INTERGENERATIONAL HEALTH PROMOTION

IN AFRICAN-AMERICANS

by
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ABSTRACT

Title of Dissertation: Intergenerational Health Promotion in African-Americans

Donna Behler McArthur, Doctor of Philosophy, 1997

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Heart disease is the leading cause of death for people over the age of 25 and is largely preventable through behavioral changes. Diet and physical activity patterns, which may be amenable to change through age-and generation-appropriate interventions, have not been extensively tested in school-based programs. The purposes of this study were to: 1. Assess the impact of a school-based intervention in promoting healthy cardiovascular behaviors in elementary school children; and, 2. Evaluate the efficacy of elementary school children as conduits of health promotion information for older generations.

Three inner city public elementary schools located within a one mile radius were randomly assigned to treatment or control groups. Individual participants were six classes of African-American students (n = 135) and their grandparent partners (n = 44). The four-week intervention incorporated workshops from Heart Power!™ with take-home activities to be shared with the grandparent partner. Constructs from the Intergenerational Health Promotion Model guided the development of the instruments and the intervention. Self-report measures assessed the effectiveness of the intervention: the Family Health Tree (FHT), the Heart Healthy Questionnaire (HHQ), the Physical Activity Record, and the 24-hour Food Record.

A significant effect for the intervention was found for the knowledge of a heart healthy diet and physical activity in one of the two intervention schools (School B) (ANCOVA) ($F(2.94) = 5.77$, $p = 0.004$). Although there were no significant treatment effects on attitudes, self-efficacy, or stages of change subscales, scores from the two intervention schools were higher than those of the control school. There were no significant differences among grandparents of students from the three schools on any of the variables. Overall, scores were higher for physical activity behaviors than nutrition behaviors. Sixty-six percent of the students in the intervention schools participated with their partners in one or more take-home workshop activities, with the greatest participation (88%) from School B.

Since cardiovascular risk factors originate early in life, interventions through school-based programs are a promising mechanism for educating an entire family or kinship network in a community about heart healthy lifestyle behaviors as supported by the sharing of information across generations.

Dedicated to the memory of my father,

Donald Franklin Behler, Sr.

Acknowledgments

Many people have made this research possible. Indeed, it was an intergenerational project. My mother prepared the heart healthy folders and snacks for the students, while my nieces, Julia and Amanda, drew a prototype Family Health Tree and decorated boxes for the workshop activity cards. My nephew Shawn created Food Record posters, and Todd participated in the physical activity workshop. My husband, Don, married a doctoral student and never lost heart. His support, tempered by his innate intelligence and sense of vision, was a constant source of encouragement.

My committee members represent a wealth of expertise. Dr. Karen Dennis shepherded me through the "See Spot run" stages as my advisor and mentor. Dr. Marilyn Winkelstein shared her health education and pediatric experience, always providing a nurturing place in which to dialogue. Dr. Barker Bausell patiently gave insight and explanation to my methodology woes. Dr. Phyllis Sharps lent her expertise early on in the instrument development phase and graciously continued to share her wisdom. Dr. Andrew Billingsley introduced me to the kinship networks within African-American families, encouraging my exploration of ethnic diversity. Dr. David Levine and his colleagues shared their expertise in community-based interventions with underserved populations.

I was fortunate to be with a community of scholars at the Claude B. Pepper Older Americans Independence Center. This interdisciplinary environment fostered the development and completion of this study. My colleagues at the University of Arizona College of Nursing have listened, gently critiqued my work, and cheered me on.

Most importantly, I want to recognize the teachers, children, and grandparents who participated in this study. My education and life experiences were greatly enhanced by sharing hours with them.

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Introduction

Heart disease is the leading cause of death for people over the age of 25 and is largely preventable through behavioral changes. Healthy People 2000 posits that diets high in fat and sedentary lifestyles are associated with coronary heart disease, and national health objectives call for improved diets and more regular physical activity among children and adults (U.S. Department of Health & Human Services [USDHHS], 1991a). Health promotion/disease prevention strategies are related to individual lifestyles, patterns of which are formed in childhood. The National Institute of Nursing Research (NINR) Priority Panel on Health Promotion identified research initiatives focusing on family relationships, health perceptions, and behavior to include investigating how families from different cultural and community contexts manage information that affects the healthy development of their children (NINR, 1993). This research topic can be expanded to include how members of families manage information that affects healthy lifestyles for all generations. Intergenerational programming is the purposeful bringing together of different generations in ongoing mutually beneficial planned activities designed to achieve specified program goals (e.g., cardiovascular health). Children and older adults share their talents and resources, supporting each other in relationships that benefit both the individuals and the community (University of Pittsburgh, 1994).

The purposes of this study were to: 1. Assess the impact of a school-based health intervention in promoting healthy cardiovascular behaviors in elementary school children;

and, 2. Evaluate the efficacy of elementary school children as conduits of health promotion information for older generations.

Hypotheses

The hypotheses were:

1. Children who participate in a school-based cardiovascular health promotion program will demonstrate greater knowledge, more positive attitudes, stronger self-efficacy, and manifest greater behavioral changes regarding heart healthy dietary intake and physical activity than children who do not participate.

2. Grandparents of children who participate in a school-based cardiovascular health promotion program will demonstrate greater knowledge, more positive attitudes, stronger self-efficacy, and manifest greater behavioral changes regarding heart healthy dietary intake and physical activity than grandparents of children who do not participate.

Background and Significance

Health promotion and disease prevention (health protection) are an integral part of nursing practice. Health promotion is directed toward increasing the level of well-being and actualizing the potential of individuals, families, and communities, and society. Disease prevention, a complementary concept, focuses on guarding or defending the individual or group against a specific illness or injury (Pender, 1996).

Cardiovascular Disease (CVD) Risk Factors

CVD risk factors develop during childhood and include environmental, psychosocial, behavioral, genetic, and physiological components (Perry et al., 1992). Generally asymptomatic until adulthood, cardiovascular risk factors such as obesity, elevated blood pressure, and elevated cholesterol levels can be identified early in life. It is estimated that 30-60 % of children in the United States exhibit at least one modifiable risk factor for coronary heart disease by the age of twelve (Berenson, 1986; Hayman, Weill, Tobias, Stashinko, & Meninger, 1988; Lenfant, 1995; Nicklas, Webber, Johnson, Srinivasan, & Berenson, 1995; Stone, Perry, & Luepker, 1989). Longitudinal studies (Muscatine, Iowa; Bogalusa, Louisiana) have provided normative data for cardiovascular risk factors and demonstrated that individual levels observed during youth persist throughout adolescence and adult life. These studies clearly demonstrate that the determination of risk factors in youth is the product of genetic influences, environment, and behavior (Frerichs, Srinivasan, Webber, & Berenson, 1976; Harlan, 1989). For example, over 50% of children exceed the recommended dietary intake of salt, fat, cholesterol, and sugar (Lenfant, 1995). Health education activities to motivate children to adopt healthier lifestyles can be achieved in part through school-based programs beginning in elementary schools. Reinforcing that heart disease "runs in families" and begins in childhood is an important beginning (Hayman et al., 1988).

Coronary heart disease (CHD), stroke, peripheral arterial disease, and congestive heart failure increase in frequency after the age of 65 for both men and women. In ethnic minorities, from ages 35-74, the death rate from heart attack for black women is about two times that of white women and three times that of other races (American Heart

Association [AHA], 1994). Thus, health education programs for older adults related to cardiovascular health may result in more positive health outcomes. One such peer education program in a housing residence showed a significant increase in overall knowledge of heart disease, diet self-efficacy, and exercise self-efficacy for the intervention group (Rose, 1992).

School-based Health Promotion Programs

Practical methods for preventing heart disease while promoting healthy lifestyles should begin early in life. School health programs provide the infrastructure for promoting the health of children and their families, with the school serving as the entree to the family structure and community (Best, 1989; Stone, Baranowski, Sallis, & Cutler, 1995). Cardiovascular health education coupled with improvements in school environments serves as a public health approach to the prevention of heart disease (Nicklas et al., 1995). The early consolidation of health behaviors (physical activity, food preferences, and smoking) noted in the school component of the Minnesota Heart Health Program (MHHP) implies that interventions should begin prior to sixth grade, before behavior patterns become resistant to change (Kelder, Perry, Peters, Lytle, & Klepp, 1995).

In the late 1970s there was a conceptual shift from an emphasis on knowledge and attitudes to cognitive and behavioral skills. Over the past fifteen years, studies have varied as to complexity of behaviors, grade level of students, ethnic group inclusions, and parental involvement (Stone et al., 1989). The majority of studies randomized schools into treatment and control groups with pre- and posttest measures. Students were generally white upper elementary or high school students from middle socioeconomic backgrounds. Longitudinal studies with multiple measures (e.g., knowledge, self-reports of diet and

exercise, self-efficacy, and physiological measures) were most common. Research on changing health-related behaviors within a family context is limited and with marginal statistical significance (Perry et al., 1989). Since 1980, six school-based studies have included parents in their programs as motivators for change in their children. Changes were found in diet and knowledge, with few significant differences for exercise. Parental involvement had no effect on knowledge or behavior of 647 sixth grade students participating in a Heart Health Curriculum (Petchers, Hirsch, & Bloch, 1987). Behavioral changes were noted only in longitudinal studies of cohort groups, to include the Heart Smart Family Health Promotion Program (Johnson et al., 1991).

A seminal study, The Child and Adolescent Trial for Cardiovascular Health (CATCH), was designed to augment the research of the late 1980s in CVD prevention among young people, and used a sophisticated experimental research design with multiple sites, multiple components, and interventions that followed a cohort through three grades (3-5) (Luepker et al., 1996). Outcomes were at the school and individual levels, with the primary individual endpoint being a change in serum cholesterol levels. One secondary hypothesis was that the school-based program with the addition of family activities would have significantly better outcomes than the school-based program alone. Although no significance was found, the investigators contended that family-based programs are needed to realize more substantial modifications in heart healthy habits. Thus, research building on the approaches of CATCH that focuses on eating behavior and physical activity with increased involvement of family members is warranted.

No studies have identified family members outside of the traditional nuclear family in health promotion activities (i.e., extended family members of ethnic minority groups).

Diversity in family structure to include the kinship networks in single head of household families has not been considered. Further development of creative family-based approaches to cardiovascular health promotion/risk reduction is needed; diet and exercise are well-suited as meals and recreational activities can involve the family as a unit (Nader et al., 1989).

Culturally appropriate programs have been found to promote behaviors that lead to healthier lifestyles. Significant changes in knowledge, diet and exercise were reported in 5th grade Navajo and Pueblo students (Davis, Lambert, Gomez, & Skipper, 1995). A family-based CHD risk reduction intervention in low-to-middle class Mexican-American and non-hispanic white families in San Diego showed a significant decrease in fat intake. These results support the ability of family-based interventions to produce long-term changes in dietary habits.

Intrafamilial associations of obesity to cardiovascular disease risk factors (e.g., hypertension, hyperlipidemia, and diabetes) support the position that increased CVD mortality and morbidity in black women may be linked to excess obesity in black women compared to white (Morrison, Payne, Barton, Khoury, & Crawford, 1994; National Heart Lung & Blood Institute [NHLBI], 1994). Only one study has focused on African-American children from an urban area in which parents were indirectly involved via a written communication regarding their children's activities (Bush et al., 1989). An interesting finding regarding the influence of older adults on dietary choices of children was reported by Baranowski et al. (1993) in a study of 4th-grade African-American children participating in a nutrition study to increase fruits and vegetables. The children

stated that much older adults (grandparents) could influence them, but probably not their parents.

The school-aged child is exposed to a variety of societal roles and interactions in the process of socialization. As the school-aged child matures, the child takes on more responsibility within the family and community. Knowledge of a formalized set of activities obtained through a school-based program can serve as a motivation to change lifestyle behaviors among family members, particularly the older generation. Grandparenting and mentorship are two roles often added to life with aging (Edelman & Mandle, 1994).

Currently school curricula support heart healthy behaviors by integrating these concepts within existing courses or a special periodic program. However, comprehensive programs are limited in elementary schools. No ongoing programs have been identified within the Baltimore City public elementary schools. Although school-based health promotion/disease prevention activities highlighting heart healthy behaviors have been demonstrated to reduce risk factors of cardiovascular disease in children, the concept of self- efficacy, and outcomes of intergenerational health promotion have not been investigated (Stone et al., 1989).

Theoretical Framework

Numerous publications over the past decade purport the centrality of health promotion to nursing, however, interpretations of this concept vary greatly. There is no universally accepted definition of health promotion, which makes operationalization and measurement difficult. With the range of definitions, questions surface regarding the relationship between illness prevention and health promotion; the classical categories of

primary, secondary, and tertiary prevention; and the role of health education (Delaney, 1994). Health promotion is a complex concept encapsulating myriad activities across the life span and is multidimensional in nature. It incorporates an understanding of what health means to the individual and how perceptions of the environment affect actual and perceived health options. It is a unifying concept for those who recognize the need for change in the ways and conditions of living, and a mediating strategy between people and their environments synthesizing personal choice and social responsibility. A positive process, it enables people to increase control over and improve their health (World Health Organization [WHO], 1984, 1986 as cited in Delaney, 1994). Health promotion focuses on actualizing human potential (i.e., empowerment through biological, cognitive, emotional, spiritual, and social dimensions) (NINR, 1993)].

Pender (1996) uses an exclusive definition, differentiating health promotion from primary prevention, contending that the former is approach behavior with the latter being avoidance behavior. She suggests that the two are complementary components of a lifestyle. The health promoting component is a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization, and fulfillment of the individual (Walker, Volkan, Sechrist, & Pender, 1988). Recurrent themes in both health promotion and disease prevention include enabling, active participation, and health education. According to Healthy People 2000, health promotion strategies are those individual lifestyle patterns that can have a major influence over one's health. These include nutrition, physical activity and fitness, tobacco, alcohol and other drugs, family planning, mental health and mental disorders, and violent and abusive behaviors (USDHHS, 1990a). McGinnis (1994) defines health promotion as "personal,

environmental, and social interventions to facilitate behavioral adaptations to improve health, level of function, and sense of well-being " (p. 218). He contends that behavior is the anchor to both health promotion and disease prevention.

Kulbok and Baldwin (1992) analyzed general health research from 1958, noting a lack of clarity regarding relationships among variables in complex explanatory models and the inconsistent definition and measurement of health behavior. However, findings did support the multidimensionality of health behavior. In the 1980s, thirty nursing research reports were identified by Kulbok and Baldwin (1992). The majority of the studies examined health promotion in well adults, but the theoretical definitions were not reported. Several investigators focused on a single action or a limited number of specific illness prevention or risk reduction behaviors. The majority were survey designs with only one ethnic minority group represented: Mexican-American migrant workers. "Health promotion involves a complicated web of knowledge, attitudes, and behaviors related to health. Health promotion at the individual level and the community level requires complex personal life-style choices made in the context of the uncertain economic, cultural, physical, and social environments" (Kulbok & Baldwin, 1992, p. 59).

Intergenerational health promotion is the perceptual, cognitive, and behavioral process enabling family members to increase their well-being through positive lifestyle patterns. The Health Promotion Model (HPM) (Pender 1996) is organized into cognitive-perceptual factors, modifying factors, and variables affecting the likelihood of action. It is derived from the Social Learning Theory (now renamed the Social Cognitive Theory) (Bandura, 1986), incorporating the dimensions of Health Locus of Control (Wallston & Wallston, 1978) and Health Belief Models (Becker, 1974). This model provides one

organizing framework for health promotion research. Instruments to examine the basic concepts in the HPM have been developed (Sechrist, Walker, & Pender, 1987; Walker, Sechrist, & Pender, 1987, 1995).

Social Cognitive Theory (SCT) has been particularly valuable in designing effective health promotion programs and models for health behavior (Baranowski, Perry, & Parcel, 1997; Best, 1989; Killen et al., 1989; Parcel, Simons-Morton, O'Hara, Baranowski, & Wilson, 1989; Pender, 1996;). The majority of studies regarding school-based programs for cardiovascular health have used SCT as the theoretical framework incorporating skill-building for health promotion behaviors (Bandura, 1986; Bush et al., 1989; Perry et al., 1989; Petchers et al., 1987). SCT addresses the psychodynamics underlying health behavior and methods of behavior change. Human behavior is explained in terms of a model in which behavior, personal factors, and environmental factors interact. Critical personal factors are the individual's capabilities to symbolize the meaning of behavior, foresee the outcomes of given behavior patterns, learn by observing others, determine or self-regulate behavior, and reflect and analyze experience (Bandura, 1986).

SCT emphasizes role socialization in developing behavior and life habits. Behavior acquisition results through the transaction between the child and social models such as the parent or grandparent. Children learn to understand and respond to cultural pressure through modeling behavior and receiving social reinforcements. The family provides the primary social learning environment for the child as parental health behavior guides the development of health practices in children and children in turn influence siblings, parents, and grandparents (Nader et al., 1989). From a SCT perspective, it is important to influence self-efficacy for performing targeted health behaviors (Bandura, 1986; Parcel et

al., 1989). Standard measures of self-efficacy constructs have shown construct validity among children as well as adults (Maibach & Murphy, 1995). Perceived barriers have consistently been shown to be the most powerful dimension of the Health Belief Model and are closely related to self-efficacy (Janz & Becker, 1984; Winkelstein & Feldman, 1993).

Self-efficacy, both as a construct in SCT and as a theory in itself has been used in health promotion measures (Maibach & Murphy, 1995; Strecher, DeVellis, Becker, & Rosenstock, 1986). It refers to a person's belief in his/her capability to organize and execute the course of action required to deal with prospective situations and confidence in capability to regulate one's motivation, thought processes, emotional states, and the social environment as well as the levels of behavioral attainment (Bandura, 1986; Maibach & Murphy, 1995). Bandura argues that perceived self-efficacy influences all aspects of behavior. There is considerable homogeneity in the way in which self-efficacy is used in health promotion literature, however operationalizations are problematic. There is no all purpose measure of this construct and scales must be tailored to specific domains of functioning. Perceived self-efficacy has been shown to be a predictor of health behavior despite the less than optimal measurement (Maibach & Murphy, 1995). These authors note that efficacy items contained in an instrument should include three factors: the behavior, the level of situational demand, and the time frame. For example, the lifestyle pattern of nutrition within the health promotion domain would have a separate self-efficacy rating from that of physical activity. Likewise, self-efficacy scales developed for one population may not be generalizable to another. Ways to enhance self-efficacy are key components of health promotion programs. These include: 1. Performance attainment

(self-mastery, shaping, providing opportunities for successful experiences); 2. Vicarious learning (modeling); 3. Verbal persuasion; and 4. Physiological feedback. Performance attainment is the most powerful predictor of increased self-efficacy.

The transtheoretical model (stages of change) (Prochaska, DiClemente, & Norcross, 1992; Prochaska et al., 1994) has been presented as a comprehensive model of behavior change across numerous health behaviors, to include heart healthy diets, exercise adoption and weight control, and smoking cessation. The respective stages of change are precontemplation, contemplation, preparation, action, and maintenance. Prochaska et al. (1994) have found evidence that self-efficacy can be integrated within the same stage dimension. The development of intervention strategies can be matched to the individual's unique position or progress in the stages of behavior change.

The Intergenerational Health Promotion Model, developed for this study, incorporates components of the Social Cognitive Theory and Stages of Change (Figure 1).

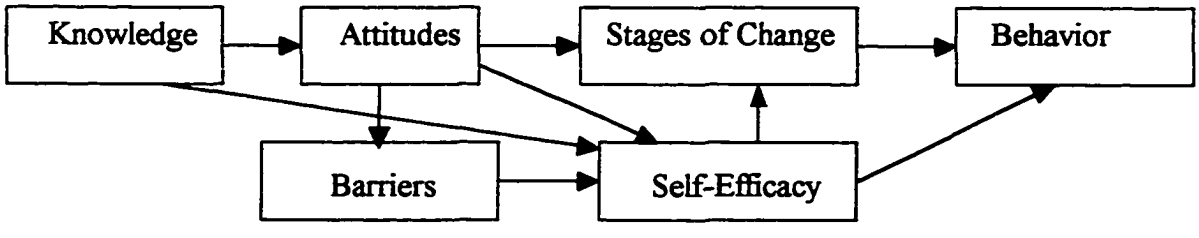

Figure 1. Intergenerational Health Promotion Model

Definitions

Intergenerational health promotion: the perceptual, cognitive, and behavioral process enabling family members to increase their health and well-being through positive lifestyle patterns.

Lifestyle: personal choices made in a social context (e.g., nutrition, physical activity).

School-age children: for the purpose of this study, African-American children in grade five.

Grandparents: biological or fictive (not related) grandmothers, grandfathers (or kin of this generation) of school-aged children who reside within the study geographical area.

Attitude: perception, predisposition, or a set of beliefs directed toward an object, person, or situation.

Heart healthy dietary intake: eating behavior outlined by the American Heart Association. The dietary pattern should include no greater than 30 percent of the calories from fat; low in saturated fat and cholesterol.

Physical activity: any body movement produced by muscles that results in increased energy expenditure (McCardle, Katch, & Katch, 1996).

Perceived barriers: potential negative factors that act as impediments to avoiding a particular behavior (Janz & Becker, 1984).

Self-efficacy: the confidence of the individual that he/she can perform specific behaviors related to heart healthy eating and physical activity.

Stages of change: one of four stages of readiness for behavior change will be identified in this study: *precontemplation* (individual has no intention to take action within the next 6 monhs); *contemplation* (individual intends to take action within the next 6

months); *preparation* (individual to take action within the next 30 days and has taken some behavioral steps in this direction); *action* (individual changed overt behavior for less than 6 months).

Assumptions

Within the Social Cognitive Theory and Stages of Change context, the following assumptions were made:

1. Behavior is dynamic and depends on environmental and personal constructs that influence each other simultaneously (Baranowski, Perry, & Parcel, 1997).

2. Changes in knowledge, attitudes, and self-efficacy precede specific changes in behavior.

3. Individuals must possess the capability to perform the behavior for perceptions of self-efficacy to be meaningful.

4. Behavioral change is a process that unfolds over time through a sequence of stages.

5. African-American kinship networks are a major social support system within the environment.

6. Children in the 5th grade will share designated health promotion activities with their selected grandparents.

Summary. Knowledge, attitudes, barriers, self-efficacy, and stages of change as related to cardiovascular health (diet and physical activity) will be operationalized using norm- referenced self-report measures (Chapter III). Much of the existing research focuses on single health behaviors in longitudinal studies. Likewise, most have been developed for use with white middle class subjects. The cultural relevance of the instrument is a major consideration as the research will be conducted in an African-

American inner city population generally composed of the lower class or working poor. Conducting research with African-Americans presents two major issues: 1. The lack of available instruments with acceptable reliability and validity; and, 2. The limited concepts that have been validated cross-culturally (Porter & Villarruel, 1993). In addition, little is known regarding effective interventions and influences on behavior in this population. The results could be used as an empirical basis for further longitudinal research on intergenerational health promotion as well as the possible incorporation of the intervention into the school curriculum using stage-matched methods of health education.

Chapter II

Review of Literature

This chapter examines selected studies that provide information about the components and theoretical underpinnings of intergenerational health promotion. Particular emphasis is on cardiovascular health in African-American children and older adults. Literature supporting the development of culturally-sensitive instruments for measuring health promotion is reviewed. Included in the literature review is the identification of gaps in the current knowledge base which promulgated the design and focus of this study.

Cardiovascular Risk Factors

Cardiovascular disease (CVD) is the leading cause of death in the United States and most other developed countries, killing more than one-half million Americans annually with the majority being between the ages of 55 and 64 (Luepker at al., 1996; USDHHS, 1991a). Currently more than 60 million Americans have some form of CVD, costing over $137.7 billion in 1995 for medical costs and disability. Especially relevant to American business is the cost of morbidity and mortality of skilled employees between the ages of 35 and 64 (AHA, 1994). Epidemiological data link CVD to the lifestyles of the population. Modifiable risk factors for coronary heart disease include physical inactivity, obesity, hypertension, cigarette smoking, and a diet high in saturated fat. These behaviors, learned in childhood and adolescence and established by young adulthood, form the basis of the insidious development of atherosclerosis (Luepker et al., 1996). The American Heart Association's Children's Heart Health Conference (1994) identified strategies for

promoting cardiovascular health in children to include physical activity and nutrition. Recommendations conformed with those of Healthy People 2000: to increase the number of children participating in physical activity and the duration and intensity of that activity, and for children to be weaned from harmful diets and encouraged to make healthful food choices that de-emphasize salt, fat, and cholesterol (Gidding, Deckelbaum, Strong, & Moller, 1995). Physical activity and dietary behavior have been identified as two of the priority health promotion areas. Regular physical activity can decrease the risk of CHD as well as prevent and manage hypertension, diabetes, osteoporosis, and obesity, health problems that have increased prevalence in middle-age and elderly adults (Pate et al., 1995; USDHHS, 1991a). National objectives call for an increase in moderate daily physical activity to at least 30% of people so that no more than 15% of the population is sedentary. Although physically active people outlive those with sedentary lifestyles and regular physical activity also can maintain functional independence for older adults, few Americans engage in regular physical activity (USDHHS, 1991a).

