Sometime we do it together.

She's been doing more exercising. We walk on Fridays. She's made her own exercise gym. [Unintelligible] She's found a fitness program on television that she keeps up with. She's went down, I want to say, I think it's 2 sizes in her clothes.

She is very self disciplined how she does things. Every evening she does a certain amount of crunches on the AB machine at home that she uses. She's on the dance team at school so that provides 3 days a week a level of physical activity for her in the afternoons.

Even if you are folding-up clothes or walking up stairs, you're losing the calories and everything.

Youth statement:

A: I really used to never exercise but now every night I do some type of physical activity.

Q: . . . What types of exercise do you do?

A: Dance.

Q: And you do dancing how many times a week?

A: Two times a week and then the rest of the nights I jog a mile with my dad.

Well, I love to walk . . . Once I started coming here, we started to walk.

**A family affair.** Parents also discussed how the program has prompted them to include the entire family in dietetic and exercise behavioral changes.

Parent statement:

I think it's important that parents support their children in any way possible and just . . . the whole family. We needed a whole family change . . . To get her to see it and then the whole family got involved. Even though her brothers didn't need to lose weight they do it along with her. . . And also, I like the fact that my children hold each other accountable. I don't have to do that because what they learned they took with them. They can point out to each other what they are eating and how many carbs that is and that kind of thing. They take the knowledge they have and apply it to their relationship.

### **What Are Your Post-Program Physical Changes?**

Youths and parents stated that weight for the youths had: 1) decreased; 2) maintained from pre-program levels; or 3) most noticeably resulted in smaller dress sizes.

Parent statements:

She's lost more weight than anyone from the class.

So, and gradually we're just seeing it. And I was telling her that she will lose the inches before you start seeing everything . . . so she gotten some clothes packed because I said she can't get back in these. She's even gotten into some of my clothes.

Youth statements:

I've maintained my weight.

I lost weight . . . About 12 pounds? It fluctuates though.

A youth shared that her Hb A1c has decreased since the program.

Youth statement:

I'm borderline [Referring to diabetes]. They said it [Referring to Hb A1c] was lower but still borderline.

A parent mentioned that she has lost 4 dress sizes since participating in the program with her daughter a year ago.

Parent statement.

I had, you know, when we started this program I was a size 20 . . . now I'm a size 12.

### **What Are the Challenges to Behavioral Changes?**

Parents talked about the challenges the youths face in order to initiate and sustain dietetic and nutritional behavioral changes. Challenges included: 1) apathy for exercising; 2) dislike of certain healthier foods; 3) aversion to following the food pyramid for daily food allowances; 4) practicing different habits when they are away from home; and 5) asserting their identity.

Parent statements:

But every now and then, my daughter, we call her. It's time to walk. She gets mad but she'll go do it.

She gripes a lot about us not having a lot of good stuff in the house. But ah, she's eating better. So that's kind of incorporating what we learned.

He likes, ranch. I tried that low fat stuff, that fat-free ranch. And that's my other problem. I taste it, it's not good me, I just can't make any of my kids eat it. I know that if it is bad for me it 's going to be bad to them.

And I don't want to make any of them you know . . . you don't want that salad, well, sit there and choke it down any kind of way. I don't want them to tell me they're hungry.

And we're not bringing so much junk food into the house so of course she has to eat better. She doesn't like it though.

I know the one thing, I'm still trying him (to get him) to eat salads. Over the summer, my uncle would say he would eat salads. Now, it's like when I say come to dinner for salad, he's like, "What?" So I stopped forcing him. He gags . . . he doesn't chew. So I have to actually tell him, slow down.

I asked her to do that food chart several times but she wouldn't do it.

. . . And I can't control what she does outside.

Q: Why didn't she want to attend the program?

A: It wasn't that she didn't want to. At the time she was very rebellious and acting out. She was staying away from home and she was going to do what she wanted to do.

Two youths talked about the lack of Physical Education (P.E.) available to them at school.

Youth statements:

Q: You were in 6th grade when you were in the program and they didn't have P.E.? A: They didn't have PE class.

I would take P.E. but they didn't give it to me. They made some changes . . . When I registered for classes I got confused.

According to one parent, her child was on medication to treat a medical condition. The medication was causing her son to gain weight irrespective of his behaviors.

Parent statement:

What happened was, I was looking at pictures of him. When he was younger he wasn't that big. But when he got diagnosed with epilepsy, he got on the medicine, he just blew up.

Another challenge is that parents are in the same position as their children; overweight with type II diabetes. Thus, the parents are not following the types of behavioral changes they are advocating for their children.

Parent statements:

Q: Have you changed any ways in exercising?

A: I make him do it.

. . . I'm a diabetic myself and I'm supposed to be going to diabetic classes . . . I learned about things I should have done by now. Like foods. [Laughs]

I had that bicycle for over 3 years. And that bicycle sat there for over a year before I even got on it. [Laugh]

Q [ To parent]: Ok. So you have increased your exercise.

A: I have, but then um . . . stopped. To be honest I stopped. And I haven't did it for a little over a week.

. . . My husband had recently been diagnosed with Type II Diabetes as well.

She, like myself, is very much overweight. Struggles with overeating. Struggles with food addiction. Mainly, our food choices . . . junk food, sugar.

The following quote by a parent elucidates the need for both parents and members to practice healthy dietetic and exercise behaviors.

Parent statement:

I think one of the things that I would like to see is . . . for the parent as you do for the child. And then, you know, take my A1c at the start of the class and hold me accountable as a parent on the same level that you are holding my child accountable. Because, that way I believe you would get more of a response and maybe more success. Because I think a lot of times, and this is a cultural-type thing or an environmental thing but, you have people that show up and do the class and they know their child is at risk for or already has diabetes. One of the other issues is they are here because their child has to be here and needs to be eating this way.

Parents had priorities that superceded the goals of the CMS program. Parents shared a variety of concerns other than that of their children' weight and type II diabetes.

Parent statement:

I am a survivor of sexual molestation in my childhood that has affected every area of my life. I love the Lord Jesus Christ with all my heart. If it were not for him I would be in the bars, Chattahoochee, and I thank God for my salvation and what he saved me from.

A different parent, after the interview recorder was turned off, cried while she shared that she was so tired from raising 4 children and working full-time.

A 12-year-old talked about the importance of individual responsibility to change.

Youth statement:

Push yourself. You're not going to do it all at one time. If you want to go a distance you can't just sit there and expect yourself to change. If this happened to me it can happen to you.

### **In-Class Observation Findings**

For the purpose of organizing the in-class observation analyses, I have provided attendance information for each of the four classes (Table 5-2). Additionally, I categorized the program's class activities into three major segments. The first segment was an exercise activity, the second segment was a snack, and the third segment was an educational segment. This allowed the data to be organized and grouped. Later, the data was categorized into nine main themes.

The grouped data revealed that: 1) the attendance rate declined with each consecutive class; 2) the aerobic exercise venue was confined; 3) youths were challenged with the skill-level required for aerobics and uncomfortable by parental presence; 4) the snack portions appeared to be too small (two out of four times); 5) parents interacted a lot among themselves; 6) the activities were frequently not engaging youths; 7) youths were not utilizing take-home equipment; and 8) the CMS instructors utilized comprehensive learning strategies, however, they may not have been age-appropriate (Table 5-1).

#### **Session Attendance**

The four-day program included 13 youths and parents (Table 5-2). Attendance declined with each consecutive class. Six participants were youths and seven were parents. The six youths ranged in age from 12 to 16. Two youths were male (M1 and M2) and four were female (F1-F4).

**Session one.** The attendance rate for session one was 93.3% percent. Five youths and seven parents attended. The parents of F-4 attended without her.

**Session two.** The attendance rate for session two dropped to 69.2%. F-4 attended this session for the only time, but four other participants did not attend. M-2 and F-2 and the mother of each were absent from session two.

**Session three.** The attendance rate for sessions three and four decreased to 46.2%. Only six youths and parents attended sessions three and four.

Session four. Thirty-one percent of youths and parents attended all four sessions or the “complete” program. M-1, his mother, and F-4’s parents attended all four sessions. F-1 attended three of the four sessions. The remaining youths missed two or more sessions.

### **Exercise Activity**

Just prior to each exercise session, youths and parents met in a first floor, CMS conference room. They signed in and seated themselves at one of two, long tables. On the first session day, CMS staff first led individual youths to a clinic room and recorded each youth's weight, height, and glycosylated hemoglobin measurements. This established biological measures for the day-of-the-program. Youths then rejoined parents in the conference room and waited for the exercise activity to begin.

**Sessions one and two.** The exercise segments in the first two sessions consisted of aerobic exercise to videos. The exercise segments in the first two sessions took place in the CMS lobby. The RN instructed youths and parents to find a place between chairs and to follow the televised aerobic instruction. The following is a narrative of the exercise segment in session two.

The exercise video “African Grace” begins. The video instructor is middle-aged and she wears colorful, African attire. Her head is wrapped in cloth to match her attire. The music is rhythmic. There are multiple drums beating in the background.

During in-class observation, I observed at that at times, the youths appeared self-conscious during the video sessions. This was evident when youths refused to participate or barely participated, laughed and looked around, or rolled their eyes.

Except for F4, the participants follow in participation. F4 smiles, rolls her eyes, and watches the other participants. The other participants are laughing and frequently misstep while they move. They occasionally bump into each other or the chairs.

*RNI approaches F-4, stands beside her, and prompts her. "Come on. Do what I'm doing." RNI moves her own feet side to side. F4 smiles and remains stationary. Both of her parents move to the video, albeit, in a hesitant and unrhythmic manner.*

*One parent is overweight and mobility-impaired. While seated in a chair, the parent follows the video instructor by swaying her upper body, bending her arms, and stomping her feet. The parent smiles and encourages her daughter to follow along, but the daughter just shakes her head, "No".*

I observed that the aerobic exercise venue was not conducive to youths and parents fully and accurately engaging in the exercise. Staff instructed youths and parents to find a place between chairs and to follow the televised aerobic instruction. Some of the youths and parents could not find enough room between the chairs and kept bumping into each other.