Data from several studies indicate that fat makes up more than 36% of calories in the average American diet (Blumenthal, Matthews, & Weiss, 1994). Obesity has become a significant public health problem for both children and adults in the United States over the past 30 years across all age/gender groups (Kennedy, 1996). Ten to 20% of U.S. children are significantly overweight, increasingly consuming fatty meals from fast food restaurants (McGinnis, 1993). Data from the Bogalusa Heart Study indicate that since 1973 10-year-old children in the same communities that were originally studied have become progressively heavier. The authors conclude that a major contributor to the increasing

overweight in these communities is decreased physical activity (Nicklas, Webber, Srinivasan, & Berenson, 1993).

Less than a third of U.S. children have a daily program of physical education in schools (McGinnis, 1993). There are substantial barriers to children obtaining adequate amounts of physical activity. While they receive most of the activity in non-school environments, many children have limited or no access to activity settings such as structured sports and gyms. This is particularly true for girls and those in underserved areas (McKenzie et al., 1996).

Risk factors for CHD do not have the same effect on the morbidity and mortality of children and youth as in adults. The National Cholesterol Education Program Expert Panel on Blood Cholesterol Levels in Children and Adolescents noted that an elevated cholesterol level early in life plays a role in the development of adult atherosclerosis which can lead to coronary heart disease. Numerous studies have shown that the atherosclerotic process begins in childhood with deposits of cholesterol and its esters in arterial intimal macrophages and smooth muscle cells to form lesions known as fatty streaks. In young children, some fatty streaks are converted into raised lesions by the continued accumulation of intracellular and extracellular lipid and the formation of a fibromuscular cap. As individuals enter middle age, raised lesions increase in size by the accumulation of lipids and become susceptible to rupture of the fibromuscular cap and overlying endothelium. This can lead to occlusive thrombosis and ischemic injury to the heart, brain, or extremity (Allensworth, 1996; McGill, McMahan, Malcom, Oalmann, & Strong, 1997; USDHHS, 1991b; Zwiren, 1992). Children in the U.S. have higher intakes of saturated fatty acids and cholesterol as well as higher blood cholesterol than their counterparts in

many other countries (USDHHS, 1991b). Primary prevention of atherosclerosis by controlling adult coronary heart disease risk factors is applicable to young men and women and to young blacks and whites (McGill et al., 1997).

The current national health objectives targeted at the year 2000 are designated as one of three categories: 1. Health status; 2. Risk reduction; and, 3. Services and protection. Objectives that address the adult prevention of CVD through intervention objectives for children and youth are categorized as health status or risk reduction objectives. These objectives are in the priority areas of physical activity, nutrition, and tobacco (Allensworth, 1996). Objectives related to physical activity include:

1.3: Increase to at least 30 percent the proportion of people ages six and older who engage regularly , preferably daily, in light to moderate physical activity for at least 30 minutes per day. The baseline for adults was 22 percent in 1985; there was no baseline for children.

2.5: Reduce dietary fat intake to an average of 30 percent or less, and average saturated fat intake to less than 10 percent of calories among people ages two and older. The baseline for adults was 36 percent of calories from total fat and 13 percent from saturated fat; there was no baseline for children.

Prevalence rates of CHD risk factors, such as diabetes, hypertension, high levels of Lipoprotein (a), increased left ventricular mass, cigarette smoking, and obesity have been documented to be higher in blacks than in whites (NHLBI, 1994). Few empirical data support that there are major differences in the eating patterns of blacks and whites, however, the preferences for certain foods appear to be different. The National Health and Nutrition Examination Survey (NHANES II) found that soluble fiber, fruits, and

vegetables were consumed less by blacks as compared to whites, whereas, table salt was used more frequently by blacks. Blacks are more sedentary than whites independent of income and education (NHLBI, 1994; USDHHS, 1991a).

There is little published literature on effective cardiovascular disease-related health behavior interventions with minority populations has not been systematically studied. For example, the heterogeneity within and between minority communities has not been recognized (Baranowski, 1992). It is suggested that among blacks, social networks may facilitate the implementation of heart healthy programs (NHLBI, 1994)

Meta-Analysis of School-based Health Promotion Programs

The rationale for using school-based interventions is broad-based. Children influence the environment and the behavior of adults as they are a valuable social reinforcement for ongoing adult behavior change. Schools have been used as an avenue to reach students, parents, and teachers with CVD prevention programs (Coates, Jeffery, & Slinkard, 1981; Luepker et al., 1996; Petchers et al., 1987). School-based interventions offer a number of advantages for effectively improving the consumption patterns and nutritional patterns of children because more than 95% of children in the United States are enrolled in school. Secondly, children eat one to two meals a day at school and can become involved in regular physical activity (Kennedy, 1996).

Recognizing the importance of cardiovascular health promotion in elementary school children, the following research question was addressed in this meta-analysis: What is the magnitude of change in the heart healthy eating behaviors of elementary school children who participate in a school-based cardiovascular health promotion program?

Method. Selection criteria and location of studies. Several retrieval methods identified in Cooper and Hedges (1994) were used to obtain the sample of studies: 1. Ancestry method using footnotes from selected articles and health behavior texts; 2. Consultation and informal discussions at conferences (e.g., National Assembly on School-based Health, Society of Behavioral Medicine; annual meeting of the American Heart Association Schoolsite Programs). Facsimile and electronic mail messages also were sent to experts in the field (e.g., Cheryl Perry, Dept. Of Epidemiology at the University of Minnesota, Dr. Tom Baranowski, University of Texas; Dr. Joanne Harrell, University of North Carolina); 3. Searches in subject indexes to include Medline 1980-present using the key words of cardiovascular health promotion, school, children; 4. Browsing journals to include Journal of School Health, Health Education Quarterly. The largest numbers of studies were identified by the ancestry method and recommendations from experts.

To protect against publication bias, the Internet was used to request information on school-based health promotion programs and cardiovascular health in children within the United States. The director of the UMB School of Nursing school-based programs was contacted and volunteered to explore the topic in school-based health care networks, especially the location of unpublished studies.

Inclusion criteria for the selected studies were: 1. An elementary school-based cardiovascular program with nutrition (heart healthy eating) as a component; a quantifiable measure of eating behavior must be included. 2. Children ages 9-11 (4th - 5th grades); 3. F = 1 df in the numerator; 4. The unit of analysis is the individual. Over 30 studies were reviewed. The final sample included 12 studies which represented 9 articles since 3 reported 2 separate studies each.

Procedure. Substantive and methodological characteristics were coded using code sheets developed for this meta-analysis with sixty-four variables identified. Substantive data included publication identification, sample characteristics, units of randomization and analysis. Methodological characteristics included the research design, duration of the study, attrition, intervention, outcomes, quality of the study, effect size description, and measures. The investigator and a cohort coded the variables followed by discussion until 100% of agreement was reached. Several decision rules were established: 1. If more than one measure of eating behavior was used in a study, a single measure would be randomly selected. 2. The first measure of eating behavior post intervention would be used; and, 3. If the results were non-significant and no p value was given nor could be extrapolated, a $p = 0.2$ was used.

The quality of the study included 6 items for a total of 18 points: the presence of a theoretical framework, the study design (pretest/posttest, nonrandomized control group, randomized), sample (lack of demographic descriptions, inadequate description, convenience sample, random representative sample), description of the intervention (no description, partial description, complete description), outcome measures (self-report, objective measures, multiple measures), and reliability of measures (not addressed, referred to another article, incomplete description, described). Higher total scores represented higher quality of the individual study. Characteristics of the sample studies are found in Table 1.

Table 1

Characteristics of Meta-Analysis Studies
(n=12)

Characteristic	Frequency
Publication identification	
Credentials of author: PhD (non-nurse)	8 (57%)
No. of authors	M=6 (S.D.3.54)
Interdisciplinary	6 (507%)
Funding-NHLBI	11 (92%)
Year of publication	2 (81), 5 (89), 1 (91), 2 (95), 2 (96)
Sampling	
Multisite	10 (83%)
Age of student	M=9.92 (S.D.61)
Predominant ethnic group	
African-American	2 (22%)
Hispanic	1 (11%)
Native American	2 (22%)
White	4 (44%)
SES	
low	5 (56%)
middle	1 (11%)
high	2 (22%)
Unit of randomization	
school	6 (55%)
student	3 (25%)
class	1 (8%)
family	1 (8%)
Unit of analysis	
school & student	1 (8%)
student	9 (75%)
family	1 (8%)
Methodology	
Research design	
Randomized experimental	8 (67%)
Time series	3 (25%)
Duration of study	
1-3 months	1 (8%)
3-5 months	1 (8%)
6 months to 1 year	4 (33%)
> 1 year	6 (50%)
Attrition	M=16.42% (n=6)

Table 1, continued

Characteristics of Meta-Analysis Studies

Characteristic	Frequency
Intervention	
Theoretical framework	3 (All Social Learning Theory)
Provider	
Classroom teacher	5 (42%)
Investigator	1 (8%)
Family participation	11 (92%)
Special curriculum	12 (100%)
No. of sessions	M=10.75 (SD18.38; range 4-60)
Total sample size	M=861.08 (SD1389.57; range 38-5106)
Outcomes	
Change in knowledge	8 (67%)
attitude	2 (16.7)
self-efficacy	12 (100%)
behavior	12 (100%)
Quality of study (sum, 18 possible)	M=11.38, range 9-16
Reliability of measures reported	4 (33%)

Measures. The operationalization of heart healthy eating behavior was varied to include self-report measures, physiologic measures (serum cholesterol), observation of food intake, and anthropometric measures. Multiple measures were used throughout the studies to include observation of heart healthy foods in the diet, nutritional practices with percent of heart healthy foods in diet, percentage of saturated fat in diet, food frequencies, usual food choices, and vegetable and fruit servings. The majority of studies used self-reports.

Data analysis. Descriptive statistics of the sample were calculated (Tables 1 & 2.). Effect size (d) was computed for each study. Effect sizes were weighted based on variance and combined for the overall effect of intervention. The 95% confidence interval was calculated using the expected parameters of the population. Homogeneity of the

effect size was calculated using the Q statistic. If this test is non-significant it is assumed that each study represented estimates of the population effect size.

Table 2

Studies Included in Final Meta-analysis

Study	Statistic	N	P	ES (d)	Quality
1a Coates et al., 1981	t-test	89	<.01	0.94	16
1b Coates et al., 1981	t-test	89	<.01	0.90	16
3 Bush et al., 1989	t-test	233	0.33	0.13	14
4a Nader et al., 1989	F value	103	0.02	0.39	13
4b Nader et al., 1989	F value	103	0.01	0.52	13
5a Cohen et al., 1989	t-test	56	<.001	1.69	9
5b Cohen et al., 1989	t-test	164	<.001	1.05	9
8a Davis et al., 1995	F value	842	0.03	0.08	9
8b Davis et al., 1995	F value	924	0.24	0.16	9
9 Leupker et al., 1996	F value	1130	<.001	0.15	12
10 Johnson et al., 1991	F value	15	>0.25	0.83	9
11b Hooper et al., 1996	F value	80	<0.05	0.48	11

Results

The homogeneity test using the Q statistic was significant with 12 studies included (Q=75.42 which exceeded the critical value of 24.72 at the .05 level of significance). Outliers were identified as having an effect size >1. Two outliers were identified. Characteristics of the outliers included: a PhD non-nurse as primary author; both studies

were from the same article (sponsored by the NHLBI with convenience samples of between 161-233 subjects). The studies were multi-site with white or non-designated ethnic group study populations and unidentified socioeconomic status. Both studies were six months to a year in duration with attrition not addressed. The quality scores were 9 each. Reliability of the measures was addressed which was unique in that only 25% of the total sample met this requirement. The effect sizes (d) of the studies were 1.70, and 1.05 respectively.

Results from the nine studies were translated into standardized effect sizes using the formulas in Cooper & Hedges (1994). The weighted average effect size for the sample of 12 studies was 0.24. According to Cohen (1977), =.20 is considered a small effect size. Although small, it suggests the positive effect of the school-based intervention. The 95% confidence interval was 0.174 to 0.301 which does not include zero. Thus, it can be concluded that the school-based cardiovascular health promotion programs had a significant effect on heart healthy eating behavior of student participants.

Discussion. The shortcomings of the primary studies, particularly those conducted in the 1980s, was noted. All funded studies were sponsored by NHLBI which may impact publication bias. There is a lack of studies focusing on ethnic minorities, especially significant in that African-Americans are at greater risk than white populations for cardiovascular disease. An interesting finding in the nine studies identified is that the lower socioeconomic group is well represented as is the inclusion of parents in some portion of the intervention. This is not representative of the majority of school-based health promotion studies.

Limitations of this meta-analysis include the dearth of studies which limits generalization. The measurements of heart healthy eating behaviors were varied and generally lacked reliability. Although the overall effect size was small, the results do support school-based programs that include eating behaviors as a component of the intervention. It is recommended that future research in school-based cardiovascular health programs identify and implement reliable measures. Increasing the representativeness of culturally diverse populations is warranted.

Theoretical Frameworks for Health Promotion

No one theory dominates research or practice in health behavior. Theories are selected according to the nature of the health problem, the situation, the population, and the behavior change goals. The most appropriate theoretical framework for health behavior research is an ecological one that takes into account the many forces that influence health behavior, which include intrapersonal, interpersonal, community, and health policy factors. Both the Social Cognitive Theory and the Transtheoretical Model (stages of change) fit this perspective (Rimer et al., 1992). The Intergenerational Health Promotion Model includes components of SCT and the stages of change.

Social Cognitive Theory. SCT provides a comprehensive context and a variety of specific mechanisms to understanding health-related behavior (Bandura, 1986). One of the prominent dynamics for promoting behavior change is that of reciprocal determinism - characteristics of the person, the environment in which the person acts, and the behavior constantly interact over time. Changes in one component induce changes in the other(s) which in turn induce reciprocal changes. The implications are that behavior change is

complex, encompassing many factors often out of the control of the individual (Baranowski, 1992).

Social cognitive theory appears to be a robust model that could be used in minority behavioral research as the variables are well specified and the theory has had considerable testing in non-minority populations (Baranowski, Perry, & Parcel, 1997; Baranowski et al., 1993; Rimer et al., 1992). The concept of skill-building, the ability to perform a particular behavior, is a key focus of SCT. People learn skills that enable them to perform particular behaviors in particular environments. Modeling, or demonstrating behavior, is a major method of learning skills. Whether a person uses a particular skill in a particular situation is determined in part by self-efficacy, the confidence a person feels that he/she can perform the behavior. Self-efficacy can be enhanced by practicing the behavior, or by persuasion from other people, or a combination of both (Rimer et. al., 1992). A sense of self-efficacy is important to developing and practicing health promoting behaviors, including physical activity and dietary patterns (Blumenthal et al.,1994). Constructs of Bandura's social cognitive theory and Fishbein and Ajzen's theory of reasoned action were assessed vis à vis the exercise behaviors of 328 undergraduate students for 7 weeks (Dzewaltowski, 1989). Findings supported that individuals who were confident that they could adhere to an exercise program and were satisfied with their standing on probable outcomes from participation exercised more days per week. Self-efficacy accounted for 12% of the variance in the average number of days exercised. The theory of reasoned action did not account for any unique variance in the behavior over the social cognitive theory.

Mastery is the developmental focus of the school years. Erickson labeled this stage as one contrasting industry with inferiority which links achievement with self-concept. The ability to compete productively in school, socially within and outside the family, in large part determines the child's sense of self-efficacy (Dixon & Stein, 1992).

Outcome expectancies guide whether behaviors are performed in specific situations. They are what the person expects will occur and the corresponding perceived benefits or costs that accrue to the person as a result of performing the behaviors. Environments play a key role in SCT. People respond to situations (mental representations of the environment) and they tend to learn and use the skills to negotiate the particular situations they encounter. If certain situations are not included in their normal experiences, they may lack the skills to negotiate that environment or they may have learned inappropriate or ineffective skills (Rimer et al., 1992). Over an individual's life span, perceptions of self-efficacy may increase, decrease, or remain the same as development progresses and the individual moves through various social circles (Berry & West, 1993).

Other constructs in SCT include that of normative expectations, people respond to expectations others have set for them. Behavior change programs using SCT have emphasized the learning of skills. They promote change in small success-oriented steps to facilitate ease in learning skills and to enhance and develop self-efficacy for the skills. They also have encouraged people to identify internal or external rewards to develop positive outcome expectations. Self-control is facilitated by: emphasizing self-recording of behavior; setting or developing specific plans for achieving challenging but realistic goals; monitoring performance; self-rewarding; and problem-solving and revising goals or plans if the goals are not achieved (Baranowski et al., 1997; Luepker et al., 1996; Rimer et al.,

1992). The Health Belief Model (HBM) addresses a person's perceptions of the threat of a health problem and the accompanying appraisal of a recommended behavior for preventing or managing the problem. Barriers is one of the four constructs. In 1988 the concept of self-efficacy was added to the HBM (Rosenstock, Strecher, & Backer, 1988).

Transtheoretical Model. Prochaska & DiClemente posit that change occurs in five stages: precontemplation, contemplation, preparation, action, maintenance, and ends in termination. (Prochaska et al., 1992; Prochaska et al., 1994). The Transtheoretical Model uses stages of change to integrate processes and principles of change from across major theories of intervention. Initial studies were of smoking, however the model has expanded in scope to include eating disorders, obesity, and high-fat diets (Prochaska, Redding, & Evers, 1997). Stages are both stable and open to change , however, without planned interventions, populations will remain fixed in the early stages. It is assumed that the majority of at-risk populations are not prepared for action and will not be served by traditional action-oriented programs. The understanding of the relationship between stages of change and the processes of change can provide a guide for interventions, both on an individual and a group basis (Rimer et al., 1992).

The stages of change model was applied to the readiness for dietary fat reduction in a mail survey of adults in South London (N=366) (Steptoe, Wijetunge, Doherty, & Wardle, 1996). More men than women were precontemplators, while more women than men were at the maintenance stage. Significant associations with fat consumption were observed; however, the model was of only a moderate use in accounting for current dietary habits. Stages of change for exercise, demographic variables, and beliefs about the health benefits of exercise were obtained for a sample of Australian adults (N=4404) (Booth et al., 1993).

Intention to do more exercise decreased with age but increased with level of education. There is evidence that the model does work for minority populations (Carlos DiClemente, PhD, personal communication, June 15, 1997). No studies have been identified using this model with school-aged children.

The SCT and Stages of Change model complement one another. Particular social learning techniques or concepts may facilitate or mediate change at different stages. When self-efficacy levels are high in the precontemplation and contemplation stages, change process can occur more often. The stages of change provide a framework in which many of the concepts from SCT can fit (Rimer et al., 1992).

Theoretical models provide a framework for the design, evaluation and interpretation of behavioral interventions and their outcomes. Despite their advantages, however, they have been inappropriately applied to and tested in ethnic minority populations. The terminology of some of the models may not be sensitive to the concerns of minority populations. The lower socioeconomic status prevalent among many ethnic minorities is associated with fewer financial and educational resources, decreased access to health care, lower quality of medical care, and less emphasis on preventive care. Models that emphasize personal responsibility and self-management may be inappropriate. Cultural norms and values must be taken onto consideration (e.g., family support/involvement, spiritual beliefs) (Rimer et al., 1992).

The Stanford Five-City Project was a 6-year field trial designed to test whether a comprehensive program of community organization and health education decreases cardiovascular risk factors. The subgroup with the lowest proportion of positive changers was most likely to be a minority (Hispanics in this population), and had the lowest health

knowledge and self-efficacy scores. The need to develop specific interventions that target specific ages, socioeconomic, and cultural subgroups was recommended (Winkleby, Flora, & Kraemer, 1994).

Heart Power! ™

The American Heart Association performed a strategic assessment on the 17-year-old and-under population during Fall 1993. CVD risk behaviors were examined: nutrition, physical inactivity, smoking, high blood pressure, and cholesterol. The report provided information relevant to health promotion/education strategies: cognitive development, health prevention models, psychosocial development, health attitudes, and marketing. The most significant demographic trend identified was the ethnic mix of the next generation, and that the typical family identified was no longer the nuclear family with the mother at home. Moreover, elementary school enrollment is expected to increase by 15%, from 47 million in 1991 to 54 million in 2003. These trends affect the role parents play in the health behaviors of their children The fact that low income families often have limited choices about what they eat and that foods they have may be nutritionally inadequate was noted (AHA Schoolsite Program, 1996b).

Psychosocial trends include peer influence. For upper elementary school age children, peer pressure may support positive behaviors which could have a domino effect. Health attitude trends suggest identifying potential partners through which to share the child's message (e.g., grandparents or older adult relatives/neighbors). Piaget's concrete operational level (7-11) finds children considering health as the ability to perform a certain function. Therefore, interventions should be designed to focus on current wants in lieu of

future expectations (e.g., being able to check the pulse and relate the number to the physical activity being performed). The major emphasis is on behavior change and focuses on developing self-esteem, self-efficacy, and decision-making skills.

Principles that guided the schoolsite task force included: children in an instructional setting are the target audience; the focus must be on the school as the environment; a variety of learning methods must be used; program objectives must be realized; materials must be sensitive to cultural and ethnic diversity; family involvement should be encouraged; and multiple motivations for health behavior change should be included (AHA Schoolsite Program, 1996b).

The AHA education programs are based on clinical and marketing science with the ultimate goal being the reduction of disability and death from cardiovascular disease and stroke. Heart Power!™ was designed to influence awareness, knowledge, attitudes, and health behaviors that highlight the prevention of cardiovascular disease and stroke. The program was released in July 1996 at the Tools for Schools Schoolsite Conference in Baltimore, Maryland. No plans exist, however, to evaluate Heart Power!™ based on effectiveness of changing behavior due to cost constraints and confounding influences in the school, home, and media (AHA Schoolsite Program, 1996b).

Heart Power!™ is a comprehensive and flexible supplemental language arts program for pre-kindergarten through grade 8 classrooms. It is designed to teach children about heart health and the prevention of heart disease and stroke. The motto reinforces these messages:

You can have a healthy heart
It's easy as 1-2-3!
Eat healthy stuff
Move around enough
Live tobacco-free! (AHA Schoolsite Program, 1996a)

The 4 workshops in Heart Power!™ were designed to interface with an integrated curriculum. Included in the grade-specific kits (5 levels) are a teacher's resource book, colorful posters, literature with heart themes appropriate for the grade levels (e.g., for grades 3-5, Who Invented Running is the reader), and hands-on investigations among numerous other activities (Appendix B).

Measures of Health Promotion

The myriad measures in health promotion research reflect numerous disciplines, each with its own requirements and eccentricities. The selection/development of an appropriate instrument or battery of instruments depends on the nature of the problem to be investigated, since the purposes for individual measures vary greatly as do the situations of use. Categories of measures include traditional measures of mortality and illness, service provision and the use of services aimed at health promotion and disease prevention; physiologic (objective) measures of health status; self-reported (subjective) measures of health status; behavior that has implications for health; physical, biological and social aspects of the environment that influence health; attitudes of the population towards management of health, including community participation; and decisions, action and

legislation at the government level that indicate priorities or determination to pursue the path of health promotion (Abelin et al., 1987).

Recently, efforts have increased in measuring attributes of interest to researchers in health science, such as subjective states and attitudes (perceptions) in lieu of focusing on objective measures (Streiner & Norman, 1989). These efforts provide a varied matrix of types of attributes to be measured by multiple means. However, a lack of published useful tools with a conceptual base explains in part why measurement activities are often isolated efforts unique to a specific study.

Objective measures

Direct observation in naturalistic or laboratory settings is occasionally used to measure dimensions of cardiovascular health promotion. The major disadvantage, however, is that the data obtained were subject to bias, particularly in poorly trained observers (Waltz, Strickland, & Lenz, 1991). Likewise, a multidisciplinary team approach is necessitated which can be impractical.

The evaluation of a Heart Healthy Program for 4th and 5th graders used direct observation of eating activity as well as paper-and-pencil assessments of knowledge and attitudes (Coates et al., 1981). Training of the observers and interrater reliability were ascertained. Five observers completed all observations while a sixth observer served as a supervisor and criterion observer. Students were observed at lunch time by trained non-participant observers three or four times a week throughout the study. The observers individually approached the student asking him/her to show the contents of his/her lunch. Each food item was recorded on a standardized form with pairs of observers independently observing the same students at the same time; the average percent

agreement across observers was 99 percent. The physical activity was observed following lunch on the playground with randomly selected 4th and 5th grade students. Each student was observed ten times over a one-minute period; at each 5-second interval, the observer recorded the student's activity into a tape recorder. Again, interrater agreements were high (97 percent). The researchers selected the observation method in lieu of the questionnaire for physical activity as direct observations are more sensitive to small variations. Likewise, the issue of recall with both diet and exercise is not problematic. Validity of the direct observation measure is not addressed. The investigators recommended additional methods to add strength to their findings (e.g., physiologic measures - blood pressure and cholesterol).

Physiologic measurement

The high degree of objectivity, reliability and validity of physiologic measures of dimensions of health promotion are tempered with the complexity of procedure, cost, and time to train data collectors (Waltz et al., 1991). The classic Bogalusa Heart Study (Nicklas et al., 1995) has studied a biracial population of children and young adults from 1973 to the present with observations on the distributions of levels, tracking, and determinants of blood pressure, serum lipids and lipoproteins, and the impact of cardiovascular risk. Rigid protocols have been followed by trained examiners. Although coming from an epidemiological bent, this study is a seminal work in cardiovascular health promotion literature.

In another study, physiological measures (cholesterol levels) are used to assess outcomes of cardiovascular health promotion interventions in a longitudinal study of

adolescents in a rural area (JoAnne Harrell, PhD, RN, personal communication, March, 1996).

Self-report measures

Self-reported data are often acquired through interviews or recorded by the respondent. Error is an issue since subjects may respond in a socially desirable manner. The advantage, however, is that information is received directly from the subject which inherently increases validity.

The majority of health promotion measures are self-report. Response to questions is frequently the easiest way to obtain information from an individual and often the only feasible way. Many lifestyle behaviors (e.g., eating and exercise) while theoretically available for observation, can not be observed at all or not observed over enough occasions to obtain reliable data. As noted previously, the quality of self-report is threatened by response errors secondary to faulty recall and social desirability. If questions address neutral topics, such as leisure time activities, and with well-defined behaviors explicated, problems stem from memory. Methods for increasing the individual's access to required information through question wording and interview techniques have demonstrable and positive effects (Kirscht, 1983).

Strategies to increase the reliability and validity of self-reports in behavioral assessments include increasing the specificity of the measures and using multiple methods. Although frequently employed in research examining health promotion, the reliability and validity of self-report measures frequently are not reported.

Eating behaviors. Self-reported behaviors of nutrition/eating behaviors, tobacco use, and physical activity are frequently cited as measures in health promotion studies (Davis et

al.,1995; Parcel et al., 1989; Stone, Baranowski, Sallis, & Cutler, 1995). In assessing the school promotion of a healthy diet and exercise program using self-reported behavior, Parcel et al. (1989) used a questionnaire consisting of 89 food choices, combining those with similar fat and sodium components. Trained technicians administered the questionnaires to the same students over five consecutive week days during the same 35-minute class period. The investigators reported that an 83.3% agreement between the children's self-report and the diet interviews covering the same period was obtained at baseline on a subsample of subjects (n = 7). A description of the interview process was not given. Physical activity self-reports incorporated an instrument denoting the frequency of participation in moderate-to-vigorous physical activity. Trained staff also observed a random sample of children (n = 44) during physical education classes on the same day they completed the self-reports. A comparison between the two measures showed an 86.3% agreement. Cognitive measures and perceptions of self-efficacy also were used in this study. The development and testing of the measures employed were not discussed. Recommendations included further refinement of measures of self-reported diet and physical activity behavior.

Davis et al. (1995) used questionnaires to assess changes in eating behavior, physical activity, and tobacco use in fifth grade Navajo and Pueblo school children following a school-based intervention. A three-page questionnaire was developed during the feasibility study (details not given) regarding eating habits. The first part contained five questions on the use of salt and fat at the table and in cooking. The second part was a checklist of 28 frequently consumed food items. Scoring guidelines for the norm-reference measures were detailed. The investigators recognized the limitations to obtaining accurate self-reports and

stated that precautions were taken in the design and administration of the instruments to minimize measurement bias. Methods to increase the reliability of the self-report were taken as students were instructed that all information was confidential and that parents and teachers wouldn't see the responses; the research staff administered the questionnaires to the students. Readability tests were performed and common terms used.

Physical activity. Attempts to develop a comprehensive self-report measure of physical activity have proved largely unsatisfactory. Taylor et al. (1978) developed the Minnesota Leisure Time Activities (LTA) questionnaire for testing the hypothesis that exercise sufficient to produce a conditioning effect on the cardiovascular system is a mechanism of protecting against coronary heart disease. The intensity of physical activities served to classify people who performed vigorous exercise making it possible to test the validity of the questionnaire against the physiological measurements. This is a criterion-referenced measure as there is a preset standard of performance. Leisure time activity is operationalized as intensity of calorie expenditure using a designated scale. Test specifications are clearly outlined but laborious. A concern in the development of this questionnaire is that the researchers report "partial validation in several studies". The instrument was used to assess 8 female swimmers and 8 female non-athletes. The researchers reported that the questionnaire discriminates effectively the energy expenditure for the two groups. This may be an attempt at estimating the construct validity of the measure. The researchers contend that the data provided by the questionnaires enable participants to be classified in longitudinal studies.

The interview takes approximately 10-20 minutes when conducted by a trained interviewer. Interrater reliability is not discussed. The intensity codes used and the list of

activities are based on middle-class, middle-aged American men. The researchers encouraged replication of the study, noting that specific activities may need to be added or deleted and intensity codes changed. It is also inappropriate for use in young children and the elderly. This instrument does not have generalizability to many ethnic minorities and at face value appears to require extensive training to use appropriately.

Recent recommendations from the Centers for Disease Control and Prevention and the American College of Sports Medicine (Pate et al., 1995) shift the emphasis from "exercise" to "physical activity". The public health message articulated is that every U.S. adult should accumulate 30 minutes or more of moderate-intensity physical activity on most days of the week (p. 402). Determinants of participation in physical activity evolved reviewing the studies of Dishman, Sallis, Godin (Pate, 1995). Physiological, behavioral, and psychological variables are related to physical activity with confidence in the ability to be physically active, perceived barriers (with time being the one most frequently cited), and enjoyment of the activity as the desired outcome being the strongest predictors. Special populations, such as the elderly, are to be targeted as physical inactivity is more prevalent. Interventions should be designed with input from the targeted population.

Correlational studies and clinical observations of children and adolescents have generally shown a positive relationship between physical fitness, body image, and self-image. These relationships are mediated, however, by the initial level of body or self-image, by level of self-efficacy, and the duration and intensity of the training. There is no definitive research as to the best method in which to instill physical activity as a lifelong habit. The environment must foster a sense of competence, control, and reward from the activity. With increased self-efficacy, a sense of competence would increase which could

determine future behavior. Enjoyment is also an important determinant as found with adults (Zwiren, 1992).

Physical activity in children can be measured by self-report, direct observation, electronic motion sensors, and doubly-labeled water (Sallis, Buono, Roby, Micale, & Nelson, 1993; Sallis et al., 1996). Self-reports are most often used in view of the cost and convenience, although the validity of self-reports (interviews, activity diaries, parent or teacher reports) is not well established. Sallis et al. (1996) evaluated two self-report instruments developed to measure physical activity outcomes in the CATCH study. Participants were children in the 5th grade with the outcome variable being time engaged in moderate-to-vigorous physical activity. Both heart rate monitors and acceleromenters were used as validation criteria.

Two self-report measures of children's physical activity were developed by representatives of all CATCH sites. Both self-reports required a one-day recall using a checklist format. They differed in the form of administration in that one was interview (Physical Activity Checklist Interview [PACI]) and the other self-administered (Self-Administered Physical Activity Checklist [SAPAC]). Both forms consisted of 21 activities, space for other activities, and an additional section for reporting TV/video viewing. Children reported the minutes they spent in each activity during three periods the previous day: before school, during school, after school. The student was to check the activity only if he/she engaged in it for 5 minutes or more. For each activity the student reported whether it caused him/her to breathe hard or feel tired none, some, or most of the time.

Prior to completing the checklist, children were given a 5-minute introductory presentation. A clock face was used for estimating time for common activities (brushing

teeth, recess, TV shows). Children were told not to include times that they were resting. In both formats the researcher read through the checklist 3 times so that the children could recall and record their activities. Students recorded their own on the SAPAC while the interviewer recorded on the PACI. On the day prior to recall, two objective measures were used: telemetric heart monitoring and the Caltrac accelerometer. Children participated in the study for two consecutive days. On the morning of day two, all children completed both the PACI and the SAPAC. Colorful inexpensive incentives were given.

Four types of data were available from the SAPAC: number of activities, total minutes of activities, intensity of activities (weighted with metabolic equivalents [METS] values). Self-reported data were summarized with the following five variables: minutes in sedentary pursuits, number of activities reported, minutes of moderate to vigorous physical activity, physical activity MET score (MVPA METS) (min of activity x MET value), and Weighted activity MET score (weighted MVPA METS) (min of activity x MET value x intensity rating)

Subjects were 55 boys and 70 girls from four regions of the U.S. The Pearson correlation coefficient between the self-administered and the interviewer administered forms was .76 ($p<.001$) with the heart rate index and .30 ($p<.001$) with the accelerometer score. It was concluded that both self-report forms received moderate support for their validity in all gender and African-American and European-American ethnic subgroups, but the self-administered form was more cost effective.

Perceptions (Attitudes) of Health

Structured self-report instruments are the most frequently used approach to measuring attitudes using composite scales (Polit & Hungler, 1995). Numerous scales have been developed principally from social psychology and more recently from nursing.

Locus of Control. The Multidimensional Health Locus of Control (MHLC) Instrument developed by Wallston and Wallston (1978) is recommended for assessing the adult's perception of health control (Pender, 1996). The Parent Health Locus of Control Scales (PHLOC) measures the parents' beliefs about who or what influences their children's health focusing on health promotion and disease/injury prevention (DeVellis, et al., 1993).

The development of the MHLC instrument is clearly explicated by the authors. Starting with the 11 items that constituted the original HLC scale, new items were written which, on an apriori basis reflected three dimensions: internality, powerful others, and externality (chance). A total item pool was devised consisting of 81 items. A statement of the purpose of the scale development, assurance of confidentiality, detailed instructions and demographic information was presented. Two versions of the instrument were printed to control for item placement. The scale development study used a sample of 282 adults over sixteen waiting at the gates of Nashville airport. The representativeness of this sample is in question. One hundred fifteen of the booklets housing the items were returned with separate item analyses run on the subscales. From these results, six pairs of items were selected for each subscale. Alpha reliabilities for the six item scales ranged from .67 to .77 and when both forms were combined into 12-item scales, the reliabilities increased (.83-.86). Correlations were computed between health status and MHLC scores as an

indication of predictive validity, showing significance. The authors reiterated the need for this instrument to be tailored to suit the study's purpose, taking into consideration the population, the health behavior being investigated, the time available and the research design. All three dimensions (subscales) may not be warranted for use.

Self-Efficacy. A construct in Social Cognitive Theory, self-efficacy has been used in health promotion measures. It refers to a person's belief in his/her capability to organize and execute the course of action required to deal with prospective situations and confidence in capability to regulate one's motivation, thought processes, emotional states and the social environment as well as levels of behavioral attainment (Bandura, 1986). There is considerable homogeneity in the way in which self-efficacy is used in health promotion literature, however, operationalizing the concept has been problematic. There is no all purpose measure of this construct since scales must be tailored to specific domains of functioning.

Perceived self-efficacy has been shown to be a predictor of health behavior despite the less than optimal measurement (Maibach & Murphy, 1995). These authors noted that efficacy items contained in an instrument should include three factors: the behavior, the level of situational demand, and the time frame. For example, the lifestyle pattern of nutrition within the health promotion domain would have a separate self-efficacy rating from that of physical activity. Likewise, self-efficacy scales developed for one population may not be generalizable to another.

Weitzel (1989) tested Pender's Health Promotion Model with blue collar workers using MHLC, the Value Survey, the Multilevel Assessment Instrument (MAI), the Self-Efficacy Scale, and the Health-Promoting Lifestyle Profile (HPLP). As reported by the

investigator, the Value Survey (Wallston, Maides, & Wallston, 1976) has the subject rank the values from most important to least. Construct and concurrent validity were reported, however reliability data were not available. In the MAI, subjects rated the quality of their health with higher scores indicating better health. Only the health status subscale of this instrument was used. The alpha coefficient of .76 with a test- retest correlation of .92 as reported by Lawton, Moss, Fulcomer, Kleban (1982) indicated reliability of this subscale. The self-efficacy instrument used a 17-item Likert scale with scores ranging from 17 to 85 with the higher scores representing greater self-efficacy. For this study, only the General Self-efficacy subscale was used. An alpha of .86 was reported for the subscale as were indicators of content, criterion, and construct validity (Sherer & Adams, 1983 as cited in Weitzel, 1989). The author's purpose, conceptualization employing Pender's Health Promotion Model, and use of the instrument appear congruent.

Children and Adolescents. Health promotion in children and adolescents is a key research agenda of the National Institute of Nursing Research. Arvidson (1990) recognized that there were no valid and reliable instruments measuring the attitudes (perceptions) of school-age children for cardiovascular health promotion and developed the Children's Cardiovascular Health Promotion Attitude Scale (CVHPAS). Social Learning Theory (the modeling process) and psychometric theory was the conceptual frameworks. The purpose of this norm-referenced instrument is to provide a measure of the attitudes of children toward cardiovascular health. The target population was school-age children in fourth, fifth and sixth grades, both male and female. Factor analysis was the statistical method used in the study. The factors identified in the instrument were:

nutrition, physical activity, smoking, and stress control. There were two revisions of the instrument resulting in a final CVHPAS of 16 items.

Content validity was evaluated by an extensive literature review and the use of six experts in cardiovascular health promotion and children. A pilot study was conducted to determine the clarity of the questions, effectiveness of instructions, completeness of response sets, and time for completion using 70 school-age children in fourth, fifth, sixth grades. Reliability estimates were done for the pilot test with subscales ranging from .51 to .80, overall .79. As a result of the pilot study, four items were deleted from the questionnaire and seven items were reworded.

The data were collected by the investigator over a six week period. After the completion of the questionnaire, eight students were chosen to be interviewed regarding their responses to the questions. Reliability estimates were measured using Cronbach's alpha correlation coefficient for internal consistency. No other measures of reliability were described. Construct validity was estimated by factor analysis. As noted, four factors were identified and found to be consistent with the conceptual framework. Cronbach's alpha correlation coefficients for the subscales indicated internal consistency with physical activity, .76, nutrition, .70, smoking, .74, and stress control, .63. The alpha correlation coefficient for the entire instrument was .80. Item analysis was not apparent in this study which may have increased the reliability and validity of this measure. Further testing of this instrument has not been accomplished by its originator. Currently two students are using the instrument, however, specific findings are not known (C.R. Arvidson, PhD, RN, personal communication, November 21, 1995).

Cardiovascular Health in Children and Youth (CHIC II) study investigators developed the Youth Health Survey as part of their school-based longitudinal study to assess and track behavior and attitudes related to cardiovascular risk factors in children and adolescents (Gilmer, Speck, Bradley, Harrell, & Belyea, 1996). Sixth, seventh and eighth grade students at two schools in the Southeast participated in the pilot study. Eight subscales assess health habits and attitudes of the adolescents as well as selected peer and family influences on those health behaviors. Internal consistencies for seven of the eight subscales ranged from .74 to .89; test-retest reliability for six of the eight subscales ranged from .69 to .89. Construct validity was established through factor analysis of four subscales. This new survey is the only single questionnaire to combine health behaviors and attitudes for youth as well as having been developed by a multidisciplinary team with nurse researchers.

Profiles in adults. A self-report scale of health habits was developed by Williams, Thomas, Young, Jozwiak, & Hector (1991) in an attempt to develop an easily administered , conceptually sound, and psychometrically adequate scale. The Health Habits Scale consists of 5 positive health items and 5 negative items (e.g., flossing teeth, using hard drugs). The simplicity of the scale is described as well as the administration and scaling. However, the categories are too broad to be used in assessing cardiovascular health. This is the only scale in which social desirability is measured directly using the Marlowe-Crowne scale. The correlation between the HHS and the Marlowe-Crowne was 0.24 which was significant at the .0001 level. This relationship suggests that scores on the HHS may be affected by a tendency to overstate one's positive characteristics.

The Health-Promoting Lifestyle Profile II (Walker et al., 1995) is a norm-referenced instrument to measure health-promoting behavior conceptualized as a multidimensional pattern of self-initiated actions and perceptions which serve to maintain or enhance the level of wellness, self-actualization and fulfillment of the individual. It is a revision of the HPLP I (Walker, Secrist, & Pender, 1985, 1987). The authors contend that this instrument has sufficient reliability and validity for use by researchers in describing the health-promoting component of life-style in various populations (e.g., middle-age workers), to explore determinants of health-promoting lifestyle, or to measure changes in health-promoting life-style as a result of interventions (Walker et al., 1987). The HPLP was developed for use in testing the Health Promotion Model developed by Pender. The purpose and conceptual basis of the HPLP have been clearly explicated. The instrument has been used repeatedly toward this purpose.

The HPLPI was developed from items contained in the Lifestyle and Health Habits Assessment, a 100 item checklist of positive health behaviors designed by Pender in 1982 (as cited in Walker, Sechrist, & Pender, 1985, 1987). Originally developed as a clinical nursing tool, Pender grouped the items in ten subscales: general health practices, nutrition, physical/recreational activity, sleep, stress management, self-actualization, sense of purpose, relationships with others, environment control, and use of the health care system. Items related to disease prevention were deleted as they lacked concept validity. Numerous other changes were made to include mixing of items from categories, rewording of items needing clarity, replacing the yes/no format with a 4-point response scale. All items are scored on a scale from 1 to 4: 1= never (N), 2 = sometimes (S), 3 = often (O), and 4 = routinely (R). Negative items are reverse scored. Item development

would have been enhanced with a presentation of blueprinting if this was accomplished. The resulting 107 -item instrument was pilot- tested on a convenience sample of 173 graduate and senior undergraduate nursing students to evaluate item clarity and response variance and to estimate reliability. Students' comments were solicited. These data were analyzed for internal consistency on the first administration and for stability on a repeat administration to 92 students two weeks later (test-retest). Cronbach's coefficient alpha was .92 indicating high internal consistency. Test-retest correlation was .85. The test-retest procedure for reliability is assumed to have come from the same sample and under the same testing conditions. Four nurse faculty with expertise in health promotion served as experts to assess content validity. They examined each item for congruence with the concept of health-promoting behavior/life-style. Items were added and deleted based on their recommendations.

The revised instrument was administered to a sample of 1107 literate "middle class" volunteer adults recruited from community settings in Illinois and North Dakota. Participants were sought with a variety of exercise patterns, i.e. from sedentary to corporate fitness members. Demographics included ages from 18-88 ($\underline{M}$ = 39.2), 436 females, 516 males. The educational level ranged from 8th grade to a professional degree with a median of "some college". Family income ranged from under $5,000 to over $50,000 (median between $25,000 and $35,000). Eighty-six percent (952) of the instruments were returned and evaluated. Recruitment efforts included approaching individuals and groups face to face to seek volunteers. The HPLP, a personal data sheet, cover letter and assurance of confidentiality and informed consent to participate were distributed to the volunteers.

A description of the 107-item instrument was given, although there was no discussion as to how the test was administered (e.g., settings, by whom, length of time). The results from the data analysis included an item analysis using an inter-item correlation matrix. The corrected item-total correlation is the preferred discrimination index for content-validated tests such as the HPLP (Nunnally & Bernstein, 1994). Items with low correlated item-total correlations were deleted resulting in 70 items for factor analysis. Principal axis factor analysis and oblique rotation was used resulting in 16 factors combined into six conceptually valid subscales. These sixteen factors accounted for 56.6% of the total variance in the instrument. Further factor analysis and item analysis suggested that a six-factor solution was the most efficient; the six subscales were named with operational definitions given. The resulting 48-item instrument had a high internal consistency (alpha = .92) with subscales alphas ranging from .70 to .90. The test directions to the respondent are simplistic, instructing the respondent to circle one of four responses (never, sometimes, often, routinely) for each item. Scoring instructions are likewise simplistic noting specific item numbers in a subscale with corresponding numerical values. Test-retest measures were used to evaluate test stability using a sample of 63 adults at an interval of two weeks. The correlation was .93 for the total instrument with ranges of .81-.91 for the subscales. It was concluded that the instrument in this final form was a valid and reliable measure of health-promoting behavior. The researchers noted that further psychometric evaluation would be conducted on the instrument to establish convergent and discriminant validity. This would assume the multitrait-multimethod approach. There is no evidence that this has been done to date, which may be due to the fact that additional measures that are valid and reliable aren't apparent. Further development of this instrument

was recommended by its authors to include studies with diverse populations at varying stages of health. Recommendations to construct additional items to strengthen the Nutrition and Stress Management subscales (alphas of .76 and .70 respectively) apparently were achieved with the development of HPLP II.

The HPLP I has been utilized in several nursing studies as an isolated instrument or in combination with others (Ahijevych & Bernhard, 1994; Pender, Walker, Sechrist, & Frank-Stromborg, 1990; Walker, Volkan, Sechrist, & Pender, 1988; Weitzel, 1989.). Health-promoting behaviors of older adults along with those of young and middle-aged adults were studied using the HPLP, further testing the universality of the instrument (Walker et al., 1988). Reliability was assessed for this study (subscales, alpha coefficients from .69-.90, overall .92). The instrument was used as one of four cognitive/perceptual measures in predicting health-promoting lifestyles in the workplace (Pender, et al., 1990). The alpha reliability coefficient in this study was .93 overall and from .68-.89 for the subscales. A Spanish language version of the HPLP also is available (S. Walker, PhD, RN, personal communication, November 21, 1995).

An article describing the development and psychometric characteristics of the HPLPII is in preparation. Based on the personal experience and feedback from the multiple users, the authors of the tool believed it needed to be revised to more accurately reflect current literature and practice and to achieve more balance in the subscales. The purpose of the measure remains unchanged, however the number of items has expanded to 52, reflecting the domains of health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. For HPLP II, the Chronbach's alphas were: Health responsibility (.86), physical activity (.85), nutrition (.80), spiritual growth

(.86), interpersonal relations (.87), stress management (.79), total HPLP II (.94). A principal axis factor analysis was used once again and supported the six factors as subscales (S. Walker,PhD, RN, personal communication, November 21, 1995). The self-actualization subscale appears to have been deleted with the addition of spiritual growth. All alpha levels have increased as compared with the original HPLP. To date, the HPLP II is suitable for adult populations only. A draft version of an instrument for use with adolescents is in progress (N. Pender, PhD, RN, personal communication, November 14, 1995). The investigators did not address the use of scales for disadvantaged or ethnic minority groups.

The instruments used in the measurement of the multidimensional concept of health promotion are largely norm-referenced self-reports with the individual as the unit of analysis. The development of additional measures examining the dimensions of the health promotion concept is indicated to measure construct validity. Further testing of existing instruments as noted with the HPLP I (Walker, Sechrist, & Pender, 1985, 1987) will increase their reliability and validity over time and across populations (Waltz et al., 1989).

The majority of instruments examined were tested in white, middle-class adult populations. Testing existing instruments in diverse cultures is necessary to include estimates of reliability and validity. Health promotion needs are greater in minority populations, children, and elderly, however, there is a dearth of instruments for these populations. Diverse geographic areas should be represented as well. Triangulation in the form of qualitative methods such as focus groups would assist in further defining the domain, particularly across cultures. Healthy People 2000 has spearheaded an initiative for research in health promotion. Measurements reflecting the communication styles, values,

and meaning of health for the target population will increase validity across the respective population. There is no single set of measures that can be uniformly applied to "minorities". The reliability and validity of data vary with features of any study population, including region of the country, age, gender, ethnicity, language use, migration patterns, level of acculturation, economic status, and community history (McGraw, McKinlay, Crawford, Costa, & Cohen, 1992).

Intergenerational Programming

The potential benefits of intergenerational programming to individuals, families, and society have been recognized over the past thirty years, beginning with the Foster Grandparent Program in 1963 (Newman, 1989; Wilson, 1994). The theoretical foundations for most programs are grounded in life span developmental theories and theories of aging. These theories are offered to support the position that programs providing opportunities for increased contact and interaction between young children and the elderly should contribute to the child's overall learning, reduce negative attitudes of both groups toward each other, and influence later moral and personal development of the child. Weaknesses have been identified, however, in the psychometrics of the measures and the lack of a theoretical basis for the variables (Cohen, 1989).

Role of the African American Family.

The family has been identified as a basic social support unit for health maintenance and influence for the development and change of health-related behaviors (Baranowski & Nader, 1985; Eostein, Naloski, Koeski, & Wing, 1989; Klesges et al., 1983; McMurray et al., 1993; Nader et al., 1996). Social support from family and friends has been

hypothesized to be strongly related to self-efficacy, outcome expectancies, and dietary behavior change. There are documented similarities within families regarding eating habits, exercise habits necessitating interventions that address traditional values, social networks, patterns of intrafamilial and interfamilial support, and food, physical activity preferences (Nader et al., 1989).

There is no normative model of the family that is relevant for all ethnic groups. Having sufficient knowledge about the kinship network enhances the culturally competent health promotion activities (Kavanagh, 1994; LaFargue, 1980; Leininger, 1991; McGoldrick, Pearce, & Giordano, 1982). Understanding kinship networks necessitates the exploration of the historical, societal, and cultural pieces.

There are multiple definitions of *family* depending in part on how kinship is determined. Variability characterizes the definitions, each replete with exceptions. Commitment to each other over time is a central feature (Kavanagh, 1994). Comparisons should be made within the respective ethnic families in lieu of comparisons with the predominant culture (e.g., the beliefs of white families are not the controlling norms for African-Americans) (Wilson, 1986)). The definition of family for many African-Americans reflects the diverse forms of familial organization and is embedded in extended family networks (Hays & Mindel, 1973). The operationalization of this concept can create methodological inconsistencies and result in stereotypes of the single-parent or the underclass (Billingsley, 1992; Wilson, 1986).

The African concept of family includes key persons living in separate households who are both formal and informal kin (Hill, 1993). A multidimensional definition of the African-American family is: an intimate association of persons of African descent who are

related to one another by a variety of means, including blood, marriage, formal adoption, informal adoption, or by appropriation; sustained by a history of common residence in America; and deeply embedded in a network of social structures both internal to and external to itself. Numerous interlocking elements come together forming an extraordinary resilient institution (Billingsley, 1992, p. 28).