Closer to the television, another member and her mother move to the video slowly, and keep misstepping. They laugh together. The member and her mother occasionally bump into each other and the chairs.

The exercise videos exceeded the ability of youths and parents. They frequently misstepped. Additionally, youths may have been uncomfortable by the presence of their parents and CMS patients who came in and out of the lobby but were not involved in the program.

The video instruction is demanding. Some of the moves require hip thrusts that make the participants laugh. About 2 minutes into the video, the male member becomes immobile. He laughs and looks around.

During the session, a dietician informed me that the program continues to review exercise videos for the purpose of finding the best one. She states that she'd like to find an exercise video that:

Is good for those participants that are greater than 300 pounds, has non-weight-bearing exercises, and is arthritis-friendly.

Some youths and parents did not wear the appropriate attire for exercise. One youth's pants fell down when he moved. Youths and parents exercised in their socks, in Birkenstocks, and in loafers.

One mother exercises in loafers. Another mother and her daughter exercise in Birkenstocks, and a third mother exercises in her socks. Every participant wears street clothes.

Whenever a certain member makes a minor move in response to the video, his low-riding pants fall down, causing him to stop moving. The RN walks over to the male member and verbally prompts him to move. He moves very little. Whenever he does move, his pants fall down and he has to pull them back up.

After 15 minutes, the RN stops the video leads the participants through two minutes of deep breathing and side stretching. She then states, “Get some water and we’ll meet back in the conference room.” The participants take turns at the water fountain that is located there in the lobby.

Once everyone is seated in the conference room, the RN asks, “What video do you like better...the one we did last week or the one we just did?” The mother of M1 states, “The walking one.” [Referring to the video in session one.] The parents of F4 nod their heads in agreement. The RN states, “This video is a little complex.”

The exercise segments in sessions three and four did not exhibit the same problems observed during the exercise segments in sessions one and two. The exercise in each segment occurred in an appropriate venue (spacious exercise areas), did not require advanced ability, and did not require special attire or equipment.

**Session three.** The exercise segment in session three involved a hula-hoop activity for youths and parents. The exercise occurred in a spacious, staff lounge, away from in-coming CMS patients. The parents and youths both appeared to enjoy themselves during this activity.

**Session four.** On the last day of the program, the exercise segment involved walking outdoors, around the spacious, CMS parking lot located in picturesque surroundings punctuated by large, majestic oak trees and rolling grass fields. The RN walked at a steady pace with the two youths in attendance, while the parents walked slowly, several yards behind.

## **Snack Activity**

The snack segment followed the completion of each exercise activity. CMS staff directed youths and parents to the water fountain in the lobby, and many did drink from the fountain. All of youths ate their snacks in the staff lounge.

During sessions one and two, dietetic instruction occurred while youths ate their snacks. The parents were also provided snacks during their dietetic instruction while in the conference room. Snack portions appeared to be small (two of the four sessions) under the circumstances.

**Session one.** The snack provided to youths and parents after the exercise session was a cup of fruit that included 15 grapes, a half of an apple, and a half of a banana. Cups of water were also provided to the them.

Youths are separated from the parents and go with the dieticians to the staff lounge. Cup of fruit are distributed to the participants. A dietician brings cups of fruit to the parents who are in the conference room.

While seated in armchairs and sofas that are placed in a circle, the participants eat from their fruit cups. The dietician introduces herself and states, "What we are going to do will be fun . . . learning about nutrition . . . snacks . . .and weight." In less than 5 minutes, all the fruit in the cups is consumed except for one members' half of a banana.

**Session two.** At session two, youths and parents were provided with a bowls of popcorn. Cups of water were also provided to the participants.

The dietician instructs the youths to follow her to the staff lounge for snacks. On one of the tables in the lounge are small plates of popcorn and cups of ice water. The youths each take their serving, and proceed to sit down in a corner of the lounge where there is a carpeted area with sofas and armchairs. The dietician sits with the youths and asks them about daily exercise. The bowls of popcorn are consumed very quickly.

During sessions three and four, snacks were either unavailable or not offered to parents. Most parents sat and watched the youths eat snacks. The one Caucasian mother was assertive at snack time. The mother asked if she could have a snack and if she could have a second portion. The other parents would not ask for snacks.

**Session three.** Vegetables plates at session three appeared to precipitate the most disappointment among youths. They ate mostly the carrots and the dip. They pushed the vegetables around in their plates, and the dieticians stood over them and prompted them by saying, “Try it.” When the plates were put away, a hungry youth went over to the dip bowl and began dipping her carrots into the bowl. She was not offered more to eat and was instructed to join the dietician for nutrition instruction.

The children are nibbling at their vegetables. [The plates remain full of broccoli and cauliflower]. One nibbles at her carrots. As the children sit at the table, the dieticians encourage the children to at least try the vegetables. The parents are seated down the table from the members and are not offered a snack.

**Session four.** Snack portions were small. Youths each received a half of an English muffin, spaghetti sauce, and miscellaneous toppings. One parent also made a pizza. The beverage was a cup of ice water.

The RN invites the children to sit down at one end of a long table. Each child is provided with one half of an English muffin and a cup of ice water. Multiple small bowls set out in front of them. Each bowl contains a different ingredient to build a pizza. The ingredients include Ragu spaghetti sauce, 2 percent mozzarella cheese, mushrooms, green peppers, onions, and pineapple.

The snack segment in session four was an opportunity for youths to engage in an associative activity independent of CMS staff. However, RN and dieticians managed the activity by directing youths’ activities and hovered over the two youths during pizza-making.

The RN and dieticians stand over the children and the food. The parents of the participants eye the food and sit at the other end of the long table. After the children make their pizzas, the dieticians place the pizzas in a broiler oven (temperature 425 degrees F) for 10 minutes while the children sit at the table and wait.

One parent walks over to the pizza-making area and asks the dieticians if she can make a pizza. The other parents stay seated and quiet. [This activity seems slow to the PI.] As the youth eat their pizzas the dieticians talk among themselves.

After the youths ate their pizza, they appeared disappointed and hungry. The Caucasian father of the adopted daughter observed this and told one of the youth to make himself another

pizza. The young boy looked to the RN and dieticians, but they did not confirm the father's suggestion. The boy sat sullen.

One participant finishes his pizza first, in about 3 bites. He eyes the food. The parent of another youth notices the boy eyeing the food. The parent states to the youth, "Have another one there." The boy looks to the instructors and the instructors don't say anything. The dieticians pack-up the pizza-making ingredients. Both children are quiet.

## **Educational Activity**

**Sessions one through four.** At the completion of snack-time, youths and parents separated into different rooms for three of the four education segments. The educational curriculum included a variety of subjects (Appendix A).

Youths met with program instructors in the staff lounge where there were comfortable, upholstered seats. The parents met with program instructors in the CMS conference room equivalently as comfortable as the staff lounge. Youths and parents met jointly with CMS staff during the educational segment for session three.

I observed that during the youths' educational sessions, the youths conversationally-engaged with the program instructors but not with each other. There did not seem to be a time when the youths visited with each other.

### Session Two

RD3 pulls out a colorful copy of a food pyramid. She points to the pyramid's grain/rice/pasta/popcorn section. She then points to the veggies/fruits, dairy/meats, and fat/sweets sections. She quizzes the youths re: how many servings, from each section, they need to eat every day. F1 and F4 answer most of the questions. RD3 laughs and tells the group how well they are doing.

Next, RD3 asks, "How much is a serving of fruit." She continues asking them about portion sizes for all the 4 food groups. F1 primarily answers all of the questions.

There were a few instances when youths appeared to be disengaged from the educational session. In one instance, a dietician had to direct a male youth to put down a newspaper he was reading during the educational segment.

## Session One

M1 is quiet and is looking at his feet. [May be a bit bored.] M2 is slouching in chair but continues to interact. The dietician informs the group, “ When you eat fried chicken, you can peel off the skin . . . ” “Try not to eat fried foods too much . . . it you’re having it a lot, try to have it just one time a week.” She continues, “Baked or broiled is better” and “Fat stays a fat.”

## Session Two

During the discussion, M1 picks up a newspaper from a table and begin to leaf through it. RD3 asks him politely to “Please put that away.”

The food journal was not a methodology that was favored by the youths. CMS staff provided each youth with a journal, instructed the youth to record his or her food intake during the week, and told each of them to bring the journal back to the program the following week. Compliance was low. Over the course of the program, approximately three youths returned their respective food journals to the dieticians for review.

## Session Two

The dietician reminds the class to remember to bring their food diaries next week. Also, she wants them to bring in one food label. She asks, "Who did your food diary last week?" M1 and F2 raise their hands. The dietician exclaims, "Good job."

The dietician leads the participants back to the conference room where the parents are meeting . . . RD3 informs me after the class that she has tried everything to get the youth to bring in their food diaries and that "Nothing works."

I observed that parents were engaged in their educational sessions. They engaged in associative activities by sharing ideas and tips with each other about cooking and grocery shopping. Parents seemed to bond over recipes and their common interest in properly parenting an overweight child. At the end of session three, parents actually stayed late, interacting among themselves and the dieticians regarding where to buy canned fruits, turnips, and collard greens.

## Session Three

[The 3 RDs continue to share advice with a group of congregated parents]

“Try one new thing a week – or another way to eat it.”

“Plan out your meals – what you are doing.”

“Lean meats are less expensive than fatty ones . . . cook lean meats for a longer time to get them tender. For example, in the oven, slow cook the roast with carrots and celery . . . keep adding water . . . worstershire . . . round steak will get really tender.” “Roasts and meatloafs are better left over.”

“Instant oatmeal has more sodium than regular oatmeal.”