Martin and Martin (1985) describe the "Black helping tradition" as having its roots in the African-American extended family. The extended family encompasses more than blood relatives and relatives by marriage. Slaves, for example, adopted relatives and established fictive kinship networks. The Black helping tradition refers to the largely independent struggle of African-Americans for their survival and advancement from generation to generation. The extended family is a multigenerational, interdependent kinship system held together basically by a sense of obligation to the welfare of members of the kin network. Mutual aid is the dominant element in an extended family life involving the reciprocal effort of family members to pool resources necessary for survival and growth. Fictive kinship is the caregiving and mutual aid relationship among unrelated African-Americans that exists because of their common ancestry, history and social plight.

Of like sentiment, Chatters and Jayakody (1995) express the centrality of the inclusion of individuals who, together with immediate family members, form an extended kin group. The notion of extended kin has significance for how African- Americans conceptualize the family unit, the emergence of distinctive household patterns and arrangements, and the provision of support within families. Extended families are found in middle class as well as poor African-American families (McAdoo, 1988; Stack, 1974).

Fictive kin take on special significance in the African-American family. These individuals are not related by blood but are held in esteem equal to or greater than that of kin (Martin & Martin, 1985; Stack, 1974). There is a paucity of research examining fictive kinship ties as means of social support. Likewise, in the provision of health care, the identification of fictive kin as potential support systems is often unrecognized.

At some point prior to adulthood, about half of all children in the United Stated will live in a single family. As the income of women is typically less than men, the single parent is often the woman who has fewer resources and is frequently poor. As poverty is the greatest threat to the health status of children worldwide, the focus on extended families is warranted (Kavanagh, 1994). The extensive help system is one of the strongest cultural patterns particularly of benefit to the single-parent African-American family (McAdoo, 1980).

Kinship systems are interdependent and multigenerational and are not specific to one ethnic minority. They are characterized by intimate involvement and a set of unwritten obligations to consanguinal and conjugal relatives regardless of age. The relations with kin are fundamental in the African-American family (McAdoo, 1978b as cited in Wilkinson, 1993). Kinship networks tend to be stronger in low-income families as opposed to middle-income. Historically, kinship networks have been stronger among African-American families than white families. This can be seen in the higher frequency in which African-Americans take relatives into their households (Hill, 1972).

Consanguinal relationships constitute the strongest element in the African-American kinship network with marriage expanding the kinship unit (Billingsley, 1992; Sudarkasa, 1981). Fictive kin or appropriated family members play a significant role as well. Child

care is a shared activity taking a variety of forms. Formal adoption is highly valued and practiced although not well-recognized. Historically, formal adoption agencies have not catered to non-whites so African-Americans developed their own network for the informal adoption of children. Informal adoptions take place in nearly 15 percent of all African-American children, with the grandparents being the primary caregivers (Billingsley, 1992). The informal adoption network among African-American families has functioned to tighten kinship bonds. Most informal adoption and informal foster care among African-American families is with formal kin, however, thousands of children are informally raised by non-related godparents, grannies, and others (Hill, 1993). It can be inferred from this that the family bonds are tight and the value placed on children is high. The tight kinship network within African-American families has proven itself to be an effective mechanism for providing extra emotional and economic support in the lives of thousands of children (Hill, 1972).

Anthropological and sociological research supports four indices of extended familial interaction networks: availability, proximity, frequency of kin contact, and functionality. Functionality is measured by the kin help system as social support including expressive and instrumental aid (e.g., advice giving, decision-making, financial support, child care, informal adoption, and absorption of dependents) (Billingsley, 1968, 1992; Hays & Mindel, 1973; Hill, 1972; Martin & Martin, 1985; McAdoo, 1993; Mindel, Habenstein, & Wright, 1988; Stack, 1974; Wilson, 1986).

In a recent study of 78 urban, methadone dependent African-American women regarding their social networks, the researchers found that network affiliations, notably

younger children and mothers, provided primary sources of expressive support: respect, love, and trust (Kavanagh, Harris, & Hart, 1996).

An investigation of the probability of receiving social support from members of their families was conducted using the National Survey of Black Americans (NSBA) data set Taylor (1986). Independent variables were family closeness, satisfaction with family life, proximity of immediate family, proximity of relatives, and family contact. The demographic variables of age, gender, income, education, marital status, urban versus rural residence, and region were utilized as well. The findings indicated that familial relationships, proximity of relatives, and family contact play crucial roles in the informal support networks of African-Americans. Respondents reported frequent interaction with family members, relatively close residential proximity to immediate family and relatives, extensive familial affective bonds, and a high level of satisfaction derived from family life. Three out of four indicated receiving support from their extended family members (Taylor, 1986).

Single-parent families have increased to approximately 34 percent of the 11.3 million total African-American households (U.S. Bureau of Census, 1995). Female-headed families are more likely to co-reside with extended kin which facilitates the exchange of goods and services. The support may enable the mother to participate in self-improvement activities, increase the quality of child care, and enhance parenting skills. In 1994, of the 5.6 million African-American families with children under the age of 18, sixty percent were one-parent family groups headed by the mother (U.S. Bureau of Census, 1995). The active participation of grandparents in the child care area has been demonstrated (Burton, 1992; Burton & Dilworth-Anderson, 1991; Joslin & Brouard, 1995). Grandparents serve

as a point of anchorage for grandchildren and provide kinds of supports for them unavailable from their own parents (Jackson, 1986). Grandparents play a significant role in extended families as over 1.2 million children live with grandparents. These grandparents largely comprise the middle years age group (40-64), which is projected to be the largest and most stable segment of the African-American community by 2000 (Billingsley, 1992).

"Getting in" a poor African-American community is a process of gaining, building, and maintaining trust with the group/individuals under study (Kaufman, 1994). With a difference in ethnicity, class, and age between the outsider and the insider, trust may be impeded which would impact the validity of the results in qualitative or quantitative research.

Summary

Strategies for cardiovascular health in children and adults include physical activity and heart healthy eating. The Intergenerational Health Promotion Model includes constructs from Social Cognitive Theory and the Transtheoretical Model, which have been used in health promotion research. The significance of school-based interventions in changing eating behaviors was demonstrated through a meta-analysis. Extant instruments measuring dimensions of health promotion (e.g., physical activity and nutrition) were critiqued. Kinship networks in African-American families were described within the context of intergenerational health programming.

Chapter III

Methodology

Design

The purposes of this study were to: 1. Assess the impact of a school-based health intervention in promoting healthy cardiovascular behaviors in elementary school children; and, 2. Evaluate the efficacy of elementary school children as conduits of health promotion information for older generations. A quasi-experimental pretest posttest intervention was used to address the study hypotheses. This was an intention to treat design in which all students/grandparent partners who participated in the pretest screening were included in the analysis regardless of their continued participation. Pretest data from the completers were compared with that of the non-completers.

Participants

The target population was the African-American child between the ages of 9-12 and the African-American adult between the ages of 40-80. All students were 5th grade African-American with approximately 58% females and a mean age 10.9 years. The students were residents of the Sandtown-Winchester area in northwest Baltimore City which is a geographical area encompassing 72 square blocks with a population of 10,300 (1990 census). The high school drop out rate is 39%, unemployment is 22%, and the median household income is approximately $12,465 with 40% of the households having no earnings. Thirty-three percent of the households have no health insurance (McDougall, 1993; Sandtown-Winchester High Blood Pressure Project, 1996). The three participating

schools have school-based clinics with a nurse practitioner from the University of Maryland School of Nursing as the primary care provider.

All (approximately 146) 5th grade students (six classes of 15-30 students each) from three inner city public elementary schools in the same largely African-American community were invited to participate in the major study. Each of the study participants was asked to select a grandparent partner for the program. Inclusion criteria for the grandparent consisted of: being able to read or understand what is read to him/her; being able to ambulate without difficulty; and having no major dietary or physical activity restrictions. A "grandparent" was defined as a relative of the grandparent's generation or fictive kin. The setting for data collection for the grandparents was their residences in a community in Northwest Baltimore City, with the paper and pencil instrument being hand-delivered by their grandchildren. Random assignment of the school to treatment or control group was made by drawing names from a slip of paper; the school attended by the participant determined the group assignment with the unit of analysis being the individual child/grandparent.

Consent procedures. Permission for school participation was obtained from the participating principals of the four elementary schools (pilot, treatment, and control). Following University of Maryland, Baltimore Institutional Review Board Approval and approval from the Baltimore City Health Department Human Subjects Review Committee, written consent was obtained for each student from his/her parent/guardian and from each grandparent participant. Because the student participants were twelve years and younger, their assent was obtained following a simple explanation of the study (Appendix A).

With a medium effect size (.50), an alpha of .05, and a power of .80, a sample size of approximately 64 per group (grandparents and children) is required (Cohen, 1977). The number of participants reflected the necessity of including intact classes and the problem with absenteeism and attrition in the respective schools.

Intervention

The existing 5th grade curriculum for the participating schools incorporated health education with topics on nutrition and fitness. However, there were no specific heart healthy programs for children within the school or the community.

Heart Power™ is a grade specific comprehensive program from the American Heart Association which is currently being implemented throughout the United States. Development and testing of this program was completed in 1996 (AHA, 1996b), but additional culturally-specific aspects were incorporated for this population. Four workshops were conducted for students in the experimental treatment schools to include: Heart Healthy; Healthful Choices (in eating); Physical Activity; and, Tobacco Free (Appendix B). A variety of instructional materials were provided to include weekly take-home activity sheets to share with grandparent partners and other family members. Materials included colorful posters depicting the circulatory system, the cartoon animated book, Who Invented Running, a plastinated adult heart, artery, and lung, and The Lung Machine (American Cancer Society). Stethoscopes were used in workshop one as the students listened to a partner's heartbeat. Components of Social Cognitive Theory were incorporated throughout the workshops and activities (Table 3).

Table 3

Components of Social Cognitive Theory in the School-based Intergenerational Intervention.

Component	Definition	Implications
Environment	Factors external to person	Opportunities in school and at home; support between grandparent/grandchild
Behavioral capability	Knowledge and skills to perform given behavior	Promote mastery learning through skills training, e.g. structured Heart Power activities in each workshop
Expectations	Anticipatory outcomes of a behavior	Students model heart healthy eating, physical activity; child-grandparent communication in home-based activities.
Expectancies	Values person places on given outcome, incentives	Possibility of receiving incentive rewards and attending Heart Healthy party with family members.
Self-control	Personal regulation of goal-directed behavior or performance	Opportunities for self-monitoring with food/physical activity sheets for student/grandparent partner
Observational learning	Behavioral acquisition that occurs by watching actions and outcomes of others	Role models for targeted behaviors to include child to grandparent and vice versa; cartoon characters in planned activities.
Reinforcements	Responses to a person's behavior that increase or decrease the likelihood of reoccurrence	Promote self-initiated rewards and incentives.

The workshops were conducted by this investigator with participation by a Pediatric Nurse Practitioner (PNP), Clinical Social Worker, senior nursing student, and freshman college athlete. Following the pretest measures (completion of the Family Health Tree,

Heart Healthy Questionnaire, Physical Activity Record, and Food Record), a weekly one- to one and one-half hour workshop was conducted for the two treatment schools. Each session incorporated one of the workshops until all four were conducted. A "heart healthy fun" activity was conducted to include both children and grandparents (e.g., healthy snack and dance afternoon). Students were encouraged to set a specific eating or exercise goal each week and write the goal on their activity card. Classes were scheduled as part of the school science curriculum. The teachers were prepared by reviewing a written curriculum, participating in the modeling and role playing, and group discussion.

The program was coordinated with the fifth grade teachers and conducted during a regular class period at the same time each week. The majority of the participation by the grandparent partner occurred outside the classroom. When the "home-based" activity was completed, a special card was returned via the child with the activity noted and both student and grandparent signatures. Small incentives were provided at the completion of selected activities for both children and grandparent partners. The timeline for this project was determined by the school calendar and the ongoing curriculum of the 5th grade classes (Table 4).

Table 4

Timeline for Intergenerational Health Promotion Study

Activity	February	March	April	May	June	July
Coordinate with teachers	X					
Family Health Tree	X					
Physical Activity Record	X		X			
Food Record	X		X			
Heart Healthy Questionnaire	X		X			
Workshop #1		X				
Workshop #2		X				
Workshop #3		X				
Workshop #4		X	X			
Student-Grandparent partner activity				X	X	
Analysis of Data				X	X	X
Follow-up with teachers				X	X	

Measures

The overall aim of the instruments was to measure the students' and grandparents' knowledge and perceptions of their cardiovascular lifestyle patterns, including self-reported behaviors. The measurement battery included The Family Health Tree, the Heart Healthy Questionnaire, The Physical Activity Record, and The Food Record (Appendix C).

Pilot for major study. The school-based pilot study was conducted with a convenience sample (intact 5th grade class) of 31 African-American children and their grandparent partners. Demographic characteristics were similar to that of the study population (Table 5). Approval for the conduct of this study was received from the school principal, the Baltimore City Health Department, and the University of Maryland IRB. Inclusion criteria for the grandparent are the same as the major study, and they should not have grandchildren in one of the major study classes.

Table 5

Sample Characteristics - Pilot Study

Variable	Frequency
Students (n=31)	
gender	
male	15 (48.4%)
female	16 (51.6%)
age (years)	10.60± 0.31 (10-11.1)
Grandparents (n=13)	
gender	
male	1 (7.7%)
female	12 (92.3%)
age (years)	50.13 ± 5.59 (28.2-79.0)
education	
elementary	1 (9.1%)
high school	7 (63.6%)
college	3 (27.3%)
relation to student	
grandmother	8 (57.1%)
mother	1 (7.1%)
other	5 (35.7%)

The HHQ, Physical Activity Record, and Food Record were administered to the students during a scheduled class. The Family Health Tree materials were given to the students at the same time. The test-retest procedure was used in pilot work with the measures. This procedure involves two test occasions with one group and attributes to be measured are expected to remain relatively stable throughout the one week testing period. The instruments were readministered under the same conditions a week later and correlation between the two sets of scores determined. As the data were measured at the interval level, the Pearson product-moment correlation coefficient was used to estimate test-retest reliability. Following the completion of the second test administration, three respondents were randomly selected for interview to discuss their perceptions of the instruments and any recommendations for changes. Reliability and validity estimates from the pilot study are reported for each individual instrument.

The Health Family Tree™ was developed and implemented by investigators at the Baylor College of Medicine and the University of Utah to identify families with positive health histories conducive to the development of heart disease, cancer, and stroke. It is also a mechanism to gather data as to how diseases and their antecedents run in families and can possibly be prevented (Mason, Williams, & Weber, 1988). The significance of a family history in addressing risk factors of heart disease is noted in nursing, medical, and lay literature (Hayman et al.,1988; Hunt, Williams, & Barlow, 1986; Rogers & Holloway, 1990; Rogers, Rohrbaugh, & McGoldrick, 1992; Singer, 1991; Williams et al.,1988).

The Health Family Tree™ was modified and renamed the Family Health Tree (FHT) to focus on the importance of family in health behaviors. Prior to initiating the FHT, input

was solicited from the school's principal, a fifth grade teacher, a Pediatric Nurse Practitioner working in the school-based clinics, and a nurse educator with a background in pediatrics and health education. A desktop publishing source was utilized to capture the final design on one large piece of paper. This was later modified to have the student draw his/her own tree. Separate blocks were completed for each sibling, aunt, uncle, mother, father, grandmother, grandfather. The "YOU" box, for the individual student, was enlarged to facilitate completion by the student in class. A pamphlet of instructions, printed on pastel paper with the tree logo was given to the students to be shared with their family members.

Pilot of FHT. An intact 5th grade class of fifteen students, all African-Americans ages 10-11, was selected from an inner city elementary school to pilot test the FHT. Prior to the distribution of the tree, an introduction was given to include our family connections, showing photographs of family members from Masa Mara, Kenya. The purpose of completing the instrument was discussed, noting that it would help the student and members of the student's family to see how certain behaviors and health problems run through generations. The enlarged "You" block was distributed for the students to complete in class. There was no discussion as to how specific life styles are related to cardiovascular disease as this could bias the results, but the students were told that they would have a class on heart healthy behaviors in the future. The regular teacher encouraged the students to complete the information by interviewing relatives who lived outside the home. The completed FHTs were collected the 5 days later, with special pencils given as incentives to the respondents.

Descriptive statistics were used to summarize data from the FHTs. The variables of sex, age, weight patterns, smoking history, exercise patterns, alcohol consumption, and specific medical conditions were examined. Ten students returned the tree, with nine being usable for a 60% response rate. Seven of the respondents were females (100% of those in class) and the mean age of the respondents was 10.2 years. The "you" blocks completed and returned in class contained the same responses as did those on the returned trees. The mean ages by generation were: student (n=26, includes siblings of student) was 12 years; parent (n=33, includes aunts and uncles) was 37 years; grandparent (n=21) was 61.3 years of age. In this sample, the degree of overweight increased with successive generations. Smoking patterns were similar between the parent and grandparent generations with over half being regular or former smokers. None of the students reported having smoked. Approximately two-thirds of the students reported vigorous exercise at least three times per week. This pattern decreased with successive generations with over half of the parent and grandparent groups reporting no regular exercise. Regular alcohol use was not reported, although one respondent in the student generation reported "some" consumption. In the parent generation, approximately forty percent reported some alcohol use with approximately twenty to twenty-five percent reporting some present or past consumption.

The only health problem reported from the student generation was hypertension (n=2). In the parent generation, there were 2-4 reports each of hypertension, heart attack, angina, stroke, diabetes, and cancer. The grandparent generation showed 2 instances each of hypertension and heart attack and single instances of angina, stroke, diabetes, cancer, and heart disease.

The Family Health Tree encouraged intergenerational activity across student, parent, and grandparent generations. Following the pilot study, the FHT was modified to delete extraneous demographic data (e.g., number of natural children). Vigorous exercise was replaced with moderate-intensity physical activity to confirm with the Center for Disease Control and Prevention recommendations (Pate et al., 1995). The reading level of the instruction pamphlet was lowered and information reduced to a one-sheet handout.

Family Health Trees were completed by 16 students in the major study pilot (Table 6). Similar to the initial pilot study, obesity increased with successive generations. Greater than 60% of the grandparent generation were regular or former smokers with 44 - 49% of the parent/grandparent generations reporting "some" alcohol use. Seventy-eight percent of the student generation reported participation in regular physical activity (at least three times a week for 20 minutes). This pattern of behavior was similar between the parent and grandparent generations (54% and 60%).

Table 6

FHT Responses - Pilot School
(n=16)

Variable	Students/Siblings n = 38	Parents/Aunts/Uncles n = 67	Grandparents n = 37
Age	10.1	34.3	61.2
Weight			
slight/average	31 (81.6%)	20 (29.9%)	8 (22.2%)
<=49 lbs overweight	7 (18.4%)	11 (16.4%)	4 (11.1%)
>50 lbs overweight	-	13 (19.4%)	11 (30.6%)
Smoking			
regular	1 (2.7%)	19 (27.9%)	8 (21.6%)
stopped	2 (5.4%)	13 (19.1%)	15 (40.5%)
never	34 (91.9%)	29 (42.6%)	12 (32.4%)
Physical Activity			
at least 3X/week, 20 minutes	28 (77.8%)	36 (53.7%)	22 (59.5%)
never	3 (8.3%)	11 (16.4%)	11 (29.7%)
Alcohol - sometimes	3 (7.9%)	30 (43.5%)	18 (48.6%)
Medical Conditions			
hypertension	2 (5.3%)	5 (7.6%)	17 (50.0%)
heart attack	-	1 (1.5%)	2 (5.9%)
heart problems	1 (2.6%)	3 (4.4%)	9 (25.0%)
stroke	-	1 (1.5%)	3 (8.8%)
high cholesterol	-	2 (3.0%)	9 (26.5%)
diabetes	-	3 (4.5%)	10 (29.4%)
cancer	-	-	3 (8.6%)

Heart Healthy Questionnaire. An instrument developed specifically for this study was the Heart Healthy Questionnaire, a 48-item self-report questionnaire that can be used for upper elementary school children and adults. The purpose of this norm-referenced, self-report instrument was to measure a family member's knowledge and perception of his/her nutrition and physical activity lifestyle patterns. Specific items, generated from an extensive literature review and pooling/revising items from extant instruments, were clustered into subscales of attitudes, self-efficacy, barriers, stages of change, and knowledge, with items addressing either physical activity or eating behaviors. Questionnaire objectives were:

Objective 1: The family member will identify healthy food choices and physical activity patterns.

Objective 2: The family member will select his/her attitudes toward participation in the nutrition and physical activity lifestyle patterns.

Objective 3: The family member will select his/her level of confidence in performing nutrition and physical activity behaviors.

Objective 4: The family member will select barriers to his/her participation in the nutrition and physical activity behavior.

Objective 5: The family member will specify his/her current stage of activity.

The initial number of items in the HHQ was 46 with 6 items added following review by experts and community members. Items were constructed to be short, focusing on one

activity and using common terms. The three-point forced- choice Likert scale (summated rating scales using no, not sure, and yes or not sure, maybe, and very sure) was used for three of the five subscales. The limited number of response choices was found to be easier to comprehend for the target population (Robert Feldman, PhD, personal communication, May 1996). The total possible score is 128 (negative items are reverse scored).

Response bias was minimized as items are both negatively and positively worded. Because of the concern for minimizing response burden for the grandparents, the questionnaire was designed so that it could be either self-administered or used in an interview format in person or over the telephone. Grandparents completed the questionnaire at home, however, the investigator was available upon request to answer any questions. The time required to complete the HHQ was approximately 15 minutes. Approaches to minimize social desirability included using neutral statements with forced choice options. Respondents were told that all responses were confidential and that there were no right or wrong answers.

Focus group. Quantitative and qualitative methods can be combined to help develop quantitative measures (Brietmayer, 1993). O'Brien (1993) used focus groups to develop health surveys, noting that the data can be used in wording questionnaires, forming new hypotheses. A strength of this method is that it provides the opportunity to observe a large amount of interaction on a given topic in a limited period of time (Lankshear, 1993). Because a naturalistic approach to studying perceptions of health promotion behaviors in general increases construct validity for later quantitative phases of the study,.a focus group of six African-American women from the study community participated in the

development of the HHQ. These women were employed as community health workers in a university sponsored blood pressure project.

Following the approval from the Health Education Department IRB, a scheduled informal meeting of approximately one to one and one-half hours was held in a neighborhood community center where the women were employed as Community Health Workers. The investigator was able to explore the vocabulary and discover some of the thinking patterns of the target population. Topics for discussion included content areas from the HHQ subscales. For example, "What do you consider low fat foods?" "What does aerobic exercise mean to you?" Responses from the focus group were used to refine the HHQ, making it more culturally appropriate.

Three of the focus group participants administered a total of seven HHQs to family members. The purpose of the questionnaire, the target population, and the purpose of this testing was discussed with the women and their nursing supervisor. The process was reiterated in a cover letter with the HHQs addressed to the individual women. The three community health workers remained with the respondents who completed the instrument and afterward solicited comments regarding the format and content.

Seven respondents completed the HHQ, two children (mean age 10.5) and five grandparents (mean age 63.6). One child and one grandparent were males. Two grandmothers had their granddaughters as the child respondent; the other respondents were not related.

Two Community Health Workers who administered the HHQs were interviewed regarding the content and administration of the instrument. Positive comments from the

respondents were that the format was easy to follow and the length was appropriate. The reading level was likewise appropriate for all respondents (the male child read at the 3rd grade level and had no difficulty). The directions were clear and the language was easily understandable. Their major concern regarded section III-Barriers. The respondents weren't sure how to answer the questions if they did not perceive any difficulty with the eating behaviors or exercise. Another suggestion was adding "sometimes" to the questions in section I on attitudes. One respondent was a vegetarian who did not eat dairy products, but this nutritional pattern wasn't taken into consideration during the development of the instrument. Printing the HHQ on blue paper or neon pink was an additional suggestion. In general, the participants found the HHQ to be a valuable instrument for the African-American residents of the inner city study area, supporting face validity and cultural sensitivity.

Reliability. Test-retest reliability for the major pilot study was .81 (students) and .99 (grandparent partners). Internal consistency was the second measure of reliability and was determined on both test administrations (test and retest). As several dimensions were measured, Cronbach's alphas were determined for each of the subscales and the individual instruments as a whole. A concern is the limited amount of variance that could be reflected in some of the responses since each subscale is short with the number of items in the HHQ ranging from 1-14. However, the instrument must not too lengthy to preclude respondents from completing them. Since the alpha is dependent on total test variance, if the alpha is too low, the number of items may need to be increased or the items having little in common need to be revised or deleted. Cronbach's alpha for the subscales and total instrument are shown in Tables 7 and 8. Alpha levels increased with the posttest

administration for an overall alpha of .81 (students) and .86 (grandparent partners). For each of the subscales, higher scores indicated responses in the criterion direction.

Table 7

Cronbach's Alpha for HHQ Scores of Students in Pilot Study

Variable	Pretest (n=31) Alpha	Posttest (n=26) Alpha
Attitude: 10 items		
physical activity (15)	0.55	0.58
nutrition (15)	0.59	0.52
total (30)	0.57	0.63
Self-Efficacy: 10 items		
physical activity (15)	0.47	0.73
nutrition (15)	0.56	0.56
total (30)	0.58	0.78
Barriers: 18 items		
physical activity (21)	0.13	0.56
nutrition (33)	0.56	0.46
total (54)	0.57	0.68
Stages of Change: 4 items		
physical activity (4)		
nutrition (12)	0.35	0.83
total (16)	0.32	0.83
Knowledge: 10 items		
physical activity (5)	0.14	0.61
nutrition (5)	0.14	0.68
total (10)	0.14	0.42
Total Instrument: 52 items		
total (140)	0.75	0.81

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 8

Cronbach's Alpha for HHQ Scores of Grandparents in Pilot Study

Variable	Pretest (n=13) Alpha
Attitude: 10 items	
physical activity (15)	0.65
nutrition (15)	0.43
total (30)	0.69
Self-Efficacy: 10 items	
physical activity (15)	0.64
nutrition (15)	0.58
total (30)	0.75
Barriers: 18 items	
physical activity (21)	0.59
nutrition (33)	0.53
total (54)	0.58
Stages of Change: 4 items	
physical activity (4)	
nutrition (12)	0.84
total (16)	0.69
Knowledge: 10 items	
physical activity (5)	0.10
nutrition (5)	0.49
total (10)	0.53
Total Instrument: 52 items	
total (140)	0.80

Note. Numbers in parenthesis represent maximum possible score for subscale. Posttest alphas were not computed due to the small sample size.

Validity. Content validity, largely a function of how the instrument is developed, is important for all measures (Waltz et al., 1991). The HHQ was developed following an extensive review of the literature and communication with experts. Prior to assessing the reliability, two experts were selected to evaluate the HHQ. One expert is an African-American nurse researcher with expertise in urban populations and children. The second expert is a doctoral candidate in nursing with expertise in health promotion in older adults. The experts were given written instructions with the questionnaires and asked to link each objective with the respective items, assessing the relevancy of the items on a 4-point rating scale. The content validity index (CVI) is the proportion of items given a rating of quite relevant to very relevant (Waltz et al., 1991). The CVI was 1.0; both experts rated all items as quite or very relevant (1 or 2 on a scale of 4 with 4 being not relevant).

Construct validity was assessed through hypothesis testing in which the theory underlying the measure's design was used to hypothesize the behavior of individuals with varying scores on the measure (Waltz et al., 1991). It was hypothesized that individuals with high total scores on the HHQ also would have high scores on the Physical Activity Record (numbers of total activities and METS) and lower percentages of moderate to high fat items on the 24-hour Food Record. The correlation between the initial test HHQ total scores and the total MET scores was .37; between the HHQ total scores and the percent of high to moderate fat items was a negative correlation of .94. The reliability of self-report physical activity and food records impacts the construct validity.

The Self-Administered Physical Activity Record. The Self-Administered Physical Activity Checklist (SAPAC) was used in the Child & Adolescent Trial for cardiovascular

Health (CATCH) study with validity and reliability reported for 4th grade studesnts (SAPAC) (Leupker et al., 1996; Sallis et al.,1993; Sallis, Pinski, Grossman, Patteson, & Nader, 1988; Sallis et al.,1996). The form consists of 21 physical activities with space for listing up to four other activities, and an additional section for reporting TV/video viewing and video/computer games. Children report the minutes they spent in each activity during three time periods the previous day (before school, during school, and after school). The student was instructed to report the activity only if he/she did it for 5 minutes or more. For each of the identified activities, the student reported whether it caused him/her to breathe hard or feel tired none, some, or most of the time (subjective intensity rating).

Several modifications were made to the SAPAC in an effort to decrease administration time and respondent burden. The subjective index of intensity was omitted to simplify the form, and the additional page of reporting TV/video viewing was omitted. Twenty-two activities are included in the student's checklist. Roller skating/line skating was added as this is a common activity observed in the target population. Fourteen activities were listed in the family member record with both records having spaces to add "other" activities. METS were assigned to each activity using a compendium of physical activities (Ainsworth et al.,1993). The self-reported data from the Physical Activity Records (PAR) were summarized with the following variables: (1) Number of activities reported; (2) Physical activity METS score. All students in the pilot study completed the PAR at time one (n=31) with the total number of physical activities ranging from 1-14 (M=6.42): total METS ranged from 6-82 (M=36.48). Eleven grandparent partners completed the PAR with total activities ranging from 1-8 (M=4.09) and METS from 4-16 (M=10.25). Test-retest reliability for this measure was .40 (total METS) and .40 (number

of physical activities) for students. The Pearson product-moment correlation coefficient was not computed for the adult partners due to limited responses. The test-retest reliability was lower than the recommended acceptable values which reflects the young age of the children.

The Food Record is a 24-hour self-report of food/beverage intake patterned after that used in the CATCH study. The validation of 24 -hour recalls assisted by food records was accomplished prior to the CATCH study (Lytle et al.,1993). Trained staff observed children during mealtimes at school, and parents observed and recorded what the children ate in their presence. The following day children participated in a 24-hour recall interview. Children's ability to recall what they consumed during a 24-hour period, when compared with the observational data, showed no significant differences. The authors concluded that the 24-hour recall assisted by food records is a valid method for assessing dietary intake of children as young as 8 for the purpose of group comparison. The data did show that the students had difficulty in quantifying portion sizes of most foods. To assist with the completion of the record in the current study, food models of common foods and beverage containers were used for demonstration purposes.

The student and grandparent partner were asked to record what they consumed at five points in time, designating the specific food and where it was eaten. Directions for administering the Food Record were given in a protocol with an accompanying letter for the parent/grandparent partner. The self-reported data were summarized using food exchanges: starch, meat, vegetables, fruit, milk, and fat using a standardized exchange text (American Diabetes Association, 1995; Franz, 1993). Total estimated calories and

percentage of calories from fat were not calculated due to the quality of the self-reports. Following the completion of the Food Record, one to two children from each class were selected for interview to compare their food record with their verbalized intake. These students also were invited to discuss their opinions of the instrument completion process. Nineteen students and eleven grandparent partners completed the Food Record at initial testing with students reporting 53.9% of food items being medium to high fat. Grandparents reported 39.5% medium to high fat items consumed within 24 hours.

Interarater and intrarater reliability were assessed with the assistance of a Registered Dietitian familiar with heart healthy food choices. Twenty-four-hour food records were randomly selected from those submitted by the students and grandparent partners. The total number of moderate to high fat items was identified independently by the investigator and the dietitian. The interrater reliability coefficients of the first three records were between .80-.90, which indicated overall agreement. It was determined that further testing was not indicated. The test-retest procedure was not accomplished on this measure due to the poor response rate on the post-test.

Data Collection Procedures

Pretest screening was conducted on all subjects prior to the intervention strategy and 1-2 weeks post intervention for both the control and the intervention groups. Data were collected by nurse practitioners assigned to the respective school-based clinics. Individual training was provided with a typed protocol for the administration of the Physical Activity Record and Food Record (Appendix C). The PAR and the HHQ were completed in class. The Food Record was started at school and completed at home. The FHT was introduced

and the "YOU" block completed, then children took it home to complete. The HHQ, PAR, and the Food Record for the older adult partners were taken home by the student for completion by the partner. Completed forms were collected by the Nurse Practitioner or the investigator within one week. It is optimal to collect diet and exercise self-reports on both school days and weekends since behaviors across these days differ. Due to overall compliance in the pilot study, respondent burden, and time constraints this was omitted.

Analysis

Descriptive statistics were used to characterize the study sample. Variables included age, gender, school attended by student, relationship of the older adult partner to the student, frequency of contact with the partner, and highest level of education completed by grandparent partner. Descriptive statistics were used to analyze data from the Family Health Tree. These included: Relationship to the student, age, gender, health conditions (heart problems, high blood pressure, stroke, high blood cholesterol, diabetes, cancer), cigarette smoking history, weight history, consumption of alcoholic beverages, physical activity, age of death, and cause of death.

Research hypothesis 1.

Hypothesis 1. Children who participate in a school-based cardiovascular health promotion program will demonstrate greater knowledge, more positive attitudes, stronger self-efficacy, and manifest greater behavioral changes regarding heart healthy dietary intake and physical activity than children who do not participate.

To determine whether there were differences in knowledge, attitudes, self-efficacy, and behavior between the intervention and control groups, a series of analyses of

covariance was used. Outcome variables included the subscale scores on the HHQ (knowledge, attitudes, self-efficacy, stages of change), with the initial pretest subscale scores used as covariates.

To determine whether there was a difference in the diet between the control and intervention groups, an analysis of covariance was used. The outcome variable was the percent of moderate to high fat items in the 24-hour posttest Food Record. The pretest score served as the covariate.

To determine whether there was a difference in the physical activity between the control and intervention groups, an analysis of covariance was used. The outcome variables were the total scores (number of activities and individual METS). The pretest score served as the covariate.

Research hypothesis 2.

Hypothesis 2. Grandparents of children who participate in a school-based cardiovascular health promotion program will demonstrate greater knowledge, more positive attitudes, stronger self-efficacy, and manifest greater behavioral changes regarding heart healthy dietary intake and physical activity than grandparents who do not participate.

Due to the low response rate for grandparents in the three schools, it was not possible to conduct an ANCOVA. Descriptive statistics were used to characterize the responses.

In quasi-experimental studies the test of treatment effects is biased by existing group differences (Reichardt, 1979). ANCOVA reduces bias by providing statistical control of the confounding variables (Wu & Slakter, 1989). Schools were randomly assigned to

treatment or control groups with subjects treated independently within groups. Correlation between the covariates and the criterion was at least .20.

Limitations

Threats to statistical conclusion validity include the low statistical power due to the small sample size, the reliability of treatment implementation, and the random heterogeneity of respondents (Cook & Campbell, 1979). The major threat to internal validity was history. A log was kept of activities that occurred within the school and community related to cardiovascular health within the time frame of the study, however exposure to media, peers, and family members can not be identified. The posttest questionnaires were presented within two weeks after the four workshops were completed and reported changes were made immediately following the activities. Therefore, long-term effects of the intervention cannot be determined from this study. All measures were completed midweek, which did not account for the changes that may be present in weekend eating behaviors and physical activity.

Other limitations of this study were noted: (1) The sample consisted only of children in grade 5; (2) The study was conducted in one geographical area; (3) Grandparent partners were not interviewed; and (4) Socially desirable answers may have been given by the subjects when answering the questionnaire.

Potential limitations to obtaining accurate self-reports of eating and physical activity behaviors exist (Davis et al., 1995). Under or over-reporting may result from students' and older adult partners' concern regarding confidentiality. This was also a consideration when interpreting the Family Health Tree results.

Summary

A pretest posttest intervention design was used in this study of 5th grade African-American students and their grandparent partners. The 4-week intervention incorporated school-based workshops from Heart Power!™ with take-home activities to be shared with the grandparent partner and family members. Self-report measures included The Family Health Tree, The Heart Healthy Questionnaire, The Physical Activity Record, and The 24-hour Food Record.

Chapter IV

Results

The presentation of results is organized into sections based upon the aims of the study: (1) To assess the impact of a school-based health intervention in promoting healthy cardiovascular behaviors in elementary school children; and, (2) To evaluate the efficacy of elementary school children as conduits of health promotion information for older generations. The sections include description of the participants on study variables and answers to the two study hypotheses.

Participants

The sample consisted of 5th grade elementary school students who: (1)attended one of three elementary schools in the Sandtown-Winchester area of Baltimore City, (2) could speak, read, and write English at an upper elementary grade level, and (3) had no major dietary or physical activity restrictions. One-hundred thirty-five students and 44 older adult partners participated in the study (Tables 9 and 10). Forty-two percent of the students were male (n=64) with a mean age of 10.9 ± .62 (range 9.3-13). Ninety-three percent of the older adult partners were female (n=41) with 59% identified as grandmothers. There were no significant differences among schools for age. The percentage of male and females students was similar. The distribution of racial representation was homogeneous, all African-American. In the baseline administration (February 1997), 135 students completed the Heart Healthy Questionnaire (HHQ). The

participation rate remained at 76% for students (n=102) and 25% for grandparents (n = 11) for the posttest (April/May 1997).

Table 9

Sample Characteristics - Students

Variable	Intervention (n=93)	Control (n=42)
Gender		
male	42	22
female	51	20
Age	10.81±0.60 (9.3-13.0)	10.93±0.63 (9.8-13.5)

Table 10

Sample Characteristics - Grandparent Partners

Variable	Intervention (n=32)	Control (n=12)
Gender		
male	2	0
female	30	12
Age	48.83±14.79 (23.2-78.8)	46.28±15.66 (24.5-67.0)
Education		
elementary	3 (10.0%)	2 (16.7%)
junior high	10 (33.3%)	3 (25.0%)
high school	15 (50.0%)	4 (33.3%)
some college	2 (6.7%)	3 (25.0%)
Relationship		
grandmother	20 (62.5%)	6 (50.0%)
grandfather	1 (3.1%)	-
mother	5 (15.6%)	3 (25.0%)
father	1 (3.1%)	-
other	5 (15.6%)	3 (25.0%)
Student/partner contact		
daily	18 (72.0%)	7 (77.8%)
once/week	2 (8.0%)	-
2-3 times/week	5 (20.0%)	2 (22.2%)

Demographic characteristics did not differ significantly between the control and intervention schools for the students. Among all students who completed the HHQ for pre and posttests, 15% (n=15) completed the pretest 24-hour food record and 97% (n=99) completed the Physical Activity Record. The posttests were completed by 11% (n=15) and 73% (n=99) respectively. Among these intervention students (n=61), 66% participated in one or more workshops with their partners.

The primary reason for sample attrition from pretest to posttest was absenteeism. This was particularly evident in intervention school A as 29 male students completed the pretest, however only 12 completed the posttest. There were no significant demographic differences between those students/partners who completed the posttests and those who did not. The lack of attrition in the control school at posttest may be explained by the students' enthusiasm for a party and incentives. The two intervention schools had the advantage of four previous workshops with activities and small incentives.

Higher pretest means were noted on every variable for School A students who completed the intervention (Table 11). School B generally showed the same trends, however the number of physical activities with associated METs were higher for the dropouts (Table 12). Higher pretest means also were found for the HHQ subcales for grandparents at pretest in all schools (Tables 13-15). The differential attrition rates may have created a positive bias, underscoring differences among the schools that were not apparent at the onset. Thus, the major emphasis in subsequent data analysis focuses on each school as a unique entity.

All students lived in the Sandtown-Winchester area. The older adult partners lived in the proximity and reportedly saw their student partners at least weekly with the majority (57%) having daily encounters. None of the student or adult partners reported disabling conditions that would prohibit them from participating in heart healthy exercise or eating.

Table 11

Pretest Means by Attrition Status for Students in School A

Scale	Dropped Out n	Dropped Out M	Completed n	Completed M	
Attitude					
physical activity	24	12.96	37	13.65	
nutrition	24	10.25	37	10.76	
total	24	23.21	37	24.38	
Self-Efficacy					
physical activity	24	11.71	37	11.78	
nutrition	24	10.25	37	10.32	
total	24	21.96	37	22.11	
Barriers					
physical activity	24	14.08	37	14.32	
nutrition	24	15.63	37	17.22	*
total	24	29.71	37	31.81	*
Stages of Change					
physical activity	23	2.65	37	3.05	
nutrition	23	6.96	37	7.22	
total	23	9.61	37	10.30	
Knowledge					
physical activity	24	3.96	37	4.19	
nutrition	24	3.17	37	3.68	
total	24	7.13	37	7.86	
Total HHQ	23	91.35	37	97.00	**
Number Physical Activities	22	9.68	35	10.94	
Total Number METS	22	55.50	35	61.84	

Note. *$p < 0.05$ compared to mean of dropouts by t-test.
**$p < 0.01$ compared to mean of dropouts by t-test.

Table 12

Pretest Means by Attrition Status for Students in School B

Scale	Dropped Out n	Dropped Out M	Completed n	Completed M	
Attitude					
physical activity	8	9.63	24	13.38	**
nutrition	8	10.75	24	10.67	
total	8	20.38	24	24.04	*
Self-Efficacy					
physical activity	8	9.63	24	12.13	*
nutrition	8	10.25	24	9.50	
total	8	19.88	24	21.63	
Barriers					
physical activity	8	12.75	24	14.71	
nutrition	8	17.13	24	17.63	
total	8	29.88	24	32.33	
Stages of Change					
physical activity	6	2.00	24	2.92	
nutrition	6	6.67	24	8.83	*
total	6	8.67	24	11.75	*
Knowledge					
physical activity	8	3.63	22	3.68	
nutrition	8	2.88	22	3.05	
total	8	6.50	22	6.73	
Total HHQ	6	85.33	22	96.41	
Number Physical Activities	8	15.88	22	8.95	*
Total Number METS	8	91.48	22	49.23	**

Note. *$p < 0.05$ compared to mean of dropouts by t-test.
**$p < 0.01$ compared to mean of dropouts by t-test.

Table 13

Pretest Means by Attrition Status for Grandparents in School A

Scale	Dropped Out (n = 12) M	Completed (n = 3) M
Attitude		
physical activity	12.91	14.67
nutrition	12.82	12.67
total	25.82	27.33
Self-Efficacy		
physical activity	12.30	11.67
nutrition	11.40	12.33
total	23.70	24.00
Barriers		
physical activity	14.30	16.00
nutrition	19.20	18.67
total	33.50	34.67
Stages of Change		
physical activity	3.00	2.67
nutrition	8.00	9.33
total	11.00	12.00
Knowledge		
physical activity	4.50	4.50
nutrition	4.00	4.00
total	8.50	8.33
Total HHQ	103.30	106.50
Number Physical Activities	6.50	4.50
Total Number METS	34.05	15.25

Table 14

Pretest Means by Attrition Status for Grandparents in School B

Scale	Dropped Out (n = 13) M	Completed (n = 4) M
Attitude		
physical activity	11.44	13.25
nutrition	11.31	11.50
total	22.75	24.75
Self-Efficacy		
physical activity	11.13	9.75
nutrition	11.56	10.25
total	22.69	20.00
Barriers		
physical activity	14.73	12.33**
nutrition	19.00	16.08
total	33.73	28.33
Stages of Change		
physical activity	2.36	2.00
nutrition	7.93	9.00
total	10.29	14.00
Knowledge		
physical activity	4.08	4.00
nutrition	3.53	3.33
total	7.60	7.33
Total HHQ	99.58	90.67
Number Physical Activities	6.30	6.33
Total Number METS	24.74	30.00

Note. **$p < 0.01$ compared to mean of dropouts by t-test.

Table 15

Pretest Means by Attrition Status for Grandparents in School C

Scale	Dropped Out (n = 8) M	Completed (n = 4) M
Attitude		
physical activity	11.20	12.50
nutrition	10.80	11.00
total	22.00	23.50
Self-Efficacy		
physical activity	10.60	10.25
nutrition	11.00	11.25
total	21.60	21.50
Barriers		
physical activity	14.25	17.25*
nutrition	18.75	21.00
total	33.00	38.25
Stages of Change		
physical activity	2.00	3.50*
nutrition	8.20	10.00
total	10.20	13.50
Knowledge		
physical activity	4.17	3.80
nutrition	3.17	3.80
total	7.33	7.60
Total HHQ	95.25	104.00
Number Physical Activities	3.33	4.33
Total Number METS	11.67	18.00

Note. *$p < 0.05$ compared to mean of dropouts by t-test.

Family Health Tree

Twenty Family Health Trees were completed by schools A and B (intervention) and 5 by the control school (Tables16 -18). Student/adult templates are pictured in Appendix C. Results show that smoking patterns between the parents' and grandparents' generations were similar, with about half being regular or former smokers. Physical activity decreased with age while obesity increased with age. Hypertension was the most frequent medical condition noted by both parent and grandparent generations in the intervention schools whereas hypertension and diabetes were equally represented in the control school.

Significance testing for differences in responses between the combined intervention schools and the control school was undertaken using chi-squared tests. There were no significant differences for the student generation (Table 13). In the parent generation, hypertension was significant different between groups. Selecting one of three responses, nine (8.8%) of the respondents in the intervention schools reported hypertension as opposed to one (3.4%) in the control school. Over one-third of the respondents in the intervention school were "not sure" if they had high blood pressure; $\chi^2(2, n = 131)$ $p = .002$. High cholesterol was reported by six (6.1%) of the intervention parents in contrast to one (3.4%) in the control school. Again, over one-third of the respondents in the intervention schools were "not sure" if they had high cholesterol. Significant differences in weight were found between the groups, with greater obesity in the control school; $\chi^2(4, n = 135)$ $p = .001$. Respondents selected one of five descriptions of their weight; fourteen (50%) of the respondents in the control school reported being over 50

pounds overweight, eleven were over 100 pounds overweight. Twenty four of the respondents in the intervention schools reported being 50 to 100 pounds overweight, with nine reporting being over 100 pounds overweight. Uncertainty was greater in the intervention group than the control group with approximately one-third of the respondents being "not sure" if they had heart problems , a heart attack, diabetes, or cancer (Table 17).

There was a significant difference in regular smoking between grandparents; $\chi^2(3,n = 67)$ $p = .032$. With four choices, seven respondents (58.3%) reported regular smoking in the control school in contrast to 12 (21.8%) in the intervention schools (Table 18). These results reflect the family members' understanding of the FHT and knowledge of their personal health, as well as the student as history-taker.

Table 16

FHT Responses Students/Siblings

Variable	Intervention (n=72)	Control (n=15)
Age	8.21	11.73
Weight		
slight/average	49 (74.2%)	10 (66.7%)
<=49 lbs overweight	17 (25.8%)	5 (33.3%)
>50 lbs overweight	-	-
Smoking		
regular	-	1 (6.7%)
stopped	2 (2.9%)	-
never	66 (97.1%)	13 (86.7%)
Physical Activity		
at least 3 x /week for 20 min.	57 (80.3%)	12 (75.0%)
never	3 (4.2%)	1 (6.3%)
Alcohol - sometimes	2 (3.0%)	1 (6.3%)
Medical Conditions		
hypertension	-	-
heart attack	-	-
heart problems	-	-
stroke	-	-
high cholesterol	-	-
diabetes	-	-
cancer	-	-

Table 17

FHT Responses Parents/Aunts/Uncles

Variable	Intervention (n=112)	Control (n=29)
Age	32.96	38.38
Weight		
slight/average	36 (33.6%)	9 (32.1%)
<=49 lbs overweight	11 (10.3%)	2 (7.1%)
>50 lbs overweight*	33 (30.8%)	14 (50.0%)
Smoking		
regular	33 (30.0%)	12 (41.4%)
stopped	16 (14.5%)	2 (6.9%)
never	28 (25.5%)	12 (41.4%)
Physical Activity		
at least 3 x /week for 20 min.	78 (70.9%)	25 (86.2%)
never	9 (8.2%)	2 (6.9%)
Alcohol - sometimes	45 (42.1%)	14 (48.3%)
Medical Conditions		
hypertension*	9 (8.8%)	1 (3.4%)
heart attack	1 (1.0%)	-
heart problems	1 (1.0%)	1 (3.4%)
stroke	3 (3.0%)	-
high cholesterol	6 (6.1%)	1 (3.4%)
diabetes	-	1 (3.6%)
cancer	2 (2.1%)	-

Note. *$\chi^2 = p < .05$

Table 18

FHT Responses Grandparents

Variable	Intervention (n=56)	Control (n=12)
Age	59.05	57.20
Weight		
slight/average	17 (30.4%)	4 (33.3%)
<=49 lbs overweight	1 (1.8%)	-
>50 lbs overweight	26 (46.4%)	4 (33.3%)
Smoking		
regular	12 (21.8%) *	7 (58.3%)
stopped	12 (21.8%)	-
never	16 (29.1%)	4 (33.3%)
Physical Activity		
at least 3 x/week for 20 min.	32 (57.1%)	4 (33.3%)
never	9 (16.1%)	5 (41.7%)
Alcohol - sometimes	17 (30.4%)	6 (50.0%)
Medical Conditions		
hypertension	14 (26.9%)	2 (16.7%)
heart attack	6 (11.8%)	1 (8.3%)
heart problems	9 (17.0%)	1 (9.1%)
stroke	5 (9.6%)	1 (8.3%)
high cholesterol	6 (12.0%)	-
diabetes	8 (15.7%)	2 (16.7%)
cancer	2 (4.1%)	2 (16.7%)

Note. *$\chi^2 = p < .05$

Study Hypotheses

Analysis of covariance (ANCOVA) was used to test the hypothesis of intervention efficacy. Each of the post intervention HHQ subscales and activities and METS from the Physical Activity Record served as a dependent measure, with the corresponding preintervention score serving as the covariate (Table 19). Since the design was quasi-experimental and the schools were not equivalent on teacher support, space, and time allocations for the interventions, the two intervention schools also were analyzed separately. Statistical significance was assessed by comparing the three schools using pairwise t-tests of the least square means (alpha = 0.05) (Table 20).

The classroom teacher in intervention school B participated in each workshop (e.g., observed student activities, posted FHTs on corridor walls, had students journal after each workshop). The number of students in each workshop was approximately 25. In contrast, school A teachers did not participate in the workshops consistently, nor did they encourage student completion of activities. The two classrooms were combined for workshops as directed by the teachers, creating a crowded environment of over 60 students at times. These factors were not anticipated at the onset of the study, nor adequately controlled.

The following assumptions were met: (1) Although the students were not randomly assigned to groups, the schools were. The students represented the same inner city elementary school 5th grade population; (2) Dependent variables were normally distributed per histograms; (3) The relationship between the dependent variables and the respective covariates were linear as demonstrated by scatterplots.

The means, standard deviations, and Cronbach's alpha reliabilities for the HHQ subscales are reported overall by school (Tables 21-28). The student participation measures include any student who completed at least 80% (four out of five subscales) of the HHQ.