“Take off the chicken’s skin before you eat it . . . what you can do is season under the skin, leave the skin on while you cook it, and then take the skin off before you eat it.”

“I like using my crock-pot or pressure cooker.”

“Make a list, be prepared, and be on a budget.”

1732: [The advice continues.]

“Fresh fruit is more expensive . . . so buy it in season. Get canned or frozen if fruit out of season.”

[Parents interact with among selves and with dieticians re: where to buy canned fruit and greens.]

For session three, youths and parents were together for the educational session. The topics were reading food labels and grocery shopping tips. Both youths and parents appeared to really enjoy themselves at that particular session.

### Session Three

The dietician informs the group that "We're going on a grocery store tour today."

With assistance of other dieticians, various types of empty bread bags, cereal boxes, and snack containers are distributed to the youth and parents. A dietician states that nutrition facts are on most food products, however, "Miniature pieces of food don't have it."

A dietician tells the group to "Stay less than 300mg/day of cholesterol a day." She stresses the importance of a diet low in saturated fat. "Some fruits and nuts such as avocados and nuts have mono-unsaturated fat . . . but be careful because they are high in calories." RD2 states that cholesterol is "Only in animal sources and products . . . not in natural vegetables." "Cholesterol is made in the liver . . . so it can only come from a source that has a liver." The participants laugh.

A dietician instructs the group to shop “on the parameter” in grocery stores. “The foods on the parameter have less fat, sugar, and calories.” These foods include dairy, produce, deli,

and bakery.” “Aromas attract you point to point. The bakery operates to draw people in . . . the longer that you are in there, the more money you spend.”

“The cereals are in the middle and are placed at children’s eye level.” “Half of the cost of most food is the packaging.” “Produce is scattered to be inconvenient to get people to buy more. It’s conveniently inconvenient. “Also, you’ll never find the things together like mayonnaise and mustard. This keeps you in the store longer.”

[I think that the content is more engaging for the participants and parents than the previous two sessions. The group is laughing a lot.]

I observed that youths were not utilizing the take-home tools that they were provided with in class. During session one, each family was provided with a set of measuring cups that they are supposed to use to manage food portions. By session four, the youths were still not using the cups.

#### Session Four

The youth are asked whether they are using their measuring cups. [A set of measuring cups were provided to each family in session 1 of the program.] Both members respond that they haven’t used the cups yet. RD2 encourages them to use the cups and states, “Get them out and do something with them. Start using them twice a day and then next week use them 3 times a day.”

Additionally, the youths were given the hula-hoop that s/he used during the exercise activity in session three. When asked the following week whether the hula-hoop is being used, a youth replied that it was still in the car.

#### Session Three

The instructor asks the group if they have been using their hoola-hoops. [Hula hoops were given to participants in session 3 of the program.] M1 states, “It’s too hard. My hoop is still in the car.” F1 states that she missed last week’s session and didn’t get a hula-hoop. The instructor tells her that she will get one when she attends the missed session next time around.

By the end of the program, the youth and parents appeared to have learned a lot about nutrition and physical activity. The concept of behavioral capability is defined as having the

knowledge and ability to perform a behavior or sequence of behaviors. When two youths were asked about what they learned in the program, the youth had ample replies.

#### Session Four

The instructor asks the two members what they have learned by participating in the program. F1 states, "As you get older it is not easier to lose the extra weight." M1 states, "Trying different foods is good and exercise is better." The instructor asks what new food they each want to try. M1 replies, "Peppers" and F1 replies, "Strawberries."

The instructor asks what else they have learned from the program. F1 states, "That there is no good food and no bad food. Every food does something different for the body." M1 states, "That exercise isn't bad . . . that it can be fun. And that you can have 3 cups of fruit a day and umm . . . that's it."

RD tells them that you need to have milk for calcium and that it plays a role to lower blood pressure. The instructor asks M1 what fruit and vegetables do for the body. He states, "They make you healthier." RD2 asks F1 what carbohydrates do for the body. She responds, "They give you energy for your body." RD2 states that the purpose of protein is to heal the body. The instructor states, "Hair and skin are made out of protein. Remember, whole grains are better because they contain more vitamins and minerals."

The instructor asks the children what they are going to change in their health habits. F1 replies, "I'll eat more vegetables and fruit instead of candy." M1 responds, "I'll eat less sugar and more vegetables and fruit."

Session four ended with M-1 and F4's parents receiving graduation certificates (F4 only attended one session). The dietician informed M-1 that he will return to the clinic in three months and six months for follow-up. CMS staff provided youths with extra, blank copies of the food journal. Class was dismissed.

#### **Theoretical Learning Concepts Used in the Program**

I observed that the CMS instructors provided comprehensive learning strategies in the behavioral intervention program in order to effectuate behavioral change among the youths and the parents. The CMS instructors utilized the following learning concepts (as defined below): 1) reciprocal determinism; 2) behavioral capability; 3) expectations and self-efficacy; 5) observational learning; and 6) reinforcement of learning concepts utilized in the program. They

provided youths and parents with pertinent dietetic and exercise information, taught social and self-management skills, and ensured parental support in order to elicit positive behavior modification.

According to Bandura (1989; 1991), youths may learn more from observational learning than verbal instruction as an influence on the internalization of standards (Bandura, 1989; 1991). The CMS program incorporated learning strategies that went beyond lectures to include opportunities to observe and model healthy behaviors, attitudes, and emotional reactions provided by program instructors, parents, and participant peers. The instructors used token reinforcement by providing hula-hoops to youths for attendance and graduation certificates. Additionally, youths and parents were provided with experiential opportunities in the program such as exercise sessions and food label activities.

### **Reciprocal Determinism**

I observed that CMS program focused on how to effect change in the home in order to change nutritional and exercise behaviors, and vice versa. For example, the parents were instructed to purchase healthy groceries, cook in healthy ways such as lowering sodium and fat, monitor their own and their children's portion sizes and food choices, exercise as a family and singly, and to decrease sedentary activities such a television viewing.

#### **In-class observations:**

The dietician is talking (to the parents) about watching sodium and fat content in food. She suggests a particular brand of light wheat bread for the parents to purchase (for the home).

The dietician states (to the parents) that to make fruit interesting for the children, the fruit can be coated in a sugar-free glaze sweetened with Splenda. She states that most fruits can be coated in a sugar-free glaze.

The dietician instructs the parents to shop "on the parameter" in grocery stores. "The foods on the parameter have less fat, sugar, and calories." These foods include dairy, produce, deli, and bakery." "Aromas attract you point to point. The bakery operates to draw people in...the longer that you are in there, the more money you spend."

The dietician discusses how grocery stores have what's referred to as "turbulence."  
"Turbulence is things like noise, distraction, and tables of things to get you stay in the store longer." "Shop with a list, don't shop if you're hungry, and get a basket...not a cart."  
You'll also notice that stores will have the pharmacy at the back, no clock, and pleasant music." "Did you know that grocery stores actually lose a lot of money on produce and bakery goods?" "I saw health bars in 3 different places in a store . . . they are not necessarily a snack but like a candy bar."

"Try one new thing a week or find another way to eat it."

"Plan out your meals . . . what you are doing."

"Lean meats are less expensive than fatty ones...cook lean meats for a longer time to get them tender. For example, in the oven, slow cook the roast with carrots and celery. Keep adding water and worstershire . . . round steak will get really tender." "Roasts and meatloafs are better left over."

"Instant oatmeal has more sodium than regular oatmeal."

"Take off the chicken's skin before you eat it . . . what you can do is season under the skin, leave the skin on while you cook it, and then take the skin off before you eat it."

"Make a list, be prepared, and be on a budget."

"Fresh fruit is more expensive...so buy it in season. Get canned or frozen if fruit out of season."

### **Behavioral Capability**

I also observed that the CMS program provided ample knowledge and skills necessary for youths to meet the recommended nutrition and exercise standards set out by major health organizations. In particular, the training was 1) resource-related, providing information from major health organizations; and 4) product-related, providing samples of Splenda and health journals; and practice related providing "hands-on" exercises, snacks, food pyramid practice, food label reading, and food diary activities.

In-class observations:

The dietician states, "You need about 20 grams of fiber a day. The average American gets between 10-13 grams of fiber per day." She tells the group that it is preferable to get fiber from foods such as fruits and vegetables . . . "Natural sugars are better too . . ."

The dietician addresses the topic of food labels. “Look to see if one of the first ingredients is sugar.” “Milk, eggs, peanuts, wheat, oats, fish, and rye will be marked in bold on the label because of food allergies.” “The new labels will tell you information about a single serving or the whole serving.”

The dietician states, “Read the label, whole wheat is not always whole wheat.” “Pumpnickle bread has molasses in it to make it dark in appearance.”

The dietician collects the tests (pre-program tests not evaluated in this study) and proceeds to give each child a colorful copy of the Food Pyramid. She states, “ We want bright colors . . . if it looks good then we’ll want to eat it.” She asks the F1, “ How many vegetables should you eat per day?” F1 replies, “5.” The dietician retorts, “Good. How many servings of fruits should you eat per day?” F1 replies, “4.” The dietician states, “We can have up to 9 servings of fruit and vegetables per day. We want everyone to have at least 5 a day so a fruit or vegetable can be eaten for each meal and snack.”

### **Expectations and Self-Efficacy**

During the process of class observations I noticed that CMS instructors motivated the youths by encouraging them during the exercise and lecture activities. However, expectations can go beyond feedback and include the anticipated time to goal attainment – which was not apparent in the program. The program did collect the height, weight, and Hb A1c measures of the youths; however, I did not observe that youths were specifically told what they could expect by participating the program.

In-class observations:

Upon arrival (on the first day of program), the RN leads individual participants to clinic room where the dietician measures and records their weight, height, and glycosylated hemoglobin measurements.

87: M2 smiles and looks around. Appears embarrassed. When M2 begins to move with the video, his low-riding pants fall lower. He stops moving. The RN walks over him and begins to encourage him to move. He moves very little. Another RN approaches M2 and both RNs encourage M2 from either side of him.

The dietician asks, "Who did your food diary last week?" M1 and F2 raise their hands. She exclaims, "Good job."

If youths feel they are capable of achieving the goal (self-efficacy), they are likely to work hard and not give up. Second, if youths are provided feedback, they are more able to develop

feasible and realistic goals. Feedback, in turn, improves self-efficacy. Third, short-term goals are more effective than long-term goals (Stone, 1998). The instructors did provide short-term goals for the youths and parents.

In-class observations:

The dietician reviews the food pyramid and discusses exercise. She states,

“Increase your exercise 1 to 5 minutes each week. Do something in addition to what you’re doing now.” The dietician provides the parents with examples of “incremental steps” such as walking around a circular driveway. She also encourage to park further away from the building that they need to be.

322: “Try one new thing a week or another way to eat it.”

Both children respond that they haven’t used their measuring cups yet. The dietician encourages them to use the cups and states, “Get them out and do something with them. Start using them twice a day and then next week use them 3 times a day.”

### **Observational Learning**

Among youths, observational learning often outweighs verbal instruction as an influence on the internalization of standards (Bandura, 1989; 1991). The CMS program incorporated learning strategies that went beyond lectures that included opportunities to observe and model healthy behaviors of the program instructors, parents, and participant peers.

In-class observations:

The RN, who is exercising while she walks about the room, encourages them (youths and parents) to follow the video.

In one instance, a parent modeled unhealthy behavior to her son. When it was time to walk for the exercise activity, the parent did not want to go. However, the parent did eventually walk a little bit.

In-class observation:

M1’s mother states, “I can’t walk today.” She coughs and points to M1 and states, “You’ll walk.”

## **Reinforcement**

Reinforcement is a response to an individual's behavior that increases or decreases the chances of the individual repeating that behavior. The CMS instructors used token reinforcement. They provided hula-hoops and graduation certificates to participants.

In-class observation:

M1 and F4's parents are awarded graduation certificates by the RDs. (M1's mother did not get one although she attended all 4 sessions with M1). RD1 informs the participants that they will return to the clinic in 3 months and 6 months for follow-up.

## **Summary**

The 11 interviews among youths and parents, and the in-class program observations, enabled me to go beyond the pre- and post-program correlations of BMI and Hb A1c and to focus on the experience of the program for the youths and parents.

Of the five youths that started the program, just one completed it. In one instance, parents attended all four sessions of the program when their daughter attended one session. I learned from the in-class observations that youths were not utilizing their take-home equipment, and that the CMS instructors were using comprehensive learning strategies.

In organizing the data, I identified that data from the post-program interviews reoccurred during my in-class observations. Reoccurring data included: 1) youths were challenged with the skill-level required for aerobics and uncomfortable by parental presence; 2) snack portions appeared to be conservative; 3) parents interacted more among themselves than youths interacted among themselves; and 4) activities were frequently not engaging youths.

Analysis of the grouped interview and in-class observation data revealed five main themes. First, youths and parents all *reported* positive post-program nutrition and exercise behavior changes. Second, the parents reported that the youths were reluctant to change post-program health behaviors. The last three themes revealed areas that the CMS program could use to

improve curriculum methodology: 1) the presence of impediments to engaging youths; 2) the existence of program service deficiencies; and 3) additional parent concerns that went beyond the priorities of the program. These themes are discussed in the following chapter.

Table 5-1. In-class observations: Program attendance.

	Week 1	Week 2	Week 3	Week 4
Youth	M1 M2 F1 F2 F3	M1  F1  F3 F4	M1    F3	M1  F1
Others	M1's MO M2's MO F1's MO F2's MO F3's MO F4's MO & FA	M1's MO  F1's MO & FR  F1's MO F4's MO & FA	M1's MO & BR    F3's MO F4's MO & FA	M1's MO & FA  M1's MO   F4's MO & FA

M = Male; F = Female; MO = Mother; FA = Father; FR = Friend; BR = Brother

## CHAPTER 6 DISCUSSION

The concept of mixed-method research is not new to primary care (Creswell, Fetters, and Ivankova, 2004). Almost 15 years ago, Blake (1989) and Stange and Zyzanski (1989), integrated quantitative and qualitative research in their studies. Quantitative and qualitative methods can be mixed, such as in collecting qualitative data before quantitative data where variables are unknown, or as in the case of this study, using qualitative methods to expand quantitative results in order to advance study aims (Creswell et al., 2004). For example, in this study, quantitative methods were utilized to analyze changes in youths' post-program biological measures. Qualitative methods expanded upon this by elucidating the rationale behind the youths' behaviors that influence the quantitative changes in biological measures.

Overall, programs have demonstrated modest success in maintaining or decreasing weight and body mass index (BMI) (Dreimane et al., 2006; Eliakim et al., 2002; Monzavi et al., 2006; Savoye et al., 2004; Speith et al., 2000; Taylor, Mazzone, Wrotniak, 2005) and in success at improving other biological measures associated with overweight-related illnesses (Monzavi et al., 2006; Taylor, Mazzone, & Wrotniak, 2005).

For example, in Eliakim, et al. (2002), the study used for this study's sample size calculation, youths demonstrated a significant decrease ( $P<0.05$ ) in BMI at 3-months post-program – a decrease from  $26.1\pm 0.3$  kg/m<sup>2</sup> to  $25.4\pm 0.3$  kg/m<sup>2</sup>. In this study, youths experienced a significant decrease in Hb A1c values by time interaction from six-months pre-program to six-months post-program ( $P<0.05$ ) – a decrease from  $5.67\pm 1.8\%$  to  $5.35\pm 0.65\%$ , whereas their BMI measurements significantly increased ( $P<0.05$ ) over the same time – an increase from  $34.9\pm 6.64$ kg/m<sup>2</sup> to  $37.0\pm 9.15$  kg/m<sup>2</sup>.

Program success is contingent on many factors beyond the control of program managers. These factors include youths': 1) willingness to change behavior (changes in weight status, number of attempts at therapy, participation in exercise groups), 2) somatic characteristics (BMI of children and family members, gender, and age), 3) socioeconomic status (level of education of the children and their parents, working mother), 4) exercise and dietary habits, and dietary intake, as well as, 5) the quality of dietary records (Bandura, 2004).

Since there are so many challenges to program success, Bandura (2004) encourages programs to have comprehensive frameworks in order to be efficacious. The CMS used several learning strategies implicit in Social Cognitive Theory to guide program teaching and target youths' learning behaviors. This study did not measure whether or not the CMS program's use of Bandura's learning concepts were effective. The researcher merely observed whether the CMS program appeared to use the learning concepts to guide program teaching and target youths' learning behaviors.

Program evaluation offers the potential to inform public policy in several ways. Public policy may identify and classify interventions as either: successful in the targeted populations; effective for broader populations or distinct population subsets; or ineffective and not appropriate for further public expenditure.

This chapter provides an integration of the quantitative and the qualitative findings and discusses the theoretical learning concepts used in the CMS program. The chapter concludes with a discussion of the implications for health policy and future research.

### **Discussion of Quantitative Findings**

Although CMS program youths experienced a significant decrease in their pre- and post-program Hb A1c values ( $P < 0.05$ ), their BMI values significantly increased over the same time

( $P < 0.05$ ). The goal of the CMS program is for the youth to decrease *both* BMI and Hb A1c measures.

These findings cannot be easily explained. While previous research findings suggest that Hb A1c values improve *with* weight loss of about 10 lb or five percent of body weight (Wing, Marcus, Epstein, & Salata, 1987), other research findings suggest that elevated Hb A1c values may improve *without* weight loss but from increasing activity alone (American Diabetes Association (ADA), 2006).

Program youths' Hb A1c measures at six-months pre-program ranged from 4.5% to 13.5% ( $M = 5.67$ ,  $SD = 1.8$ ) and six-months post-program Hb A1c measures ranged from 4.4% to 7.9% ( $M = 5.35$ ,  $SD = 0.65$ ). Unfortunately, there is not enough research available to elucidate whether different Hb A1c values have different susceptibilities to diet and exercise, or not. For example, would a Hb A1c of 5.5% be more sensitive to diet and exercise, without weight loss, than a Hb A1c of 6.5%?

There was a wide range in Hb A1c values. The wide range of Hb A1c measurements among youths is suggestive of "outlier" values. However, the mixed general linear model used to analyze the data, the Unstructured Covariance Matrix, was valid because the assumptions were satisfied.

Other possible limitations of Hb A1c findings may include: 1) laboratory results can differ depending on the analytical technique; and 2) biological variation between individuals can be up to one percentage point. For example, two individuals with the same average blood sugar can have Hb A1c values that differ by up to one percentage point (Rohlfing, Wiedmeyer, & Little, 2002).

With regard to the BMI findings, an important note to make is that youths' BMI values were not calculated using the recommended age- and gender-specific growth charts for youth. Since the IRB process prohibited the researcher from collecting members' date of birth – a necessary component for calculating age- and gender-specific BMI percentiles, youths' BMI values were calculated using the BMI formula for adults. Thus, the BMI findings in this study are appropriate to reveal only a *general* trend of the youths' BMI values and do not accurately depict their true BMI measurements. The six-months pre-program BMI measures ranged from 22.8 to 50.9 ( $M = 34.9$ ,  $SD = 6.64$ ) and six-months post-program BMI measures ranged from 22.2 to 62.2 ( $M = 37.0$ ,  $SD = 9.15$ ).

According to the NIH (2006) definitions, a healthy adult weight is a BMI of 18.5-24.9; overweight is 25-29.9; and obese is 30 or higher. While the BMI for adults is a simple, inexpensive method of screening for weight categories, it does not take into account age, gender, or muscle mass. Nor does it distinguish between lean body mass and fat mass. As a result, some people, such as heavily muscled athletes, may have a high BMI even though they don't have a high percentage of body fat. In others, such as elderly people, BMI may appear normal even though muscle has been lost with aging (IOM, 2005).