Table 19

Adjusted Posttest Means by Group for Students

Scale	Intervention n	Intervention M	Intervention M'		Control n	Control M	Control M'
Attitude							
Nutrition	61	10.64	10.63		41	10.44	10.45
Physical Activity	61	13.21	13.19		41	13.49	13.53
Total	61	23.90	23.86		41	23.93	23.99
Stages of Change							
Nutrition	58	7.98	8.04		36	7.42	7.33
Physical Activity	58	3.02	3.03		36	2.86	2.84
Total	58	10.83	10.90		36	10.28	10.16
Barriers to Change							
Nutrition	61	17.79	17.65		39	17.82	18.04
Physical Activity	61	14.25	14.18		39	14.05	14.16
Total	61	31.87	31.59		39	31.87	32.31
Self-Efficacy							
Nutrition	60	10.17	10.12		41	9.54	9.61
Physical Activity	60	11.35	11.32		41	11.15	11.19
Total	60	21.42	21.30		41	20.69	20.86
Knowledge							
Nutrition	58	3.43	3.14		40	2.83	2.98
Physical Activity	58	3.98	3.96	*	40	3.50	3.53
Total	58	7.14	7.29	*	40	6.33	6.51
Heart Health Quest.	55	96.53	96.05		35	93.29	94.03
No. Phys. Activities	56	11.82	12.56		37	15.76	14.65
Total Number METS	55	68.14	72.22		37	86.35	80.28

Note. M' = adjusted posttest mean.
*$p < .05$.

Table 20

Adjusted Posttest Means by School for Students

	School									
	A			B				C		
Scale	n	M	M'	n	M	M'		n	M	M'
Attitude										
Nutrition	37	10.46	10.44	24	10.93	10.90		41	10.45	10.50
Physical Activity	37	13.27	13.21	24	13.14	13.10		41	13.53	13.50
Total	37	23.73	23.62	24	24.07	24.08		41	23.98	23.99
Stages of Change										
Nutrition	34	7.74	7.95	24	8.33	8.16		36	7.42	7.33
Physical Activity	34	3.06	3.06	24	2.96	2.98		36	2.86	2.84
Total	34	10.79	11.03	24	11.29	11.14		36	10.28	10.16
Barriers to Change										
Nutrition	37	17.73	17.66	24	17.88	17.62		39	17.82	18.04
Physical Activity	37	14.19	14.18	24	14.33	14.18		39	14.05	14.16
Total	37	31.92	31.84	24	32.21	31.74		37	31.87	32.24
Self-Efficacy										
Nutrition	37	10.32	10.17	23	9.91	10.03		41	9.54	9.61
Physical Activity	37	11.22	11.24	23	11.57	11.45		41	11.15	11.19
Total	37	21.54	21.31	23	21.48	21.54		41	20.68	20.86
Knowledge										
Nutrition	36	3.36	3.14	22	3.55	3.61	*	40	2.83	2.99
Physical Activity	36	3.83	3.73	22	4.23	4.33	*	40	3.50	3.53
Total	36	7.19	6.84	22	7.77	7.96	*	40	6.33	6.54
Heart Health Quest.	34	95.29	94.68	21	98.52	98.27		35	93.29	94.03
No. Phys. Activities	34	11.27	11.44	22	12.68	14.35		37	15.76	14.60
Total Number METS	34	63.30	64.03	22	75.98	86.19		37	86.35	78.88

Note. M' = adjusted posttest mean.
*$p < .05$.

Table 21

Mean HHQ Scores of School A (intervention) Students

Scale	Pretest (n=37) M	SD	Range	Posttest (n=37) M	SD	Range
Attitude: 10 items						
physical activity (15)	13.65	1.69	7-15	13.27	2.59	3-15
nutrition (15)	10.76	1.74	5-15	10.46	1.74	7-14
total (30)	24.38	2.54	17-28	23.81	3.26	14-29
Self-Efficacy: 10 items						
physical activity (15)	11.78	2.30	6-15	11.22	2.59	6-15
nutrition (15)	10.32	2.32	7-15	10.32	2.40	5-15
total (30)	22.11	3.65	14-30	21.54	4.37	13-30
Barriers: 14 items						
physical activity (18)	14.32	2.50	8-18	14.19	2.50	8-18
nutrition (24)	17.22	2.85	11-23	17.73	3.35	10-24
total (42)	31.81	3.84	24-39	31.68	5.11	20-41
Stages of Change: 4 items						
physical activity (4)	3.03	1.17	1-4	3.06	0.98	1-4
nutrition (12)	7.21	2.84	1-12	7.74	2.39	3-12
total (16)	10.26	3.30	2-16	10.77	3.04	4-16
Knowledge: 10 items						
physical activity (5)	4.19	0.75	2-5	3.83	1.21	1-5
nutrition (5)	3.67	1.12	1-5	3.36	1.13	1-5
total (10)	7.86	1.51	3-10	7.19	1.82	3-10
Total Instrument: 48 items						
total (128)	96.88	8.23	75-110	95.29	9.70	67-111

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 22

Mean HHQ Scores of School B (intervention) Students

Scale	Pretest (n=24) M	SD	Range	Posttest (n=24) M	SD	Range
Attitude: 10 items						
physical activity (15)	13.38	1.69	6-15	13.13	1.96	9-15
nutrition (15)	10.67	2.43	5-14	10.92	1.82	7-15
total (30)	24.04	3.80	14-29	24.04	2.88	19-28
Self-Efficacy: 10 items						
physical activity (15)	12.09	2.56	5-15	11.57	2.73	7-15
nutrition (15)	9.52	2.15	6-14	9.91	1.44	7-12
total (30)	21.61	3.50	12-27	21.48	3.45	15-25
Barriers: 14 items						
physical activity (18)	14.71	2.44	8-18	14.33	2.63	10-18
nutrition (24)	17.63	3.19	13-24	17.88	2.77	12-24
total (42)	32.33	4.61	22-41	32.21	4.71	22-40
Stages of Change: 4 items						
physical activity (4)	2.92	1.02	1-4	2.96	1.23	1-4
nutrition (12)	8.83	2.70	3-12	8.33	2.71	3.12
total (16)	11.75	3.47	5-16	11.29	3.37	5-16
Knowledge: 10 items						
physical activity (5)	3.68	0.78	2-5	4.23	1.06	1-5
nutrition (5)	3.05	1.25	0-5	3.55	1.28	1-5
total (10)	6.73	1.70	3-10	7.77	1.88	4-10
Total Instrument: 48 items						
total (128)	96.24	13.19	68-117	98.52	11.23	78-117

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 23

Mean HHQ Scores in School C (control) Students

Scale	Pretest (n=41) M	SD	Range	Posttest (n=41) M	SD	Range
Attitude: 10 items						
physical activity (15)	13.29	1.93	7-15	13.33	1.65	9-15
nutrition (15)	10.66	1.78	6-15	10.45	2.40	6-15
total (30)	23.98	3.04	18-29	23.98	3.17	16-29
Self-Efficacy: 10 items						
physical activity (15)	11.76	2.19	7-15	11.15	2.49	5-15
nutrition (15)	9.66	2.15	5-14	9.54	1.99	6-13
total (30)	21.41	3.32	12-27	20.68	3.66	14-28
Barriers: 14 items						
physical activity (18)	14.03	3.31	6-18	14.05	2.69	7-18
nutrition (24)	16.59	3.75	10-24	17.82	3.67	9-24
total (42)	30.62	6.15	17-42	31.87	5.69	17-42
Stages of Change: 4 items						
physical activity (4)	3.14	1.15	1-4	2.86	1.20	1-4
nutrition (12)	8.47	2.35	4-12	7.42	2.31	4-12
total (16)	11.61	2.84	6-16	10.28	3.14	5-16
Knowledge: 10 items						
physical activity (5)	3.85	0.86	1-5	3.50	0.99	1-5
nutrition (5)	2.83	1.11	1-5	2.83	1.11	0-5
total (10)	6.68	1.51	4-10	6.33	1.58	2-9
Total Instrument: 48 items						
total (128)	94.40	10.32	73-111	93.29	10.36	73-116

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 24

Mean HHQ Scores of Grandparents in School A (intervention)

Scale	Pretest (n=3) M	SD	Range	Posttest (n=3) M	SD	Range
Attitude: 10 items						
physical activity (15)	14.67	0.58	6-15	13.33	2.08	11-15
nutrition (15)	12.67	2.52	10-15	11.67	1.53	10-13
total (30)	27.33	2.08	18-29	25.00	3.61	21-28
Self-Efficacy: 10 items						
physical activity (15)	11.67	1.15	10-14	9.67	3.22	6-12
nutrition (15)	12.33	4.62	7-15	12.33	3.06	9-15
total (30)	24.00	5.29	18-28	22.00	6.08	15-26
Barriers: 14 items						
physical activity (18)	16.00	2.00	10-18	15.67	2.08	14-18
nutrition (24)	18.67	5.51	13-24	19.00	3.61	15-22
total (42)	34.67	7.51	25-42	34.67	5.51	29-40
Stages of Change: 4 items						
physical activity (4)	2.67	0.58	1-4	3.33	0.58	3-4
nutrition (12)	9.33	1.15	4-12	7.67	1.53	6-9
total (16)	12.00	1.73	6-16	11.00	1.00	10-12
Knowledge: 10 items						
physical activity (5)	4.50	0.71	3-5	4.67	0.58	4-5
nutrition (5)	4.00	0.00	3-5	4.67	0.58	4-5
total (10)	8.33	0.58	7-10	9.33	0.58	9-10
Total Instrument: 48 items						
total (128)	106.33	6.51	91-114	102.00	6.56	95-108

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 25

Mean HHQ Scores of Grandparents in School B (intervention)

Scale	Pretest (n=4) M	SD	Range	Posttest (n=4) M	SD	Range
Attitude: 10 items						
physical activity (15)	13.25	2.87	5-15	12.25	3.22	9-15
nutrition (15)	11.50	1.73	7-15	13.25	2.08	11-15
total (30)	24.75	2.99	14-30	25.50	1.16	24-26
Self-Efficacy: 10 items						
physical activity (15)	9.75	2.87	6-15	11.75	2.65	8-13
nutrition (15)	10.25	1.71	8-15	11.50	2.52	10-15
total (30)	20.00	4.55	14-30	23.25	0.58	23-24
Barriers: 14 items						
physical activity (18)	12.33	0.58	10-18	14.33	1.53	13-16
nutrition (24)	16.00	4.58	11-24	12.67	2.08	11-15
total (42)	28.33	5.03	23-42	27.00	2.00	25-29
Stages of Change: 4 items						
physical activity (4)	2.00	1.73	1-4	2.33	1.53	1-4
nutrition (12)	9.00	3.00	3-12	10.00	1.73	9-12
total (16)	11.00	4.58	4-16	12.33	3.26	10-16
Knowledge: 10 items						
physical activity (5)	4.00	1.73	2-5	4.33	3.43	1-9
nutrition (5)	3.33	1.15	2-5	3.00	2.00	1-5
total (10)	7.33	1.53	5-10	7.33	2.52	5-10
Total Instrument: 48 items						
total (128)	90.67	14.01	77-117	95.33	4.16	92-100

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 26

Mean HHQ Scores of Grandparents in School C (control)

Scale	Pretest (n=4) M	SD	Range	Posttest (n=4) M	SD	Range
Attitude: 10 items						
physical activity (15)	12.50	2.52	9-15	12.50	2.08	10-15
nutrition (15)	11.00	2.31	8-15	12.75	2.06	11-15
total (30)	23.50	4.43	18-28	25.25	2.22	23-28
Self-Efficacy: 10 items						
physical activity (15)	10.25	4.03	6-15	10.50	4.20	6-15
nutrition (15)	11.25	2.50	8-14	11.50	1.29	10-13
total (30)	21.50	5.26	16-28	22.00	3.16	18-25
Barriers: 18 items						
physical activity (18)	17.25	0.96	12-18	14.25	2.06	12-17
nutrition (24)	21.00	2.94	15-24	21.50	2.38	19-24
total (42)	38.25	2.87	29-40	35.75	4.27	31-41
Stages of Change: 4 items						
physical activity (4)	3.50	0.58	1-4	3.25	1.50	1-4
nutrition (12)	10.00	1.41	5-12	9.00	2.16	7-12
total (16)	13.50	1.91	6-16	12.25	2.63	10-16
Knowledge: 10 items						
physical activity (5)	3.80	1.30	2-5	4.00	0.82	3-5
nutrition (5)	3.80	1.10	1-5	3.75	0.50	3-4
total (10)	7.60	2.30	4-10	7.75	1.26	6-9
Total Instrument: 48 items						
total (128)	104.00	8.60	81-115	103.00	7.44	96-113

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 27

Cronbach's Alphas for Students' HHQ Scores in Major Study

Variable	Pretest (n=135) Alpha	Posttest (N=102) Alpha
Attitude: 10 items		
physical activity (15)	0.29	0.59
nutrition (15)	0.16	0.27
total (30)	0.37	0.47
Self-Efficacy: 10 items		
physical activity (15)	0.70	0.70
nutrition (15)	0.46	0.41
total (30)	0.62	0.69
Barriers: 14 items		
physical activity (18)	0.60	0.52
nutrition (24)	0.35	0.57
total (42)	0.53	0.70
Stages of Change: 4 items		
physical activity (4)	-	-
nutrition (12)	0.52	0.55
total (16)	0.57	0.65
Knowledge: 10 items		
physical activity (5)	0.04	0.39
nutrition (5)	0.18	0.27
total (10)	0.27	0.42
Total Instrument: 48 items		
total (128)	0.69	0.76

Note. Numbers in parenthesis represent maximum possible score for subscale.

Table 28

Cronbach's Alphas for Grandparents' HHQ Scores in Major Study

Variable	Pretest (n=44) Alpha	Posttest (n=11) Alpha
Attitude: 10 items		
physical activity (15)	0.72	0.72
nutrition (15)	0.64	0.16
total (30)	0.73	0.21
Self-Efficacy: 10 items		
physical activity (15)	0.76	0.78
nutrition (15)	0.53	0.33
total (30)	0.74	0.52
Barriers: 14 items		
physical activity (18)	0.41	0.12
nutrition (24)	0.71	0.73
total (42)	0.76	0.70
Stages of Change: 4 items		
physical activity (4)	-	-
nutrition (12)	0.49	0.28
total (16)	0.64	0.36
Knowledge: 10 items		
physical activity (5)	0.32	0.07
nutrition (5)	0.26	0.51
total (10)	0.40	0.56
Total Instrument: 48 items		
total (128)	0.81	0.56

Note. Numbers in parenthesis represent maximum possible score for subscale.

Hypothesis 1

Children who participate in a school-based cardiovascular health promotion program will demonstrate greater knowledge, more positive attitudes, stronger self-efficacy, and manifest greater behavioral changes toward heart healthy dietary intake and physical activity than children who do not participate.

Knowledge of heart healthy diet and physical activity. This hypothesis was tested using the subscale scores for nutrition and physical activity with higher scores indicating greater knowledge. As shown in Table 19, a significant effect of the intervention was found on the knowledge subscales of the HHQ; $F(1, 94)=8.40$, $p=0.005$). When comparing the three schools, students in intervention school B had a significantly higher adjusted mean on the nutrition component than the control school ($p=.027$), but no effect of the intervention was seen in School A (Table 20). The omnibus F test of the treatment effect tended towards significance ($F(2,94)=2.58$, $p = 0.08$). The physical activity component also revealed significant effects. School B had significantly higher adjusted means than both the control school ($p = 0.006$) and School A ($p = 0.048$). In this case the omnibus F test was significant ($F(2,94) = 3.98$, $p = 0.021$). This pattern was repeated on the total knowledge score. School B differed from both the control ($p = 0.001$) and School A ($p = 0.015$); the omnibus F results were $F(2,94) = 5.77$, $p = 0.004$.

Students' responses to item 1 regarding the food guide pyramid were 63.9% correct for intervention school A, 75% for school B, and only 35% for the control school. Numerically higher scores for school B were also found on items 3 and 4 related to heart disease and fat consumption and popcorn, with or without butter. Knowledge for students

in all three schools remained low as to the high fat content in fast foods (item 7) and canned vegetables versus fresh (item 10).

School B students had numerically higher scores on items related to the physiological effects of exercise (e.g., makes the heart muscle stronger and increases the heart rate). Ninety-two percent of the students responded correctly for both items 8 and 9 whereas school A and the control school reported 78 and 83 % for item 8 and 75 and 58% respectively for item 9. In all schools, female students scored higher on both nutrition and physical activity subscales than did male students.

Attitudes toward heart healthy diet and physical activity. Subscale scores for nutrition and physical activity were used with higher scores indicating more positive attitudes. Scores for both intervention schools and the control school were overall positive toward physical activity, less so toward heart healthy eating (Table 19). Seventy-six to 85% of students liked to exercise (item 1), however only 54-71% thought it made them feel better (item 3). Eighty-three to 87% believed that exercise keeps their bodies healthy and that it is good to exercise 3-5 times a week (78-92%). Sixty-seven to 76% reported being able to exercise with friends if desired (item 8).

Attitudes toward heart healthy eating were less positive than those for exercise. Only 50 - 61% reported liking vegetables (item 1) with 33 to 44% liking to eat greasy food (item 7). Skim milk was very unpopular with only 16% reporting preference over regular milk. Sixty-one to 88 % of the students report liking to snack on fruit (highest in intervention school B) with 17 - 20% liking extra salt on their food (item 4). Male

students in all 3 schools scored higher on the physical activity subscale than did female students.

Self-efficacy with regard to heart healthy diet and physical activity. Subscale scores for nutrition and physical activity were used. Higher posttest scores indicated more confidence in the ability to perform behaviors related to heart healthy eating and physical activity. Overall scores for both behaviors were numerically higher for the intervention schools, once again increased with physical activity (Table 19). The majority of students thought that "maybe" they could try new fruits and vegetables (46 - 61%). They had similar responses to eating food without adding salt (38 - 59% "maybe"). Students were "not sure" that they could drink 1% skim milk (item 4) and eat fried chicken without the skin (61 - 74% and 35-56%).

Increased confidence was shown in physical activity with 43 - 57% of the students reporting they were "very sure" that they could walk 15 - 20 minutes without stopping. High certainty was also expressed for the ability to exercise 3 to 5 times a week (54 - 70%). Students were less certain that they could stick to their exercises if they were tired (32 - 48% "very sure"), and exercise with others who were too slow or too fast (29 - 41%). Self-efficacy scores were numerically higher for females in all subscales with the exception of physical activity in intervention school A.

Activity level as per stages of change. Subscale scores for nutrition and physical activity were used in this analysis. Higher scores indicated a progression along the activity continuum (e.g., thinking about the behavior versus planning to start or engaging in the behavior). The overall scores for nutrition were numerically higher in intervention school

B and for physical activity in intervention school A, however without significance (Table 20). The majority of students in intervention schools A and B (60 and 71%) were in the preparation and action phases of eating 5 or more servings of fruits and vegetables a day. Students were divided more evenly among the four stages in the control school (e.g., 25% precontemplation, 22% contemplation, 19% preparation, and 33% action). Students responded similarly to eating food without adding salt. Approximately one-third of the intervention students (33-35%) reported eating food without adding salt from the shaker, whereas only 25% of the control school students reported being in the action stage. In general, students had mixed opinions regarding eating foods with less fat. Thirty-eight percent of the students in school B were in the preparation stage compared with 21 and 19% in school B and the control school. Twenty-nine percent in school B reported currently eating foods with less fat which is similar to that of the other schools (27 and 25 percent).

Physical activity scores place students from each school in the preparation and action stages of doing some form of exercise 3 or more times a week. Once again students in intervention school B reported higher numbers in the action stage (50%) with 41 and 44% in the other two schools. Physical activity subscale scores were numerically higher for males in the intervention schools than in the control school. Females in all schools showed higher nutrition subscale scores.

Intervention school A showed a shift to higher stages of stage from pretest to posttest in both physical activity and nutrition, while knowledge posttest scores were lower than pretest scores (Table 21). In contrast, students in intervention school B showed greater

knowledge at posttest with slightly lower stage of change scores (Table 22). Knowledge and stage of change scores for the control school were lower at posttest for both behaviors (Table 23).

Barriers related to heart healthy eating and physical activity. Although barriers to behaviors were not included in the hypotheses, their identification impacts behaviors. The intervention and control schools were not significantly different as to the identified barriers. Subscale scores for nutrition and physical activity were used in this analysis. Difficulty in eating low fat foods was attributed in part to disliking the taste (35 - 43%) and unavailability at home (38 - 54%). Cost was not identified as a major barrier. The majority of students did not identify barriers to eating fresh vegetables, with 45 - 57% liking the taste. Interestingly enough, 28 - 41% identified not having a place to store vegetables as a barrier. The taste of food without added salt was not a significant barrier according to 49 -58% of the students.

The two major barriers to physical activity were no safe place and the cost of equipment. Although the three schools are geographically within one to two miles of one another, 29% of intervention school B students reported safety as a barrier (29%); intervention school A and the control school reported 51% and 46% respectively. More barriers were identified by females in all schools for both subscales.

Students in the intervention group will demonstrate greater behavioral change in physical activities. The number of checked activities on the Physical Activity Report and the sum of METS for the activities were totaled (Tables 29-31). Numbers of activities reported were greatest in the control group but without significance. Likewise,

intervention school B indicated greater intensity of activities with higher total METS. Male students in the intervention schools reported greater numbers of activities to include those with moderate to high intensities. Gender differences in the control school were minimal. In general, male students participated in basketball, football and running more often than females who reported more dance, mixed walking and running, and chores.

Students in the intervention group will demonstrate greater behavioral change in heart healthy eating behaviors. Tables 29-31 present the findings from the 24-hour self-report food record. The poor response rate to the completion of the food records limited statistical analysis. Descriptive statistics support a slight decline in the percent of food items recorded that were moderate to high fat items in intervention school A with no change in school B. The control school demonstrated an increase in the percent of fatty foods for both male and female students.

Hypothesis 1 was partially supported. Children who participated in a school-based cardiovascular health promotion demonstrated greater knowledge toward heart healthy dietary intake and physical activity than those who did not participate. However, the desired positive changes in attitudes, self-efficacy, and behaviors were not supported.

Table 29

Physical Activity and Food Records - School A (intervention)

Scale	Pretest M	Pretest SD	Pretest Range	Pretest n	Posttest M	Posttest SD	Posttest Range	Posttest n
Students								
Physical Activities	11.09	5.02	4-23	34	11.27	7.62	1-33	34
METS	62.61	29.81	19-137	34	63.30	44.42	3.5-194.1	34
% High Fat Foods	52.43	12.15	33-67	7	46.71	14.85	33-75	7
Grandparents								
Physical Activities	4.50	2.12	3-8	2	1.50	0.71	1-2	2
METS	15.25	6.01	11-41	2	5.25	2.48	3.5-7	2
% High Fat Foods	44.25	17.86	6-60	3	48.67	15.04	33-63	3

Table 30

Physical Activity and Food Records School B (intervention)

Scale	Pretest M	Pretest SD	Pretest Range	Pretest n	Posttest M	Posttest SD	Posttest Range	Posttest n
Students								
Physical Activities	8.95	4.38	2-23	24	12.68	7.41	5-28	24
METS	47.76	26.59	8-94	24	75.98	44.38	23-160	24
% High Fat Foods	50.00	-	-	1	63.00	-	-	1
Grandparents								
Physical Activities	6.33	3.21	1-11	3	5.33	3.79	1-8	3
METS	30.00	12.29	4-51	3	26.00	17.58	6-39	3
% High Fat Foods	47.63	17.31	20-75	3	57.67	8.62	50-67	3

Table 31

Physical Activity and Food Records School C (control)

Scale	Pretest M	Pretest SD	Pretest Range	Pretest n	Posttest M	Posttest SD	Posttest Range	Posttest n
Students								
Physical Activities	13.00	7.16	2-23	37	15.76	9.07	2-37	37
METS	73.92	41.21	14-130	37	86.35	53.60	8.5-213.8	37
% High Fat Foods	49.00	12.43	36-67	6	56.50	12.90	46-80	6
Grandparents								
Physical Activities	4.33	4.93	4-42	3	9.67	10.02	2-21	3
METS	18.00	20.88	4-42	3	48.33	48.40	8-102	3
% High Fat Foods	42.67	23.12	21-67	3	53.33	5.77	56-60	3

Hypothesis 2

Grandparents of children who participate in a school-based cardiovascular health promotion program will demonstrate greater knowledge, more positive attitudes, stronger self-efficacy, and manifest greater behavioral changes regarding heart healthy dietary intake and physical activity than grandparents who do not participate.

A sample size of 64 was calculated by power analysis to be the required number for detecting a moderate (.50) effect size with a power of .80, and p =.05. The small grandparent sample negated completion of ANCOVA for analysis. Descriptive statistics are reported.

Knowledge of heart healthy diet and physical activity. Subscale scores for nutrition and physical activity were used in this analysis with higher scores indicating greater knowledge. Posttest scores were numerically higher for the physical activity subscale than the nutrition subscale (Tables 24-26). Particularly low scoring items were knowledge of the food guide pyramid (item 1) and the healthiness of canned vegetables as opposed to fresh (item 10). All respondents knew that exercise should be fun, can help you lose weight, and makes your heart stronger (items 5, 6, and 8).

Attitudes toward heart healthy diet and physical activity. Subscale scores for nutrition and physical activity were used in this analysis with higher scores indicating more positive attitudes. Posttest scores for both intervention schools and the control school were generally positive toward eating vegetables and fruit (items 1 and 4), however respondents were "not sure" that exercise made them feel better in half of the cases with a similar response to liking to exercise (items 3 and 1). Skim milk was disliked in 68-75% of the cases.

Self-efficacy with regard to heart healthy diet and physical activity. Subscale scores for nutrition and physical activity were analyzed, with higher scores indicating more confidence in the ability to perform behaviors related to heart healthy eating and physical activity. Scores for both behaviors were high for intervention and control schools. Respondents from schools A and B were more confident in trying new fruits and vegetables (item 1), eating fruit for snacks (item 6) and eating skinless chicken (item 7) then those from the control school. Confidence in the ability to exercise 3 to 5 times a week was highest in school B (67%). Less confidence was reported in being able to stick

to the exercises when tired (item 9) and exercising with others who were too fast or slow (item 10).

Activity level as per stages of change. Subscale scores for nutrition and physical activity were analyzed with higher scores indicating a progression along the activity continuum. The overall scores for nutrition were numerically highest in intervention school B, however differences were not significant (Table 25). Regarding physical activity, 75% of the control school respondents reported being in the action stage.

Barriers related to heart healthy diet and physical activity. Although barriers to behaviors were not included in the hypotheses, their identification impacts the behaviors of the older adult partners. Major barriers to eating low fat foods were taste and not having them at home. Respondents from school B also noted that taste, availability, and storage were barriers to eating fresh vegetables. The primary barriers to exercise were cost of equipment and having no safe place.

Self-report of physical activities (PAR). The number of checked activities were totaled as well as the total sum of METS for the activities. Numbers of activities reported and the greatest number of METS were in the control group but without significance (Table 31).

24-hour self-report of eating behavior. Tables 29-31 present the findings from the 24-Food Record. The percentage of moderate to high fat foods remained high for all respondents (M 48.00-57.67).

Hypothesis 2 was not supported by the data. Significant differences among the intervention and control groups on self-reported knowledge, attitudes, self-efficacy, and

stages of change for both physical activity and heart healthy dietary behaviors could not be assessed due to the limited sample size.

Participation

Assessment of the older adult partner participation was based on the completion of the instruments (e.g., Family Health Tree, HHQ, Physical Activity and Food Records) and the return of the workshop activity cards. Greater numbers of grandparents participated in intervention school B with 88% of the student participants completing one or more workshops (Table 32). Eighty-four percent of student participants in school A (n = 16) were female, with 62% (n = 13) in school B. The girls likewise completed a greater number of workshops than boys in both schools (seven girls completed three or four workshops in school A, with eleven completing three or four in school B).

The dose response was measured using a Pearson product moment correlation between the total workshops attended and student change scores. A moderate positive correlation ($r = .32$, $p < .05$)) was found between the HHQ attitude subscale score and the total number of workshops completed (Table 33).

Table 32

Workshop Activities Completed by Students and Partners

Workshops Completed	School A (n=37)	School B (n=24)
none	18 (48.6)	3 (12.5)
one	2 (.05)	4 (16.7)
two	11 (29.7)	5 (20.8)
three	3 (8.1)	8(33.3)
four	3 (8.1)	4 (16.7)

Note. Numbers in parenthesis represent percent of student sample who completed both pretest & posttests. Workshop activities were completed by both student & grandparent partner.

Table 33

Pearson product moment correlations between total workshops attended and change scores (students)

Test	r	n
Attitude		
physical activity	0.15	42
nutrition	0.29	42
total	0.32*	42
Self-Efficacy		
physical activity	0.24	41
nutrition	0.00	41
total	0.22	41
Barriers		
physical activity	0.18	42
nutrition	-0.02	42
total	0.05	42
Stages of Change		
physical activity	0.00	42
nutrition	0.07	42
total	0.03	42
Knowledge		
physical activity	0.20	40
nutrition	0.11	40
total	0.18	40
Total Instrument	0.23	39
Number Phys. Activities	-0.07	40
Total Number METS	-0.03	39

Note. *$p < 0.05$

The HHQ subscale scores of students and grandparent partner workshop participants were compared (Table 34). Numerical trends suggest that student HHQ stage of change subscale scores increased with participation in three or more workshops. Grandparents who were partners of students who participated in two or more workshops were female with a mean age of 47.8. Seventy-one percent were grandmothers (n=5); 86% (n=6) saw their grandchild daily (information regarding the residence of the grandparent was not obtained). Seventy-one percent (n=5) of the grandparents had completed junior high school.

Table 34

HHQ Means by Workshop Participation

Variable		Students		Grandparents	
		Pretest	Posttest	Pretest	Posttest
Workshops Completed	Scale				
Two	Knowledge	8	8	7	7
(n = 1)	Attitudes	27	26	28	26
	Self-efficacy	21	21	25	24
	Stages of ch.	16	10	16	16
	Barriers	25	29	29	27
Three	Knowledge	6.7±1.15	7.3±3.06	7.7±1.53	8.0±2.65
(n = 3)	Attitudes	25.0±1.00	24.0±2.00	23.3±2.08	23.7±2.5
	Self-efficacy	21.0±1.00	22.0±3.51	20.7±3.06	21.3±3.2
	Stages of ch.	11.3±4.16	13.0±1.53	11.7±3.00	10.3±1.7
	Barriers	33.7±2.08	32.0±2.65	29.3±9.5	31.3±7.7
Four	Knowledge	8.5±.71	8.5±.71	8.5±.71	9.5±.71
(n = 3)	Attitudes	22.5±3.54	27.3±.54	23.0±7.07	26.0±1.4
	Self-efficacy	25.0±2.83	24.0±3.54	27.0±1.41	25.5±.71
	Stages of ch.	11.0±0.0	12.0±0.0	11.5±2.12	11.5±.71
	Barriers	26.5±4.95	30.0±2.83	32.0±5.66	32.0±4.24

Summary

Descriptive data for study variables were outlined in this chapter. Analysis of covariance was employed to answer one study hypotheses. Behavioral changes were not found. A significant effect of the intervention was found on the knowledge of a heart healthy diet and physical activity in school B. Although there were no significant effects on attitudes, self-efficacy, or stages of change subscales, scores from the intervention schools were higher than those of the control school. Grandparent responses were described, however, the poor response prohibited statistical analysis. Sixty-six percent of the students in intervention schools participated with their partners in one or more take-home workshop activities. The largest percentage of completed workshops was from School B with 88% participation. A positive correlation was found between the number of workshops completed and the total attitude score of the HHQ.

Chapter V

Discussion

This study was designed with two purposes: to test the impact of the heart healthy intervention on 5th grade students; and to evaluate the efficacy of students as conduits of health information to their older adult partners. Self-report measures were developed to assess the effectiveness of the heart healthy interventions designed to improve the diet (less moderate to high fat items) and to increase the number and intensity of physical activities of students and their grandparent partners. Constructs from the Intergenerational Health Promotion Model guided the development of the Heart Healthy Questionnaire and the intervention. The Heart Power™ program was developed following several years of research and review, yet since its initiation in July 1996, no measures have been developed for process or outcome evaluations. Despite the lack of behavior change, the immediate impact of the heart healthy workshops with school children was demonstrated in knowledge of heart healthy physical activity and dietary behaviors in one intervention school.

Participants

Grandmothers represented the largest percent of older adult partners in both the intervention and control groups. The bonds and relationships in the case of African-Americans with the significantly greater tendency of females to be in a supportive role was reinforced (Fuller-Thomson, Minkler, & Driver, 1997). Girls participated in the workshop activities more than boys in both intervention schools. This finding suggests that the Heart

Healthy workshops may have been more appealing to the girls and/or that taking activities home to share was "not a boy thing" to do. The small number of older adult male partners may reflect the dearth of male role models in the kinship networks.

Knowledge

Students in one intervention schools showed significant gains in knowledge, supporting the hypothesis of the potential of a culturally oriented cardiovascular heart healthy curriculum. In this study, students who participated in more workshop activities with their older adult partners had greater knowledge of heart healthy eating and physical activity than those with less participation. This finding is consistent with previous research studies in which parental support and participation improved the knowledge of exercise and nutrition in children (Hopper et al., 1996; Perry et al., 1990). Increased knowledge is a first step in facilitating behavior changes. Long-term follow-up of the students and their partners would be necessary to determine the persistence of new knowledge.

Requisite for appropriate knowledge transfer to take place from student to parent is adequate knowledge and skill development on the part of the student (Fors, Owen, Hall, McLaughlin, & Levinson, 1989). An important factor in diffusion appears to be the atmosphere of the family in which mutual interchange and respect are encouraged and expected. In the evaluation of a diffusion strategy for school-based hypertension education in 6th grade students and their families, it appeared that blacks and males were the hardest group to reach (Fors et al., 1989).

Attitudes and Self-efficacy

Attitudes toward heart healthy eating were less positive than those for exercise. The self-efficacy results for diet and physical activity were more encouraging as scores were higher for the intervention schools than the control schools, particularly confidence in engaging in physical activity behaviors. Attitudes and self-efficacy may be enhanced by additional classroom instruction plus positive practice (e.g., field trips to local grocery stores, student-arranged sport activities attractive to both genders). From a SCT perspective, it is important to influence self-efficacy for performing targeted health behaviors. Although behavior change did not occur in the six-to eight-week period, programs continued throughout the school year emphasizing these heart healthy behaviors may encourage change in attitudes and self-efficacy. A positive correlation was found between the number of workshops completed and the total attitude scores, supporting the importance of continued programming. The absence of effect on physical activity is similar to that of other studies (Nader et al.,1989). Reasons for this may include: (1) unrealistic goals, particularly for the older adult partners, (2) insufficient intervention, and (3) barriers suggested from the data.

Over the past 10 years, SCT has been the dominant theoretical framework for health education. The practical constraints in the school environment may limit the amount of mastery exercises necessary to increase self-efficacy. Mastery and self-efficacy can be undermined by verbal and social influences in the environment (e.g., peer influences, fast foods, high fat snacks, watching videos) (Edmundson et al., 1996).

Stages of Change

Higher scores were reported for the intervention schools on the stages of change subscale, however these did not reach significance. Immediate impact was not seen with the older adult partners. The rationale for including the partners was because of the potential influence of the children on the older adults as well as the modeling and reinforcements provided by the partner. Again, a more in-depth program for the partners may have increased the desired effect.

Barriers

Perceived support for efforts in physical activity may be important for students. The lack of a designated physical education teacher coupled with "gym" periods once every few weeks does little to reinforce the benefits of physical activity. Access to equipment and a safe place were identified as major barriers by both students and their partners. This is especially important for the girls who become less active and engage in more sedentary activities as they get older. Sedentary behavior tracks over adolescence and adulthood and is resistant to change (Edmundson et al., 1996).

Cultural and psychosocial barriers that affect the lives of members of underserved populations were apparent. One powerful barrier is poverty which has multiple confounding effects on life priorities (e.g., food choices). and immediate or long-term health goals. Poverty likewise impacts access to facilities, transportation (Marín et al., 1995). The Sandtown -Winchester community has health priorities (e.g., prevention of substance abuse and violence) in addition to those of diabetes and cardiovascular disease.

Challenges

Four categories of challenges have been noted in school-based health promotion studies: administrative-level, resources, school-wide, and student-level (Lytle, 1996). These challenges were apparent in this study. There are several barriers to implementation of health education programs in primary grades to include: crowded curricula, perceived teacher and administration ambivalence toward health education, lack of administrative support, and other competing demands for time. None of the study schools had health educators on staff nor a formal physical education teacher. Administrative-level challenges included finding time in the school day and calendar for the four workshops. School principals and master teachers were informed of the importance for the children and their older adult partners. The feasibility was reiterated in that it would not cost the school any money and participant and school incentives would be rewarded (e.g., grand prize $50 gift certificates for athletic shoes for each partner, and the Heart Power!™ kit for the school future use). Resource challenges included training nurse practitioners and student nurse participants, and space.

Intervention. Problems were identified with the implementation and measurement of the program that may have biased the results and decreased its potential effectiveness. Problems were associated with consent requirements, variability in teacher support, student absenteeism and data collection procedures. A major weakness in the implementation was its lack of uniformity. Ideally all intervention students and partners would receive the intervention the same way, however, this was not the case. Content was essentially the same, but the physical space and numbers of students per session varied at the teacher's discretion.

The respective teachers embraced the program to varying degrees. One principal and one vice principal attended portions of the activities. It was understood by the administration that the teachers would not have to conduct the workshops because of already full schedules and set curriculum, although their attendance was encouraged in order for them to be able to replicate the workshops in the future. The classroom teacher in intervention school B was consistently enthusiastic (e.g., displayed the Family Health Trees throughout the school halls giving prizes for the most original trees; had the students journal after each workshop). It follows that significant changes in knowledge for physical activity and nutrition were noted in this school and more workshop activities were completed with the partners.

Two nurse practitioners (NPs) who were responsible for the school-based clinics participated in the data collection. A variety of training methods were used including one-on-one didactic sessions with written overviews of each lesson and instructions for test administration. Reading levels of the students were varied, and this was likely the case with their older adult partners. The nurse practitioner assigned to the respective school's clinic administered the instruments to the participating students, however, the classroom conditions and the style of presentation varied despite the use of a script. Two classes were combined in one classroom or an auditorium which on one hand made for better control by the teachers but did not create an optimal environment for students. This setting mirrored that used with standardized testing which in itself could be anxiety producing for the students. Different teachers were present for the pretest and posttest in School A and the control school. Students in school A also were repeatedly called out of the classroom for various functions.

School-wide challenges were largely due to timing. The timing, duration, and space requirements were presented well in advance with contact information. However, on several occasions the workshops had to be rescheduled on very short notice due to conflicts with other activities.

Student-level challenges began with obtaining consents and for recruiting their adult partners. Maintaining student interest in evaluation activities was problematic especially when the regular teacher was absent. Incentives were provided for each student with bigger incentives for those who completed most of the activities (for each completed activity, a card was placed in a special box for a grand prize drawing). Keeping track of students who attended each workshop was difficult, especially when extra students would be invited to attend by the teachers (students with special needs). Several students participated in the posttest procedures only (these were not included in the analysis) and others appeared to exhibit sporadic interest. The need for flexibility on the part of the investigator proved to be critical.

A major factor in the minimal results was insufficient dose. Studies suggest that 15-20 hours of health education programming per year should be sufficient to produce significant behavioral and physiological cardiovascular risk factor effects (Resnicow, Cross, & Wynder, 1993). The planned doses of the classroom workshops included Healthy Heart, Healthful Choices, Physical Activity, and Tobacco-Free workshops lasting one to one and one-half hours. Although the tobacco-free workshop was not specifically targeted to the outcome behaviors, the content was deemed appropriate by the investigator and the school faculty. Previous material was reviewed at the beginning of each class and

integrated into the lesson. A positive correlation was found between the numbers of workshops completed and the total attitude score of the HHQ. With additional workshops and other intergenerational activities, self-efficacy scores and the stage of change of physical activity and heart healthy eating may improve.

There was no specific evaluation protocol to monitor the program implementation and participation which would allow for examination of dose-response as well as possible type III error (incorrectly attributing lack of intervention effects to the intervention rather than to inadequate implementation) (Resnicow, Robinson, & Frank, 1996). The magnitude or absence of program effects may be related to inconsistency in environmental and teacher support.

Culturally-appropriate interventions. There is a dearth of information on the development of effective health education interventions with members of underserved populations. The variability among members of underserved populations is an issue (Marín et al., 1995). For example, back women are less preoccupied with dieting and somewhat more tolerant of obesity than white women. The social environment of black women is less negative about obesity than might be commonly assumed based on data for white women; being overweight is not synonymous with being unattractive (Kumanyika, Wilson, & Guilford-Davenport, 1993).

Prior to initiating this study, community organizations (e.g., Community Building in Partnership and Visions for Health Consortium) were contacted. Community members actively participate in this organization which addresses needs of the Sandtown-Winchester community. A meeting was held with members of the partnership group with

components of the program shared. The executive director expressed interest in having community health workers use the program in the community, however, the outcome of this is unknown to date. In view of the barriers to physical activity and heart healthy eating identified by the students and their partners, a community-based intervention soliciting support from local agencies is indicated.

Instrumentation. The analysis is limited by the problems associated with the reliability and validity of self-report measures, particularly newly developed/adapted instruments. The inability to examine characteristics of the older adult partner within the context of the family is also missing. The only measure of the quality of interaction between the student and his/her partner was the frequency of contact between them. Direct observation was not used to measure food choices or physical activity due to the necessity of recruiting and training observers, increased cost, and the possible disruption of the classroom setting.

Correlations between self-reports and observational measures would increase validity. Physiological measures are objective with less bias and track through adulthood (Harlan, 1989). The resting heart rate is an indirect measure of aerobic capacity and thus related to physical activity. This may be an appropriate non-invasive measure in the school-age population (Killen et al., 1989).

Since measurement precision is positively related to instrument reliability, program effects may have been muted by weaknesses in instrumentation. The instruments were discussed prior to administration with the students, and questions clarified by the nurse practitioner. Grandparent partners had to interpret the instruments with the help of their student which may have limited understanding. Interpretation of the observed program effects for self-reported physical activity must be tempered by the possibility that students'

responses to the checklist may reflect their knowledge and attitudes (social desirability bias) and or preferences in lieu of actual participation. The validity of the 24-hour food record would also be enhanced with additional interviews and cafeteria observations. Budgetary and time constraints prohibited this. Several students were interviewed post completion of the PAR and asked what activities they had done the previous weekday. Their responses mirrored those checked, however, findings on direct observation would probably have been different.

Analysis. The unit of design and analysis pose some problems (Murray, Hannan, & Zucker, 1989). The individual student/grandparent partner responses were analyzed whereas the unit of randomization was the school. This conflict is due in part to the insufficient degrees of freedom for analysis at the school level. The basic problem is estimating the degree of error (McKinlay, Stone, & Zucker, 1989). Lack of randomization, variability in teacher participation, and high untracked absenteeism in the intervention schools limit the internal and external validity of this study. Cronbach's alpha levels of knowledge and other subscales were lower than the usual accepted limit of 0.7 which limits internal validity. Lower reliability coefficients are more acceptable in new instruments in early stages of research (Nunnally & Bernstein, 1994; Pedhazur & Schmelkin, 1991). The analysis is also limited by the lack of any measure of the nature or quality of the interaction between the student and adult partner.

Recommendations

High-risk individuals from diverse cultures should be targeted with programs delivered in concert with population-based programs, i.e., partner with the community at large. This could include training community members or school volunteers to conduct the

workshops. Interviewing family members by phone if available to validate the 24-hour food record and PAR plus the student's sharing of activities would be advantageous. Providing food that represents the ethnicity of the study population (as well as being prepared in as healthy of a manner as possible) is always a crowd-pleaser. Students exposed to "heart healthy snacks" (e.g., fresh vegetables, yogurt dip, pretzels, and fruit) appeared delighted with the choices if leftovers was any indication. Optimally, a school health promotion team would be desirable to include representatives from the health center, teachers, administration, parent, and the community).

Including gender-specific activities in the workshops might encourage the participation of boys and perhaps older male partners. Computer-based activities may hold the interest of select students and could be shared with the school community at large.

The difficulties of assisting people to initiate and maintain heart healthy behaviors are well-recognized. While difficult to achieve, behavior should be the primary outcome rather than knowledge, attitudes, or self-efficacy. The small number of older adult partners and the short duration of intervention made it unlikely that statistically significant group changes would be detected. Self-monitoring of behavior can be reactive in that students in the control group may change their behaviors on the basis of becoming aware of them (Nader et al.,1983). Control subjects may change in part as a result of exposure to the questionnaires and self-monitoring forms (Hawthorne effect). Even with this operating, the intervention group reported a greater change in knowledge indicating a significant treatment effect from the intervention.

Focus groups representing both the older adult partner and student generations from the target community should review extant workshops and instruments (Krueger & King, 1998). The group members would also be valuable in clarifying barriers to physical activity and heart healthy eating within the community. Training teachers and/or community health workers to deliver health promotion programs in nutrition and physical activity using programs that are culturally sensitive and focus on skill-building is necessary in achieving national health objectives in school-based settings.

The most appropriate educational program (dose, timing) needs exploration. The development of an efficient and acceptable model to enhance affordability and teacher acceptance is still warranted. The majority of studies utilize a lengthy intervention to assure change that is impractical for most underserved areas with limited resources. Smaller and more frequent interventions over longer periods of time may be one approach.

Reading achievement has been shown to be significantly correlated with: (1) intelligence; (2) socioeconomic status of the family; (3) parental attitudes; and (4) the nature of the home environment. Therefore, health education research should investigate the relationship between program outcomes and reading achievement (Sunseri et al., 1983). Readability tests were performed and common terms used in developing the questionnaires. However, the ability of students and older adults to recall and report past use may be an issue.

Reductions in risk factors for children may require more intensive individualized or comprehensive interventions. It may be more important to modify dietary and physical activity behaviors that may lead to the development of lifelong patterns than to alter

physiologic risk factors at these ages (Webber et al., 1996). The impact of the program on other cohorts of children may be enhanced if the intervention occurred in the 4th grade allowing the older children to act as role models for the younger children for two years.

Implications

This study focused on the major health behaviors of eating and physical activity. This small cluster of behaviors may serve as a foundation for approaches to other health behaviors besides cardiovascular health. Continued emphasis should be placed on theory-based interventions focusing on skill-building appropriate for the participants developmental stage. Small efficacy studies within the school environment have potential for diffusion to the community as supported by the sharing of information across generations. Providers should serve as a role models and ideally should be members of the community. Nurses can play a pivotal role in training the community members and provide instrumental and emotional support throughout the intervention.

Summary.

Schools play an important role in helping to meet the nation's objectives for health-related physical activity and heart healthy diets. This study supports the results of other studies which demonstrated that school-based cardiovascular health promotion can facilitate heart healthy knowledge in children. The effectiveness of these programs is related to the duration of interventions, community and school environmental support, and the reliability and validity of instruments. The partner intervention may not have been sufficiently implemented by the student or the partner, however, the sharing of information

did take place as evidenced by the completion of pre and posttests, the Family Health Trees, and the workshop activity cards.

Since CVD risk factors have their origins early in life, early interventions through school-based programs represent a promising means of teaching an entire family (or kinship network) in a community to modify dietary and physical activity behaviors. The relationship between the level of adult participation and the knowledge, attitudes, and self-efficacy of the children may be precursors to behavior change. The challenge is to find the minimal effective dose of an intergenerational intervention that is culturally appropriate, cost-effective, and theory-driven.

References

*included in meta-analysis

Abelin, T., Brzezinski, Z.J., & Carstairs, V.D.L. (Eds.). (1987). Measurement in health promotion and protection. Copenhagen: World Health Organization Regional office for Europe.

Ahijevych, K., & Bernhard, L. (1994). Health-promoting behaviors of African-American women. Nursing Research, 43(2), 86-89.

Ainsworth, B.E., Haskell, W.L., Leon, A.S., Jacobs, D.R., Montoye, H. J., Sallis, J.F., & Paffenberger, R.S. (1993). Compendium of physical activities: Classification of energy costs of human activities. Medicine and Science in Sports and Exercise, 25 (1), 71-80.

Allensworth, D. (1996). Cardiovascular objectives for youth in Healthy People 2000: Update on the status of risk factors. Journal of Health Education-September/October 1996 supplement,27(5), S-17-S-23.

American Diabetes Association & The American Dietetic Association. (1995). Exchange lists for weight management (Rev.). Alexandria, VA: American Diabetes Association.

American Heart Association (1994). Heart and stroke facts: 1995 statistical supplement. Dallas: AHA.

American Heart Association Schoolsite Program (1996[a]). Heart Power. Dallas: AHA.

American Heart Association Schoolsite Program (1996[b]). Heart power! From research to reality. Dallas: AHA.

Arvidson, C.R. (1990). Children's cardiovascular health promotion attitude scale: An instrument development. Doctoral dissertation, Texas Women's University (UMI #9119225).

Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, NJ: Raven Press.

Baranowski, T. (1992). Interpersonal models for health behavior intervention with minority populations: Theoretical, methodological, and pragmatic issues. In: D.M. Becker,, D.R. Hill,, J.S. Jackson, D.M. Levine, F.A. Stillman, & S.M. Weiss (Eds.) Health behavior research in minority populations: Access, design, and implementation. Bethesda, MD: USDHHS, NIH Publication No. 92-2965.

Baranowski, T., Domel, S., Gould, R., Baranowski, J., Leonard, S., Treiber, F., & Mullis, R. (1993). Increasing fruit and vegetable consumption among 4th and 5th grade students: Results from focus groups using reciprocal determinism. Journal of Nutrition Education, 25(3), 114-120.

Baranowski, T.& Nader, P.R. (!985). Family health behavior. In D.C. Turk, & R.D. Kerns (Eds.), Health, illness, and families. (pp. 51-80). New York: Wiley.

Baranowski, T., Perry, C.L., & Parcel, G.S. (1997). How individuals, environments, and health behavior interact - social cognitive theory. In K. Glanz, K., F.M. Lewis, & B. K. Rimer (Eds.), Health behavior and health education (2nd ed., pp. 153-177). San Francisco: Jossey-Bass.

Becker, M. H. (Ed.). (1974). The health belief model and personal health behavior. Health Education Monographs, 2.

Berenson, G.S. (Ed.). (1986). Causation of cardiovascular risk factors in children - Perspectives on cardiovascular risk in early life. New York: Raven Press.