Although the adult BMI is not as accurate for youths, it was useful in that it demonstrated the general trend in the youths' BMI measures. Essentially, BMI is a simple mathematical formula based on height and weight that is used to measure fatness. The researcher did evaluate weight independent of BMI values in this study and weight significantly increased over time ( $P < .05$ ). However, youths' heights also increased significantly over time ( $P < 0.05$ ). These findings are attributable to the fact the youths were growing.

Thus, the increase in BMI measures may be partly explained by recalling that BMI does not distinguish between lean body mass and fat mass. According to the post-program interview findings, youths' improvement in diet and exercise may have increased the participants' lean body mass.

Additionally, fatness and BMI have been found to be closely correlated with maturation stage (or development age) among girls (Kaplowitz, Slora, Wasserman, Pedlow, & Herman-Giddens, 2001). For example, early maturing girls are almost twice as likely to be overweight than average-maturing girls (Adair and Gordon-Larsen, 2001). There is limited research on the correlation between boys. According to Wang (2002), early sexual maturation is associated with overweight in girls but not in boys. The rising BMI findings in this study do not take into account the maturational development of the youths. The use of the age- and sex-specific BMI percentiles would have compensated for the maturational changes among youths more than using the adult BMI calculations.

There were no significant differences between gender or ethnic groups for BMI or Hb A1c findings. In another program, gender also had no influence on BMI changes, nor did pubertal status or the degree of participants' obesity (Eliakim et. al., 2002).

Previous programs demonstrate that youths whose parents are not overweight have significantly greater decreases in BMI compared to youths of obese parents (Eliakim et al., 2002). In the CMS program, parents were frequently overweight and diagnosed with type II diabetes. Additionally, programs that include parents or significant caretakers have greater effect on weight loss than those that do not include parents or significant caretakers (Jain, 2004).

The CMS youths' BMI and Hb A1c measures were evaluated over a short period of time. By following the youths' biological measures over a longer period of time, significant

improvement in BMI values may also occur; similar to the significant improvement in the Hb A1c values. It takes time for behavioral changes to improve BMI measures.

The following qualitative findings elucidate the post-program improvements that the youths and parents reported they made to their diet and exercise regimes. Additionally, the qualitative findings illuminate areas the CMS program may improve.

### **Discussion of Qualitative Findings**

Five main themes emerged from the interview data and field notes. First, all youths and parents reported positive post-program nutrition and exercise behavior changes. Second, parents reported that youths were reluctant to change post-program health behaviors. The last three themes revealed areas that the CMS program could use to improve curriculum methodology: 1) the presence of impediments to engaging youths; 2) the existence of program service deficiencies; and 3) additional parent concerns that went beyond the priorities of the program (that may have affected their ability to participate).

#### **Positive Post-Program Behavior Change**

Youths and parents reported positive post-program improvement in diet and exercise behavior. During the interviews, youths and parents stated that they consume more fruits, vegetables, and whole grains; and less sugary beverages, junk food, as well as less salt, sugar, and fat. They also stated that they watch portion sizes, read food labels, and exercise more.

This finding is consistent with the quantitative data findings - that that Hb A1c values for the youths significantly improved post-program. With regard to the youths' BMI values, it may be that the full effect of the CMS program on those values may not fully emerge until some time beyond the last post-program data collection period. Despite youths' reported changes in diet and exercise, the BMI findings may be partly explained by recalling that BMI does not

distinguish between lean body mass and fat mass or especially, adjustment related to potential hormone-related growth velocity changes that often occur during the pubertal phase.

### **Reluctance To Change Post-Program Behaviors**

Although all youths and parents reported positive post-program diet and exercise changes, parents stated that those changes did not come easy for the youths. According to parents, youths were frequently reluctant to make healthful changes. Examples of the reluctance among youths to change included: (1) apathy for exercising; 2) dislike of certain healthier foods; 3) aversion to following the food pyramid for daily food allowances; 4) practicing different habits when away from home; 5) asserting their identity; and 6) not using measuring cups at home.

The greater reluctance to changes in diet and exercise among youths may be related to differences in age, experience, and perspective, as well as differences in experience during program participation. Although the presence of parents during program participation adversely affected the participation of youths in the program, the presence of parents appears to positively affects post-program behaviors of youths. Thus, CMS should devise ways to enhance the experience of parents in during program participation. One parent stated that the program may want to consider recording and monitoring BMI and Hb A1c measurements for the parents. One parent shared that she has lost 4 dress sizes after attending the program with her child. BMI data may be more appropriate for adults than for youths and may provide parents with objective standards, in addition to dress sizes, by which parents can measure post-program progress and compliance.

The CMS program is in a unique position to introduce youths to types of exercise and foods that are appealing. Rather than providing water as the beverage of choice in the program, the youths could be given a choice of low-calorie beverages. A further recommendation would be to instruct parents how to pack the youths' lunches so that they are appealing.

## **Impediments to Engaging Youths**

Snack and exercise methodologies fostered “solitary” and “parallel” (side-by-side) play among the youth. Solitary and parallel play activities are more appropriate for younger children. School-age children and adolescents require activities that foster “associative play” among members of the group. Associative play begins among the preschool age (London, Ladewig, Ball, & Bindler, 2006) when children begin to interact with each other during play. School age child and adolescents continue this type of interaction: bonding over games, competitions, and projects. Youths in the CMS program did not appear to have a meaningful opportunity to get to interact with each other during play.

Unlike youths, parents articulated that they looked forward to attending each session. Parents bonded by sharing recipes and cooking tips and looked forward to experiencing the feeling of camaraderie each week.

The program is in a position to create opportunities for communication that fosters friendship and support among youths. In turn, youths would look forward to coming to weekly sessions, rather than attending “because they have to” or not attending at all, as attested to by the dismal attendance and graduation rates. One suggestion is that the CMS instructors may want to ask the youths, prior to the beginning of the program, what games and sports that they enjoy playing with their friends. The CMS instructors could then offer those activities to the youths.

Class observations and interviews indicated that parents may be enjoying the CMS program more than youths. That could be because parental presence during the snack and exercise segments impedes the ability of youths to get to know one another. A parent shared that she embarrassed her daughter because the parent was the “class clown” during exercise (drawing unwanted attention to the daughter).

Unlike their parents, youths did not express feelings of camaraderie with their peers. A variety of factors may influence the relatively diminished bonding among youths. It may be that youths are shy due to age or other causes. However, because the youth and parents participate together for exercise- and snack-activities, the presence of the parents may impede the ability of youths to get to know one another. The CMS program may want to consider separating youths and parents for some activities and joining them for group discussions of their separate activities. Since research demonstrates that parental involvement in programs is vital for positive program outcomes, it is very important that parents are as involved in a program as youths.

The CMS program was mandatory for the youths and parents. A significant decline in attendance was observed with each consecutive class; only one of the five enrolled youths completed all four classes.

Adolescents frequently experience boredom, time stress, and lack of choice (lack of control) in their daily lives. In Shaw, Caldwell, and Kleiber (1995), adolescents reported high levels of time stress and boredom related not only to lack of options, but also to participation in adult-structured activities. In addition, adolescents, at times, participated in activities to please others rather than to please themselves.

Since the CMS program is mandatory, it places time stress on the participants. This challenge may not be readily resolved. It may be necessary for CMS instructors to acknowledge that they are aware of the “loss of control” that the youths may be feeling and then have the youths talk about it as part of the program. The instructors should continue to improve on program dynamics; provide an atmosphere that is engaging to the youth to keep them interested.

Additionally, within the program, youths should be given choices whenever possible. For example, rather than having the program instructors provide the snacks, the program could

provide each youth with a gift certificate to purchase his or her snacks in accordance with food label requirements for nutrition. This would bring more variety to the snack activity, diminish the sense of loss of control, enhance participation, enhance associative play among youths, and improve attendance (as the youths would know that others are relying on them).

### **Program Service Deficiencies**

The aerobic exercise was impeded by the location of the activity. The activity was implemented in the front lobby of the CMS agency. The youths and the parents had to find a place to workout between the chairs. It also appeared that youths were self-conscious when CMS patients arrived for their scheduled appointments (as the activity occurred while the CMS office was open for daily business).

The location issue could be remedied with an appropriate change in venue. The exercise activity could occur in the spacious staff lounge or in some other CMS room. Also, some youth participants did not dress appropriately for exercise – this factor hindered their movement abilities. CMS instructions for exercise attire should be modified to avoid this issue in the future.

The youths and the parents were challenged with the skill-level necessary for the video aerobic activity; they frequently misstepped. This may be remedied by the use of age- and skill-appropriate aerobic video activities. The CMS instructors may want to invite youths to discuss the types of activities that they enjoy playing with their friends.

The researcher also observed that snack portions appeared to be small under the circumstances. The youths and their parents may have been hungry at that time of day, especially after the unaccustomed exercise that they had just completed. The small servings risk creating a negative association in the minds of the participants that a healthful diet means deprivation.

Vegetable plates at session three appeared to precipitate the most disappointment among the youths. They ate mostly the carrots and the dip. Program instructors may want to include a greater variety and a greater portion of appealing vegetables to the youths and the parents.

One parent suggested that instructors may want to go “out of the norm of what people think they wouldn’t like” at the snack activity. The parent suggested that instructors serve vegetables other than the typical carrots and broccoli. In addition, larger, more satisfying portions may reinforce the perception that snacks are nutritious and satisfying.

### **Additional Parent Concerns**

During and after the post-program interviews, two parents shared personal concerns that went beyond the expertise of the program; one having had been sexually abused as a child, and the other feeling overwhelmed by life generally. Since improvements in emotional well-being and behavior are positively correlated with weight loss (Dreimane et al., 2006), the CMS program may want to consider the feasibility of providing social or psychological counseling to the youths and the parents.

The interviews and in-class observation findings suggest that the CMS program is eliciting dietetic and exercise behavioral changes among youths and parents. The findings also clarified some areas in need of improving the CMS program: 1) engaging the youth to get to know each other; 2) engaging the youth with activities that they enjoy and look forward to participating in; and 3) separating the parents for some activities.

### **Implications for Health Policy and Future Research**

The next step for the CMS behavioral intervention program is to have the youths followed long-term, such as one to two years post-program, to see whether their BMI and Hb A1c measures are improving or not improving. The long-term study could also include pre- and post-program age- and sex-specific BMI percentiles. In doing so, the research would address a

limitation in this study - that the researcher did not include age-and sex-specific BMI percentiles. In the meantime, the CMS program instructors could continue to work to improve the program by including feasible suggestions from this study.

The program instructors may want to think about ways to get the youths and parents “to buy into the program.” They may want to consider following parents’ biological measures of BMI and Hb A1c.

Another way for the program instructors to get the youths and parents “to buy into the program” would be to create clear expectations for the youths and parents from the onset. For example, youths and parents could be told to expect to a change in their clothing size within three months if they follow program guidelines. Since the youths’ and parents’ outcome priorities may be different than those of the program instructor’s priorities, it may also be helpful to address expectations on an individual basis with the input of the participants. Rather than graduation certificates, the program may want to consider store gift cards.

Additionally, the program may want to separate the youths according to age groups because their ages ranged from 7 to 18 years. Parents and youths could be separated for all of the activities as well.

The identification of effective teaching methods utilized in the CMS program and other programs enables health providers to replicate and improve successful intervention methods. Behavior may be influenced by the following: 1) reciprocal determinism; 2) behavioral capability; 3) expectations; 4) self-efficacy; 5) observational learning; and 6) reinforcement (NIH, 2003) (Table 2-1).

Behavioral change results from an interaction between an individual and three key factors identified as personal, environmental, and behavioral (reciprocal determinism). Research

suggests that environmental factors may influence children's health behaviors more than personal ones because children are not so worried about their health (Gochman, 1987). The involvement of parents in the CMS program is crucial is because parents control much of the home environment. A possible way to improve youths' compliance with the "food diary" activity would be to have the parents responsible to monitor the activity at home. In addition, the parents could also participate in the activity (observational learning). Individuals are more likely to adopt a modeled behavior if behavior change results in outcomes they value, and if the model is: 1) similar to the observer, 2) has admired status, and 3) has functional value (Bandura, 1977).

The CMS program provides behavioral skills training to youths and parents in the way of nutrition and exercise lectures, and snack and exercise activities. However, the learning of skills just begins in the CMS classroom, and ends within the complexity of the external environment – such as home and school. Thus, the CMS program may want to creatively engage youths and parents during "after hours." For example, the youths' could be responsible for shopping for the weekly program snacks using food labels.

The learning concepts of expectation and self-efficacy were less utilized by the CMS program. There were not explicit explanations for youths or parents as to how their nutrition and exercise choices would affect their health outcomes (expectations) in a measurable way, or obvious tactics to build the youths' and parents' confidence so that they would feel that that could change their behavior (self-efficacy).

Factors that motivate an individual's expectations as they go through the process of setting goals for themselves include self-efficacy, feedback, and the anticipated time to goal attainment (Bandura, 1986; 1989). If the youths and parents felt that they were capable of achieving the goal (self-efficacy), they would be likely to work hard and not give up.

The youths and parents could be given one-on-one individual weekly feedback using their weekly food diaries, and they would be more able to adjust their goals to be feasible and realistic. Feedback, in turn, improves self-efficacy. Also, short-term goals are more effective than long-term goals. Weekly incremental goals for reduced fat and increased fiber and fruits and vegetables, and physical outcome expectations could be included in the curriculum.

According to Margolis and McCabe (2004), strategies for improving self-efficacy may include: 1) establishing small, incremental goals for participants; 2) reinforcing effort and persistence; 3) emphasizing modeling; and 4) providing feedback through record-keeping (Margolis & McCabe 2004).

According to Bandura (2004), an effective program includes similar components to effectuate self-efficacy. The components include 1) information regarding the desired behavior; 2) the development of social and self-management skills; 3) building a resilient sense of efficacy such as supporting the exercise of control in the face of difficulties and setbacks in everyday life; and 4) enlisting and creating social supports for desired personal change such as enlisting participants' caregivers in the effort.

Future research can go beyond observation and description of the theoretical concepts, and *measure* whether the utilization of a particular learning concept in the CMS program actually elicits behavioral changes among the youths. For example, this study revealed that the CMS is utilizing “reinforcement” methods, such as giving out program graduation certificates. However, this reinforcement method does not appear to work. There are a variety of reinforcement rewards that have been utilized in other programs that have been shown to improve program outcomes including stars, modest prizes, jump ropes, and water bottles. As aforementioned, store gift cards may be more effective to improve attendance and outcomes.

With regard to thematic coding procedures in this study, in the future it will be important for the researcher to choose another researcher to assist in cross-coding the interview and in-class observation transcripts in order to validate the thematic findings. In this study, the researcher identified themes in the transcripts without the assistance of another researcher.

It would be interesting to include the input of the program instructors in the study methodology. For example, after the qualitative data is thematically coded by two researchers, one or both of the researchers could then meet with the program instructors to elicit feedback and suggestions regarding their findings. The program instructors could also be interviewed after the program. This would allow the researcher to gain insight of the instructors' perception of the CMS program.

Future research offers the opportunity to reduce or eliminate some limitations unique to this study design. In the interviews, youths and parents may have shared only what they thought the researcher wanted to hear – that they have made positive changes to their lifestyle. It is difficult to know whether youths and parents accurately reported their behavioral changes. In the future, behavioral change data may be more accurately collected if youths and parents would bring their recorded daily diet and exercise regimes to the interview. In-home observation by the researcher might also be helpful.

Ideally, a control group would strengthen the validity of the study findings. Youths that participate in the program could be compared to youths that do not participate in the program (and receive only routine in-office educational sessions).

Other opportunities for study design improvement include the opportunity to reduce or eliminate some other limitations unique to this study, including sample size, time-span, and external environmental influence. For example, by replicating the study in other programs, the

aggregate results effectively enlarge the sample size to statistically significant proportions of affected youth.

Analysis of larger sample sizes may be able to tease out time-spans and environmental influences that, in concert with intervention programs, correlate with desired behavior modification. For example, 100 future studies of similar intervention programs would enlarge the sample size to 6,000 youth. The larger aggregate study population, more likely than not, may confirm that BMI and Hb A1c are inappropriate measures of efficacy for children and adolescents. However, the larger study may be able to demonstrate, through qualitative analysis, the efficacy of certain intervention methodologies up to some period, such as 24 months after the conclusion of the program, without subsequent intervention but declining efficacy thereafter without renewed intervention.

Future research may also target external environmental events that precipitate undesired dietetic and exercise behavior with a view toward eliminating those events. For example, peer group influence may be shown to have more proportional influence on positive or negative outcomes than does parental influence. That is, graduates of intervention programs may be influenced more by peers than by the parents of the graduates. It may be possible to evaluate the interplay between school intervention programs, peers, and parents, and the net effect on youths who graduate from intervention programs.

There is not enough qualitative research concerning program evaluation. Only one of nine the programs in the literature review used qualitative research. This study demonstrates the usefulness of a mixed-method design to illuminate biological measures findings and to enhance program effectiveness.

The CMS program is fulfilling objectives of national and state public health policies. Currently, Healthy People 2010 seeks to reduce overweight among youths to five percent. In Florida, the "Governor's Task Force on Obesity" has recommended that health care providers promote lifelong nutrition and physical activity by implementing programs that promote healthier lifestyles and disease management for overweight-related illnesses such as diabetes and hyperinsulinemia (Florida Department of Health, 2004).

With the initiation of the CMS program, health care providers at Tallahassee CMS have demonstrated a commitment to go beyond typical in-office nutrition and exercise education. They are dedicated to improve the CMS program despite the challenges. As previously mentioned, separating youths and parents during the program (while keeping it as a family intervention), and creating clear program expectations of youths and parents, emerged as areas requiring improvement.

The CMS program is propagating future informed adults who can advocate for healthful diets and exercise. The take-home message for policy makers is that program evaluation informs public policy, with either qualitative or quantitative data or both, and is aimed toward providing information that helps policy makers decide how a certain program may be understood in terms of better or worse social outcomes. Strategies and methodologies that are identified as successful for distinct population group subsets may be replicated in behavior intervention programs that target similar populations.

Potentially, the CMS program may be implemented by other CMS agencies, and eventually, by outpatient health clinics generally. Future research may compare other CMS programs or programs similar to this CMS program public and private intervention programs, their methodologies, and their relative efficacy.

## Summary

A design that includes both quantitative and qualitative methods of evaluation offers the potential for gathering complete, accurate, contextualized evidence needed to evaluate the effectiveness of a health intervention program (Creswell, Fetters, and Ivankova, 2004). This mixed-method is particularly appropriate when biological outcomes, that are dependent on diet and exercise behavioral changes, are being followed for only a short-term following the program intervention. For example, the CMS program appeared to have successfully motivated behavioral changes relative to diet and exercise behaviors. However those behavioral changes may be more evident in BMI outcomes if members were followed for a longer period of time. Overall, programs have demonstrated modest success in maintaining or decreasing weight and BMI (Dreimane et al., 2006; Eliakim et al., 2002; Monzavi et al., 2006; Savoye et al., 2004; Speith et al., 2000; Taylor, Mazzone, Wrotniak, 2005) and in success at improving other biological measures associated with overweight-related illnesses (Monzavi et al., 2006; Taylor, Mazzone, & Wrotniak, 2005).

For example, in Eliakim, et al. (2002), the study used for this study's sample size calculation, youths demonstrated a significant decrease ( $P<0.05$ ) in BMI at 3-months post-program – a decrease from  $26.1\pm 0.3$  kg/m<sup>2</sup> to  $25.4\pm 0.3$  kg/m<sup>2</sup>. In this study, youths experienced a significant decrease in Hb A1c values by time interaction from six-months pre-program to six-months post-program ( $P<0.05$ ) – a decrease from  $5.67\pm 1.8\%$  to  $5.35\pm 0.65\%$ , whereas their BMI measurements significantly increased ( $P<0.05$ ) over the same time – an increase from  $34.9\pm 6.64$ kg/m<sup>2</sup> to  $37.0\pm 9.15$  kg/m<sup>2</sup>.

There were no significant differences between gender or ethnic groups for BMI or Hb A1c findings. The decrease in Hb A1c measures and increase in BMI measures may be partly explained by recalling that BMI does not distinguish between lean body mass and fat mass or

especially, adjustment related to potential hormone-related growth velocity changes that often occur during the pubertal phase. According to the post-program interview findings, the youths were increasing their exercise levels and improving their dietary intake.

Although the youths' BMI values were not calculated using the recommended age- and gender-specific growth charts for youth, it was useful in that it demonstrated the general trend in the youths' BMI measures. Essentially, BMI is a simple mathematical formula, based on height and weight that is used to measure adiposity.

The qualitative analyses elucidated several areas of program implementation as factors that may adversely influence the ability of youths and parents to internalize CMS principles for healthier living. The most obvious factor is the absence of a methodology for ensuring attendance. Other factors include, incompatible exercise skill levels, exercise venue and equipment, and the absence of implementation methods that foster associative interaction among youths.

Future research offers the opportunity to reduce or eliminate some limitations unique to this study, including sample size, span, and external environmental influence. Identification of effective intervention methods utilized in various disease prevention programs enables other health providers to replicate and improve successful intervention methods and facilitates the generalization of successful methods to broader populations.

APPENDIX A  
CMS PROGRAM CURRICULUM

**Week 1**  
**General Overview and Introduction Outline**

*I. Pre-preparation*

A. Health/diet history participant's form

1. Ensure that all participants have received/completed these forms:

- a. Participant form
- b. Guardian form

2. NOTE: These forms sent out minimum one week prior to class

B. Assessment

1. Review participant's records

- a. If no A1C value is noted in previous four weeks, this data will be assessed/collected first class
- b. If A1C are noted in patient chart a month or less prior to first day of class, no A1C is necessary on first day

C. Flow sheet

1. A flow sheet, which includes height, weight, and A1C data for each participant will be used
2. Data will be entered by the end of first class for each participant

D. Food: Fruit (apples, oranges, bananas) and flavored water (Fruit2O)

E. Prizes: (for example, paddleballs)

*II. Introduction*

A. Overview of goals of the clinic

1. Emphasize healthy lifestyle, not weight loss

2. Review layout of class

- a. begin with exercise session each class
- b. either participants remain with parent/guardian or are separated
- c. review topics to be covered

3. Provide snacks

- a. sliced fruit
- b. water

*III. Class begins*

A. Exercise session

1. Parents/Guardians and children all participant in this activity

2. This takes place in the lounge room
- B. (Return to conference room)  
Distribute pre-test for
1. Participants
  2. Parents/Guardians
- C. Food Guide Pyramid and Eating Smart: Keeping Your Eating Under Rap
1. Distribute handouts
  2. Identify categories
  3. Discuss total servings for each group/category
  4. Review appropriate portion sizes utilizing food models and Eating Smart handout
- D. What does a calorie look like?
1. Display various foods demonstrating what 20, 60, and 120 kcals look like
    - a. 20 calories demonstrated with appropriate servings of
      - i. air popped popcorn
      - ii. cookie
      - iii. cracker
      - iv. pretzel
    - b. 60 calories
      - i. small apple
      - ii. small banana
      - iii. 4 oz juice
      - iv. 2 Hershey's kisses
    - c. 150 calories
      - i. 12 ounces of cola
      - ii. 9 ounces of juice
      - iii. 8 ounces of whole milk
- E. Exercise
1. Review "Hey Couch Potatoes" on Eating Smart handout to emphasize the benefits of exercise
  2. Distribute Lean Routines for exercise journal
- F. Distribute Food Journals
1. Emphasize the need to document what and HOW MUCH was consumed every day until the next class
    - a. offer incentives for completion
    - b. emphasize need to include beverages
  2. Discuss the need to familiarize with portion sizes

- G. Closing
  - 1. Distribute prizes
  - 2. Address questions

## Week 2

### Focus: Diabetes Prevention Outline

- I. Pre-Preparation
  - A. Obtain copies of handouts, as appropriate
  - B. Food: popcorn and flavored water
  - C. Obtain prizes
  - D. Obtain food/beverage samples for children's discussion (colas, diet colas, juice, etc)
- II. Exercise
  - A. Class will be led by Dr. A. Mobley (or other provider)
  - B. Once again, both children and parents/guardians are to participate
- III. Snack offered: Popcorn and water
- IV. Review
  - A. Brief discussion and review concerning previous class on portion sizes and serving sizes
  - B. Discuss journal entries
    - 1. Food journals
      - a. What patterns emerged?
      - b. What types of beverages consumed?
      - c. How are portion sizes?
- V. Discussions
  - A. Parents/Guardians in Conference Room for discussion led by Roberta Stevens, M.S., R.D., C.D.E.
    - 1. What is Type II Diabetes?
      - a. the disease
      - b. the risks
      - c. the health effects
      - d. how to prevent or manage
    - 2. How does diet play a role?
      - a. beverage choices
      - b. Food labels handout (what do I look for?) (additional handouts may be provided by Roberta Stevens)
      - c. Fast food/best choices
        - i. Calorie books for fast foods obtained from Lily via Suzanne Laws
        - ii. Discover Nutrition Anytime Anywhere: Menu Makeovers handout

- B. Children in Lounge area for discussion
  - 1. What does Type II diabetes mean for you?
    - a. what is happening to your body?
    - b. what are the risks?
    - c. what are the health effects?
    - d. what can you do?
  - 2. How does your diet play a role? (emphasizing “sugars” and excessive calories)
    - a. review beverage options (juice, milk, water, soda)
    - b. incorporate label reading introduction into this
    - c. taste test of regular vs. diet sodas
  - 3. Fast Food options
    - a. excessive portion sizes
    - b. “healthier” fast food choices (offering a calorie count comparison)
  - 4. Incorporate a “Jeopardy-like” format, dividing group into teams to guess calories of various fast foods or “what-is-the-better-option” in a fast food setting

VI. Closing

- A. Children and parents/guardians all gather in Conference Room
- B. Review and encourage continued journal entries (food and exercise)
- C. Address questions
- D. Distribute “prizes”

**Week 3**

**Focus: Virtual Supermarket Tour Outline**

- I. Pre-preparation
  - A. Virtual Tour
  - B. Handout: Discover Nutrition Anytime Do-It-Yourself Supermarket Tour
  - C. Bring a measuring cup (1 c, ½ c for solids) to use for demonstration purposes highlighting portion sizes
- II. Exercise session
- III. Virtual Tour-in general, encourage them to begin at produce and end at meats (from both a health and food safety perspective)
  - A. Produce
    - 1. Ask: How many fruit/vegetable servings per day? For review (5d)
    - 2. What do we get from fruit/vegetable?
      - a. lots of vitamins (A, C) and minerals
      - b. plant chemicals, known as phytochemicals, which may have a role in preventing many diseases such as cancer
      - c. GOAL is to get as many “colors” in your diet everyday
    - 3. Ask: What are your favorite fruits and vegetables?

4. Highlight different fruit such as kiwi, star fruit, mango, etc, and different vegetables, broccosprouts, broccoflower, etc.
5. Highlight fruit and vegetables as great snacks
  - a. apple and cheese
  - b. banana and peanut butter
  - c. mini carrots with ½ sandwich
  - d. dried fruit (raisins, apricots, etc.)
  - e. prepared vegetables make it really easy!!

#### B. Snack Chips

1. focus on high amount of fat, calories, sodium
2. while occasionally fine, can displace more nutrient dense snacks
3. ACTIVITY:  
Have everyone pick up a bag of chips and look at the labels
  - a. how many calories?
  - b. what is considered a serving size?
4. Compare pretzels to chips
  - a. look at labels
  - b. Ask: are you really saving anything in calories
  - c. Suggest pretzels dipped in mustard as a snack, add a piece of fruit and you are doing great!!
5. ACTIVITY with popcorn:
  - a. have everyone pick up microwavable popcorn
  - b. tour guide can use popcorn kernels (for air-popped popcorn as “gold standard”)
  - c. Ask: What are the serving sizes and calories for each?
  - d. Is there a “best one”? Let them decide...
  - e. Great high fiber and (can be) low calorie snack if chosen wisely
  - f. add some yogurt , cheese, fruit, or nuts for higher satiety

#### C. Bread/Cereal

1. Lower calorie breads typically mean thinner slices
2. Look for high fiber breads (Nature’s Own White Wheat, or 100% Whole Wheat)  
Key here is that the first ingredient says “WHOLE” wheat”
3. Cereals
  - a. look for higher fiber cereal >5 g/serving)
  - b. granola cereals can be very high calorie
  - c. watch serving sizes on cereal (have them look at the serving sizes)
  - d. cereals can make a great snack
  - e. may consider mixing a high fiber cereal (like All-Bran) with a high sugar/low fiber cereal (Frosted Flakes)

#### D. Juice

1. Calcium fortified orange juice for those who aren’t getting enough calcium

2. NO MORE THAN 8 ounces per day of ANY juice
  3. Review class discussion about juice
    - a. briefly look at labels for calories per serving
    - b. highlight 100% fruit juices (Juicy Juice, Mott's)
- E. Milk/Yogurt/Cheese
1. aim for 3 servings/d (this includes high calcium foods such as cheese, yogurt, etc.)
  2. look at the huge variety of yogurts (drinkable, whipped, regular, with added crunch/granola, etc.)
  3. calcium fortified cottage cheese
  4. cheese sticks for snacks, etc...
- F. Frozen foods section: Meat alternatives
1. Boca Burgers
  2. Harvest Burger recipe crumbles
  3. Veggie hot dogs (e.g. Yves Good Dogs)
- G. Meat
1. Key here is FAT (therefore calories) and saturated fat
  2. Leaner is better
  3. Meat can ABSOLUTELY be a part of a healthy diet
  4. Still, limit red meat when possible
  5. Seek >90% lean meats
 

WARNING: "ground turkey" may not be saving you anything in fat and calories (since it may have skin, dark meat, etc, ground in there...be sure to read the labels!!!
  6. Advantages/disadvantages to cooking poultry with/without skin
    - a. cook with skin for flavor
    - b. remove before eating
  7. Beef
    - a. >90% lean
    - b. key words are "top round", "eye round", "loin", or "London broil"
    - c. when frying, may consider draining the fat and then rinsing with hot water to remove more fat
- H. Pork
- Tenderloins can be a wonderful option
- I. Fish/Shellfish
1. limit frying
  2. aim for one serving/week
- J. Miscellaneous

1. Soups can be a great snack that fills you up
  - a. Campbell's Healthy Request, Healthy Choice soups, etc.)
2. Beans-great fiber, protein, vitamins, and minerals
  - a. rice and beans make a great meal
  - b. also try bean burritos, etc
3. Nuts also make a great snack
  - a. watch portion sizes
  - b. awesome protein and minerals
  - c. high satiety value

TAKE HOME MESSAGE: Aim for a majority of your foods from grains, fruits, and vegetables,, ...fair amount of lean meats, poultry, low fat dairy, and least amount of fats, oils, and sweets.

#### **Week 4**

#### **Focus: Healthy Meals, Healthy Snacks Outline**

- I. Pre-Preparation –4 weeks ahead
  - A. Seek student volunteers from FSU Student Dietetic Association (at least 2)
- II. Preparation
  - A. Make copies of the Post-test for participants
  - B. Make copies of the post test for parents
  - C. Make copies of handouts to be included in the end-of-class book
  - D. Make copies of the feedback form
  - E. Obtain food for pizzas (student activity)
    1. Utensils
      - a. toaster oven/conventional oven
      - b. knives to prepare condiments for pizza
      - c. spoons/forks to serve condiments
      - d. can opener
    2. Plates
      - a. large platter or individual paper plates and/or bowls for “buffet line” of toppings
      - b. serving (paper) plates
    3. Napkins
    4. Food
      - a. English muffins
      - b. Tomato sauce
      - c. Shredded mozzarella cheese
      - d. Pepperoni
      - e. Pineapple

- f. Onions
- g. Green pepper
- h. Tomatoes
- i. Mushrooms

F. Have paper/pens available for parent activity

G. Pens are also needed for post-test for participants and parents

## II. Exercise

Dr. Mobley (or other providers)

## III. Parents: healthy Meals, Healthy Living

A. Review health risks of obesity

B. Include in discussion

1. (review of) what is hyperinsulemia-risks
2. (review of) what is diabetes-risks, prevention, management
3. (review of) how managing their weight will be a lifetime challenge
4. (review of) how it will be much more difficult for your children to first tackle this as adults. They are much more impressionable now and, therefore, we want to take advantage of that impressionability...

C. The importance of nutrition and exercise in managing hyperinsulemia and/or Diabetes (i.e. the role of diet and lifestyle)

D. EXTREMELY important and invaluable position you have as a ROLE MODEL for them in terms of both diet AND exercise

- a. they watch what you do
- b. they learn from what you do
- c. they count on you to make available, prepare, and/or serve healthful snacks and meals
- d. however, empowering them with the same knowledge and abilities to choose, prepare, obtain, and/or serve for themselves (either at home or away from home) is the MOST important thing that you can do for them (because the impression you have made on them should be one that influences them and stays with them even if you are not around at the time they have to make the healthful decisions for themselves...)

E. What you bring into the house matters (recap supermarket tour)

F. While all foods can fit, you want to encourage the healthful ones and find ways to incorporate those into their daily meal plans

1. involve your children in meal planning
2. take them to the grocery store with you

G. Parent Activity: Meeting the Challenges

Description: Divide the parents into two groups (if enough are present; in the event that there is not a minimum of two in each group, combine the activity)

1. Group I:
  - a. identify/list the challenges you face in offering and/or preparing healthy snacks (allow about three minutes for this)
  
  - b. List how you can meet that challenge (problem-solve!) (allow about five minutes for this). Also include a list of some healthy snacks that would work well with your children...
  
2. Group II
  - a. Identify/List the challenges you face in offering and/or preparing healthy meals (including lunch for school) (allow three minutes for this)
  - b. List how you can meet that challenge (allow five minutes to problem-solve) and give examples of some healthy meals (even something that you haven't tried before!)
  
3. Discussion of the above...incorporating the following:
  1. all foods can fit into a healthy meal plan
  2. planning for all meals (including lunches and/or snacks) when grocery shopping is imperative
  3. Being a positive role model for your children is invaluable
  4. Look for some other ideas in your take-home packet (lean meat choices, healthy lunch makeovers, supermarket tour list, etc.)
  
4. Post-test questionnaire
5. Feedback questionnaire

#### IV. Participants

- A. Review health risks of obesity
- B. Include in discussion
  1. (review of) what is hyperinsulemia-risks
  2. (review of) what is diabetes-risks, prevention, management
  3. (review of) how managing their weight will be a lifetime challenge
  4. (review of) how it will be much more difficult for them to first tackle this as adults. (pre/post-test question)
  
- C. The importance of nutrition and exercise in managing hyperinsulinemia and/or Diabetes (i.e. the role of diet and lifestyle)
  
- D. REMEMBERING THAT ALL FOODS CAN FIT!!
  
- E. Activity  
The children are to be divided into two groups:  
This will allow one FSU student volunteer to manage/oversee the food activity

while another FSU student volunteer oversees the paper activity

1. Group A: meeting the challenge
  - Have participants list the types of snacks they have typically eaten that may or may not fit well into a healthy meal plan
  - What are some ideas they have for healthy snacks? Let's see which group can come up with the most ideas that fit include a variety of foods from the FGP
2. Group B: Food Activity first
  - a. discuss all of the food groups represented in the pizza snack (can they tell you what groups fit where?)
  - b. discuss the low fat mozzarella, the leaner pepperoni, and all of the different vegetable (and fruit!) toppings that can be included
3. Each group will then switch
4. Post-test quiz

V. End-of-clinic

- A. Distribute certificates
- B. Distribute packets
- C. Discuss follow-up clinic sessions

*Food Guide Pyramid: Guide to Daily Food Choices*

*A Food Diary Example*

*Eating Smart: Keep Your Eating Under Rap*

*Snack Attack*

*Nutrition Fact Sheet: 7 Steps to Being More Active*

*Nutrition Fact Sheet: Straight Facts about Beverage Choices*

*Handout: Recommended Reading & Websites*

*Splenda information with Sample*

*Positive Diabetes Journal, September 2006*

*Diabetes Health Journal, September 2006*

APPENDIX B  
INTERVIEW GUIDE

**Youth Questions**

1. Tell me a little bit about yourself.
2. Tell me how you happened to go to the program.
3. Tell me about the program. What kinds of things did you do in the program?
4. What kinds of things did you learn about how you eat and exercise?
5. Since the program, do you eat healthier food? Do you exercise more than you did before the program? If so, in what kind of ways?
6. Was the program fun? Did you like it? If so, tell me what was fun about it?
7. Were there any parts of the program that were not fun or that you didn't like? If so, which parts?
8. Do you think your friends would like the program? Why or why not?

**Parent Questions**

1. Tell me a little bit about yourself.
2. Why did you attend the program?
3. What was the program like for you?
4. What kinds of things did you learn?
5. Did it motivate you to improve nutrition and exercise routines for your child/family?
6. Since the program, have you changed how you do things at home (example: grocery purchases, cooking, exercise)? How?
7. Do you think your child learned anything new? Did your child want to change (diet and exercise routines)? Does your child do anything differently after the program?
8. Can you tell me about what you liked about the program? Were there any aspects of the program that you didn't like?
9. Did your child want to attend the program? Did you? Why or why not?

10. Did you think your child liked the program? What things did he/she like or not like?
11. If you were giving advice to the program organizers to the program, what would you say?
12. Would you recommend the program to other parents or children? Why or why not?

APPENDIX C  
HIPAA IDENTIFYING FACTORS

1. Names;
2. All geographical subdivisions smaller than a state, including street address, city, county, precinct, ZIP code, and their equivalent geocodes, except for the initial three digits of a ZIP code, if according to the current publicly available data from the Bureau of the Census: (1) The geographic unit formed by combining all ZIP codes with the same three initial digits contains more than 20,000 people; and (2) The initial three digits of a ZIP code for all such geographic units containing 20,000 or fewer people is changed to 000;
3. All elements of dates (except year) for dates directly related to an individual, including birth date, admission date, discharge date, date of death; and all ages over 89 and all elements of dates (including year) indicative of such age, except that such ages and elements may be aggregated into a single category of age 90 or older;
4. Phone numbers;
5. Fax numbers;
6. Electronic mail addresses;
7. Social Security numbers;
8. Medical record numbers;
9. Health plan beneficiary numbers;
10. Account numbers;
11. Certificate/license numbers;
12. Vehicle identifiers and serial numbers, including license plate numbers;
13. Device identifiers and serial numbers;
14. Web Universal Resource Locators (URLs);

15. Internet Protocol (IP) address numbers;
16. Biometric identifiers, including finger and voiceprints;
17. Full face photographic images and any comparable images; and
18. Any other unique identifying number, characteristic, or code (note this does not mean the unique code assigned by the investigator to code the data).



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