Berry, J.M., & West, R.L. (1993). Cognitive self-efficacy in relation to personal mastery and goal setting across the life span. International Journal of Behavioral Development, 16(2), 351-379.

Best, J.A. (1989). Intervention perspectives on school health promotion research. Health Education Quarterly, 16(2), 299-306.

Billingsley, A. (1968). Black families in America. Englewood Cliffs, NJ: Prentice-Hall.

Billingsley, A. (1992). Climbing Jacob's ladder. New York: Simon & Schuster.

Blumenthal, S.J., Matthews, K., & Weiss, S.M. (Eds) (1994). New research frontiers in behavioral medicine: Proceedings of the national conference. Washington, DC: U.S. Government Printing Office, NIH Pub No. 94-3772.

Booth, M.L., Macaskill, P., Owen, N., Oldenburg, B., Marcus, B.H., & Bauman, A. (1993). Population prevalence and correlates of stages of change in physical activity. Health Education Quarterly, 20(3), 431-440.

Breitmayer, B.J., Ayres, L., & Knafl, K.A. (1993). Triangulation in qualitative research: Evaluation of completeness and confirmation purposes. Image, 25(3), 237-243.

Burton, L.M. (1992). Black grandparents rearing children of drug-addicted parents: Stressors, outcomes, and social service needs. The Gerontologist, 32(6), 744-751.

Burton, L.M., Dilworth-Anderson, P. (1991). Intergenerational family roles of aged Black Americans. Marriage and Family Review, 16, 311-330.

*Bush, P.J., Zuckerman, A.E., Taggart, V.S., Theiss, P.K., Peleg, E.O., & Smith, S.A. (1989). Cardiovascular risk factor prevention in black school children: The "Know your Body" evaluation project. Health Education Quarterly, 16(2), 215-227.

Chatters, L.M. & Jayakody, R. (1995). Commentary: Intergenerational support within African-American families: concepts and methods. In: V.L. Bengtson, K.W. Schaie, & L.M. Burton (Eds.), Adult intergenerational relations (pp. 79-96). New York: Springer.

*Coates, T. J., Jeffery, R.W., & Slinkard, L.A. (1981). Heart healthy eating and exercise. Introducing and maintaining changes in health behaviors. American Journal of public Health, 71(1), 15-23.

Cohen, D. (1989). Intergenerational program research to refine theory and practice. In: Newman, S., & Brummel, S.W. (Eds.) Intergenerational programs., 217-230. Binghamton, NY: Haworth Press.

Cohen, J. (1977). Statistical power analysis for behavioral sciences, (Rev. ed.). NY: Academic Press.

*Cohen, R., Felix, M., & Brownell, K. (1989). The role of parents and older peers in school-based cardiovascular prevention programs: Implications for program development. Health Education Quarterly, 16(2), 245-253.

Cook, T. D., & Campbell, D.T. (1979). Quasi-experimentation - Design & analysis issues for field settings. Boston: Houghton Mifflin.

Cooper, H. & Hedges, L.V. (1994). The handbook of research synthesis. New York: Russell Sage Foundation.

Craig, S., Goldberg, J., & Dietz, W.H. (1996). Psychosocial correlates of physical activity among fifth and eighth graders. Preventive Medicine, 25, 506-513.

*Davis, S.M., Lambert, L.C., Gomez, Y., & Skipper, B. (1995). Southwest cardiovascular curriculum project: Study findings for American Indian elementary students. Journal of Health Education, 26(2), S-72-81.

Delaney, F.G. (1994). Nursing and health promotion: Conceptual concerns. Journal of Advanced Nursing, 20, 828-835.

DeVellis, R.F., DeVellis, B.M., Blanchard, L.W., Klotz, M.L., Luchok, K., & Voyce, C. (1993). Development and validation of the parent health locus of control. Health Education Quarterly, 20(2), 211-225.

Dzewaltowski, D.A. (1989). Toward a model of exercise motivation. Journal of Sport and Exercise Psychology, 11, 251-269.

Dixon, S.D. & Stein, M.T. (1992). Encounters with children: Pediatric behavior and development (2nd ed.). St. Louis: C.V. Mosby.

Edelman, C.L. & Mandle, C.L. (1994). Health promotion throughout the life span (3rd ed.). St. Louis: C.V. Mosby.

Edmundson, E., Parcel, G.S., Feldman, H.A., Elder, J., Perry, C.L., Johnson, C.C., Williston, B.J., Stone, E.J., Yang, M., Lytle, L., & Webber, L. (1996). The effects of the

child and adolescent trial for cardiovascular health upon psychosocial determinants of diet and physical activity. Preventive Medicine, 25, 442-454.

Epstein, L.H., Valoski, A., Koeske, R., & Wing, R.R. (1989). Family-based behavioral weight control in obese young children. Journal of the American Dietetic Association, 86(4), 481-484.

Fors, S.W., Owen, S., Hall, W.D., McLaughlin, & Levinson, R. (1989). Evaluation of a diffusion strategy for school-based hypertension education. Health Education Quarterly, 16(2), 255-261.

Franz, M.J. (1993). Exchanges for all occasions (3rd ed.). Minneapolis, MN: Chronimed Publishing.

Frerichs, R.R., Srinivasan, S.R., Webber, L.S., & Berenson, G.S. (1976). Serum cholesterol and triglyceride levels in 3,446 children from a biracial community. Circulation, 54(2), 302-309.

Fuller-Thomson, E., Minkler, M., & Driver, D. (1997). A profile of grandparents raising grandchildren in the United States. The Gerontologist, 37(3), 406-411.

Gidding, S.S., Deckelbaum, R.J., Strong, W., Moller, J.H. (1995). Improving children's heart health: A report from the American Heart Association's Children's Heart Health Conference. Journal of School Health, 65(4), 129-132.

Gilmer, M.J., Speck, B.J., Bradley, C., Harrell, J.S., & Belyea, M. (1996) The youth health survey: Reliability and validity of an instrument for assessing cardiovascular health habits in adolescents. Journal of School Health, 66(3), 106-111.

Glanz, K., Lewis, F.M., Rimer, B.K. (1997).Health behavior and health education (2nd ed.). San Francisco: Jossey-Bass.

Harlan, W.R. (1989). A perspective on school-based cardiovascular research. Health Education Quarterly, 16(2), 151-154.

Hayman, L.L., Weill, V.A., Tobias, N.E., Stashinko, E., & Meninger, J.C. (1988). Which child is at risk for heart disease? Maternal Child Nursing, 13,328-333.

Hays, W.C. & Mindel, C.H. (1973). Extended kinship relations in Black and white families. Journal of Marriage and the Family. February, 51-73.

Hill, R.B. (1972). The strength of black families. NY: National Urban League.

Hill, R.B. (1993). Research on the African-American family. Westport, CN: Auburn House.

*Hopper, C., Gruber, M., Munoz, K., & MacConnie, S. (1996). School-based cardiovascular exercise and nutrition programs with parent participation. Journal of Health Education-September/October Supplement, 27(5), S-32-39.

Hunt, S.C., Williams, R.R., & Barlow, G.K. (1986). A comparison of positive family history definitions for defining risk of future disease. Journal of Chronic Disease, 39(10), 809-821.

Jackson, J. (1986). The extended family - Black grandparents: Who needs them? In: R. Staples, The Black family - essays and studies (3rd ed.). Belmont, CA: Wadsworth.

Janz, N.K. & Becker, M.H. (1984). The health belief model: A decade later. Health Education Quarterly, 11(1), 1-47

*Johnson, C.C., Nicklas, T.A., Albeir, M.L., Harsha, D.W., Mott, D.S., Hunter, S.M., Wattigney, W., & Berenson, G.S. (1991). Cardiovascular intervention for high-risk families: The Heart Smart Program. Cardiovascular Health Promotion, 84,(11), 1305-1312.

Joslin, D. & Brouard, A. (1995). The prevalence of grandmothers as primary caregivers in a poor pediatric population. Journal of Community Health, 20(5), 383-401.

Kauffman, K.S. (1994). The insider/outsider dilemma: Field experience of a white nurse researcher "getting in" a poor African-American community. Nursing Research, 43(3), 179-183.

Kavanagh, K.H. (1994). Family: Is there anything more diverse? Pediatric Nursing, 20(4), 423-426).

Kavanagh, K.H., Harris, R.M., & Hart, M. (1996). Personal relationships and HIV/AIDS of drug dependent women. Unpublished manuscript.

Kelder, S.H., Perry, C.L., Peters, R.J., Lytle, L.L., & Klepp, K-I. (1995). Gender differences in the class of 1989 study: The school component of the Minnesota heart health program. Journal of Health Education, 26(2), S-36-44.

Kennedy, E. (1996). Healthy meals, healthy food choices, healthy children: USDA's team nutrition. Preventive Medicine, 25, 56-60.

Killen, J.D., Robinson, T.N., Telch, M.J., Saylor, K.E., Maron, D.J., Rich, T., Bryson, S. (1989). The Stanford adolescent heart health program. Health Education Quarterly, 16(2), 263-283.

Kirscht, J.P. (1983). Preventive health behavior. A review of research and issues. Health Psychology, 2(3), 277-301.

Klesges, R.C., Coates, T.J., Brown, G., Sturgeon-Tillisch, J., Moldenhauer-Klesges, L.M., Holzer, B., Woolfrey, J., & Vollmer, J. (1983). Parental influences on children's eating behavior and relative weight. Journal of Applied Behavior Analysis, 16(4), 371-378.

Krueger, R.A., & King, J.A. (1998). Involving community members in focus groups. Thousand Oaks, CA: Sage.

Kulbok, P.A. & Baldwin, J.H. (1992). From preventive health behavior to health promotion: Advancing a positive construct of health. Advances in Nursing Science, 14(4), 50-64.

Kumanyika, S., Wilson, J.F., Guilford-Davenport, M. (1993). Weight-related attitudes and behaviors of black women. Journal of the American Dietetic Association, 93(4), 416-422.

LaFargue, J.P. (1980). A survival strategy: Kinship networks. Aerican Journal of Nursing, September, 1636-1640.

Lankshear, A.J. (1993). The use of focus groups in the study of attitudes to student nurse assessment. Journal of Advanced Nursing, 18, 1986-1989.

Leininger, M.M. (Ed.). Culture care diversity and universality: A theory of nursing. New York: National League for Nursing.

Lenfant, C. (1995). Improving the health of America's youth: The NHLBI perspective. Journal of Health Education,26(2), 6-8.

*Luepker, R.V., Perry, C.L., McKinlay, S.M., Nader, P.R., Stone, E.J., Webber, L.S., Elder, J.P., Feldman, H.A., Johnson, C.C., Kelder, S.H., Wu, M. (1996). Outcomes of a field trial to improve children's dietary patterns and physical activity. Journal of the American Medical Association, 275(10), 768-776.

Lytle, L.A. (1996, April). Challenges in Conducting Health Promotion in Schools: Experiences from CATCH. Paper presented at the meeting of the Society of Behavioral Medicine, Washington, DC.

Lytle, L.A., Nichman, M.Z., Obarzanek, E., Glovsky, E., Montgomery, D., Nicklas, T., Zive, M., Feldman, H. (1993). Validation of 24-hour recalls assisted by food records in third grade. Journal of the American dietetic association, 93(12), 1431-1436.

Maibach, E. & Murphy, D.A. (1995). Self-efficacy in health promotion research and practice: Conceptualization and measurement. Health Education Research, 10(1), 37-50.

Marín, G., Burhansstipanov, L., Connell, C.M., Gielen, A.C., helitzer-Allen, Lorig, K., Morisky, D.E., Tenney, M., Thomas, S. (1995). A research agenda for health education among underserved populations. Health Education Quarterly, 22(3), 346-363.

Martin, J.M. & Martin, E.P. (1985). The helping tradition in the black family and community. Silver Spring, MD: National Association of Social Workers.

Mason, J.O., Williams, R., & Weber, N. (1983). Family health trees: Targeting prevention strategies. Utah State Medical Association Bulletin, 31, 14-16.

McAdoo, H.P. (1980). Black mothers and the extended family support network. In: L.F. Rodgers-Rose (Ed.). The black woman (pp. 125-159). Beverly Hills, CA: Sage.

McAdoo, H.P. (Ed.). (1988). Changes in the formation and structure of Black families: The impact on Black women. Wellesley College Center for Research on Women. Working paper # 182.

McArdle, W.D., Katch, F.I., & Katch, V.L. (1996). Exercise physiology (4th ed.). Baltimore: Williams & Wilkins.

McDougall, H.A. (1993). Black Baltimore - A new theory of community. Philadelphia: Temple University.

McDowell, I. & Newell, C. (1987). Measuring health: A guide to rating scales and questionnaires. New York: Oxford University Press, Inc.

McGill, H.C., McMahan, A., Malcom, G.T., Oalmann, M.C., Strong, J.P. (1997). Effects of serum lipoproteins and smoking on atherosclerosis in young men and women. Arteriosclerosis, thrombosis, and vascular biology, 17(1), 95-106.

McGinnis, J.M. (1994). Disease prevention/health promotion - The role of behavioral research in national health policy. In S.J. Blumenthal,, K. Matthews, & S.M. Weiss (Eds.). New research frontiers in behavioral medicine (pp. 217-222). Washington, DC: NIH

McGinnis, J.M. (1993). The year 2000 initiative: implications for comprehensive school health. Preventive Medicine, 22, 493-498.

McGoldrick, M., Pearce, J.K., & Giordano (Eds.). (1982). Ethnicity and family therapy. New York: Guilford Press.

McGraw, S.A., McKinlay, J.B., Crawford, S.A., Costa, L.A., & Cohen, D.L. (1992). Health survey methods with minority populations: Some lessons learned from recent experience. In: D.M. Becker, D.R. Hill, J.S. Jackson, ,D.M. Levine, F.A. Stillman, & S.M. Weiss (Eds.). Health behavior research in minority populations: Access, design, and implementation. Bethesda, MD: USDHHS, NIH Publication No. 92-2965.

McKenzie, T.L., Nader, P.R., Strikmiller, P.K., Yang, M., Stone, E.J., Perry, C.L., Taylor, W.C., Epping, J.N., Feldman, H.A., Luepker, R.V., & Kelder, S.H. (1996). School physical education: effects of the child and adolescent trial for cardiovascular health. Preventive Medicine, 25, 423-431.

McKinlay, S.M., Stone, E.J., & Zucker, D.M. (1989). Research design and analysis issues. Health EducationQuarterly, 16(2), 307-313.

McMurray, R.G., Bradley, C.B., Harrell, J.S., Bernthal, P.R., Frauman, A.C., & Bangdiwala, S.L. (1993). Parental influences on childhood fitness and activity patterns. Research Quarterly for Exercise and Sport, 64(3), 249-255.

Mertz, W. (1992). Food intake measurements: Is there a "gold standard"? Journal of the American Dietetic Association, 92(12), 1463-1465.

Mindel, C.H., Habenstein, R.W., & Wright, R. (Eds.). (1988). Ethnic families in America - Patterns and variations (3rd ed.).Englewood Cliffs, NJ: Prentice-Hall.

Morrison, J.A., Payne, G., Barton, B.A., Khoury, P.R., & Crawford, P. (1994). Mother-daughter correlations of obesity and cardiovascular disease risk factors in black and white households: The NHLBI growth and health study. American Journal of Public Health, 84(11), 1761-1767.

Murray, D.M., Hannan, P.J., & Zucker, D.M. (1989). Analysis issues in school-based health promotion studies. Health Education Quarterly, 16(2), 315-320.

Nader. P.R.,, Baranowski, T., Vanderpool, N.A., Dunn, K., Dworkin, R., & Ray, L. (1983). The family health project: cardiovascular risk reduction education for children and parents. Developmental and Behavioral Pediatrics, 4(1), 3-10.

*Nader, P.R., Sallis, J.F., Patterson, T.L., Abramson, I.S., Rupp, J.W., Seen, K.L., Atkins, C.J., Roppe, B.E., Morris, J.A., Wallace, J.P., Vega, W.A. (1989). A family approach to cardiovascular risk reduction. Results from the San Diego Family Health Project. Health Education Quarterly, 16(2), 229-244.

Nader, P.R., Sellers, D.E., Johnson, C.C., Perry, C.L., Stone, E.J., Cook, K.C., Bebchuk, J., and Luepker, R.V. (1996). The effect of adult participation in a school-based family intervention to improve children's diet and physical activity: the child and adolescent trial for cardiovascular health. Preventive Medicine, 25,455-464.

National Heart Lung & Blood Institute (1994). Report of the working group on research in coronary hear disease in blacks. Sprinfield, VA: U.S. Dept. Of Commerce, National Technical Information Service.

National Institute of Nursing Research. (1993). Health promotion for older children and adolescents. Bethesda, MD: USDHHS.

Newman, S. (1989). A history of intergenerational programs. In In: S. Newman, & S.W. Brummel,(Eds.). Intergenerational programs. (pp. 1-16). Binghamton, NY: Haworth Press.

Nicklas, T.A., Webber, L.S., Johnson, C.C., Srinivasan, S.R., & Berenson, G.S. (1995). Foundations for health promotion with youth: A review of observations from the Bogalusa heart study. Journal of Health Education, 26(2), S-18-26.

Nicklas, T.A., Webber, L.S., Srinivasan, S.R., Berenson, G.S. (1993). Secular trends in dietary intakes and cardiovascular risk factors in 10-year-old children: the Bugalusa Heart Study (1973-1988). American Journal of Clinical Nutrition,57, 930-937.

Nunnally, J.C., & Bernstein, I.H. (1994). Psychometric theory (3rd ed.). New York: McGraw-Hill.

O'Brien, K. (1993). Using focus groups to develop health surveys: An example from research on social relationships and AIDS-preventive behavior. Health Education Quarterly, 20(3), 361-372.

Parcel, G.S., Simons-Morton, B., O'Hara, N.M., Baranowski, T., & Wilson, B. (1989). School promotion of healthful diet and physical activity; impact on learning outcomes and self-reported behavior. Health Education Quarterly,16(2), 181-199.

Pate, R.R., Pratt, M., Blair, S.N., Haskell, W.L., Macera, C.A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G.W., King, A.C., Krists, A., Leon, A.S., Marcus, B.H., Morris, J., Paffenberger, R.S., Patrick, K., Pollock, M.L., Rippe, J.M., Sallis, J., & Wilmore, J.H. (1995). Physical activity and public health. Journal of the American Medical Association, 273(5), 402-407.

Pedhazur, E.J., & Schmelkin, L.P. (1991). Measurement, design, and analysis - An integrated approach. Hillsdale, NJ: Lawrence Erlbawn

Pender, N.J. (1996). Health promotion in nursing practice, 2rd ed., Stamford, CN: Appleton & Lange.

Pender, N.J., Walker, S.N., Sechrist, K.R., & Frank-Stromborg (1990). Predicting health-promoting lifestyles in the workplace. Nursing Research, 39(6), 326-332.

Perry, C.L., Luepker, R.V., Murray, D.M., Hearn, M.D., Halper, A., Dudovitz, B., Maile, M.C., & Smyth, M. (1989). Parent involvement with children's health promotion: A one-year follow-up of the Minnesota Home Team. Health Education Quarterly, 16(2), 171-180.

Perry, C.L., Parcel, G.S., Stone, E., Nader, P., McKinlay, S.M., Luepker, R.V., & Webber, L.S. (1992). The child and adolescent trial for cardiovascular health (CATCH): Overview of the intervention program and evaluation methods. Cardiovascular risk factors, January, 36-44.

Perry, C.L., Stone, E.J., Parcel, G.S., Ellison, R.C., Nader, P.R., Webber, L.S., & Leupker, R.V. (1990). School-based cardiovascular health promotion: The child and adolescent trial for cardiovascular health (CATCH). Journal of School Health, 60, 406-413.

*Petchers, M.K., Hirsch, E.Z., Bloch, B.A. (1987). The impact of parent participation in the effectiveness of a heart health curriculum. Health Education Quarterly, 14(4), 449-460.

Polit, D.F. & Hungler, B.P. (1995). Nursing research (5th ed.). Philadelphia: J.B. Lippincott Co.

Porter, C.P.,& Villarruel, A.M. (1993). Nursing research with African American and Hispanic people: Guidelines for action. Nursing Outlook, 41(2), 59-67.

Prochaska, J.O., DiClemente, C.C., & Norcross, J.C. (1992). In search of how people change. American Psychologist, 47(9), 1102-1114.

Prochaska, J.O., Redding, C.A., Evers, K.E. (1997). The transtheoretical model and stages of change. In K. Glanz, F.H. Lewis, & B.K. Rimer (Eds.), Health Behavior and health education - Theory, research and practice. San Francisco: Jossey-Boss.

Prochaska, J.O., Velicer, W.F., Rossi, J.S., Goldstein, M.G., Marcus, B.H., Rakowski, W., Fiore, C., Harlow, L.L., Redding, C.A., Rosenbloom, D., & Rossi, S.R. (1994). Stages of change and decisional balance for 12 problem behaviors. Health Psychology, 13(1), 39-46.

Reichardt, C.S. (1979). The statistical analysis of data from nonequivalent group designs. In T. D. Cook & D.T. Campbell (Ed.), Quasi-experimentation - Design & analysis issues for field settings (pp. 158-200). Boston: Houghton Mifflin.

Resnicow, K., Cross, D., & Wynder, E. (Winter, 1993). The Know Your Body program: A review of evaluation studies. Bulletin of the New York Academy of Medicine, 70(3), 188-207.

Resnicow, K., Robinson, T.N., & Frank, E. (1996). Advances and future directions for school-based health promotion research: commentary on the CATCH intervention trial. Preventive Medicine, 25, 378-383.

Rimer, B.K., Auslander, W., Affonso, D., Alpert, B., Baranowski, T., Bennett, G., Bone, L., Falkner, B., McBane-Sims, I., Prochaska, J., Rand, C., & Sussman, L. (1992). The role of theory in health behavior research in minority populations. In: D.M. Becker, D.R. Hill, J.S. Jackson, D.M. Levine, F.A. Stillman, & S.M. Weiss (Eds.). Health behavior research in minority populations: Access, design, and implementation. Bethesda, MD: USDHHS, NIH Publication No. 92-2965.

Rogers, J. and Holloway, R. (1990). Completion rate and reliability of the self-administered genogram (SAGE). Family Practice- An International Journal, 7(2), 149-151.

Rogers, J.C., Rohrbaugh, M., & McGoldrick, M. (1992). Can experts predict health risk from family genograms? Family Medicine, 24(3), 209-215.

Rose, M.A. (1992). Evaluation of a peer education program on heart disease prevention with older adults. Public Health Nursing, 9(4), 242-247.

Rosenstock, I.M., Strecher, V.J., & Becker, M.H. (1988). Social learning theory and the health belief model. Health Education Quarterly, 15(2), 175-183.

Sallis, J.F., Buono, M.J., Roby, J.J., Micale, F.G., & Nelson, J.A. (1993). Seven-day recall and other physical activity self-reports in children and adolescents. Medicine and Science in Sports and Exercise, 25(1), 99-108.

Sallis, J.F., Condon, S.A., Goggin, K.J., Roby, J.J., Kolodny, B. & Alcaraz, J.E. (1993). The development of self-administered physical activity surveys for 4th grade students. Research Quarterly for Exercise & Sport, 64(1), 25-31.

Sallis, J.F., Pinski, R.B., Grossman, R.M., Patterson, T.L., & Nader, P.R. (1988). The development of self-efficacy scales for health-related diet and exercise behaviors. Health Education Research, 3(3), 283-292.

Sallis, J.F., Strickmiller, P.K., Harsha, D.W., Feldman, H.A., Ehlinger, S., Stone, E.J., Williston, B.J., & Woods, S. (1996). Validation of interviewer-and self-administered physical activity checklists for fifth grade students. Unpublished manuscript.

Sechrist, K.R., Walker, S.N., & Pender, N.J. (1987). Development and psychometric evaluation of the exercise benefits/barriers scale. Research in Nursing and Health, 10, 357-365.

Singer, F. (1991). Risk factors for coronary artery disease: taking the family history. American Heart Journal, March, 947-948.

Stack, C.B. (1974). All our kin. New York: Harper & Row.

Steptoe, A., Wijetunge, S., Doherty, S., Wardle, J. (1996). Stages of change for dietary fat reduction: associations with food intake, decisional balance and motives for food choice. Health Education Journal, 55, 108-122.

Stone, E.J., Baranowski, T., Sallis, J.F., & Cutler, J.A. (1995). Review of behavioral research for cardiopulmonary health: Emphasis on youth, gender, and ethnicity. Journal of Health Education, 26(2), S-9-17.

Stone, E.J., Perry, C.L., Luepker, R.V. (1989). Synthesis of cardiovascular behavioral research for youth health promotion. Health Education Quarterly, 16(2), 155-169.

Strecher, V.J., DeVellis, B.M., Becker, M.H., Rosenstock, I.M. (1986). The role of self-efficacy in achieving health behavior change. Health Education Quarterly, 13(1), 73-91.

Streiner, D.L. & Norman, G.R. (1989). Health measurement scales - A practical guide to their development and use. New York: Oxford University Press.

Sudarkasa, N. (1981). Interpreting the African heritage in Afro-American organization. In: McAdoo, H.P. (Ed). Black families. Beverly Hills, CA: Sage.

Sunseri, A.J., Alberti, J.M., Kent, N.D., Schoenberger, J.A., Sunseri, J.K., Amuwo, S., & Vickers, P. (1983). Reading, demographic, social and psychological factors related to pre-adolescent smoking and non-smoking behaviors and attitudes. Journal of School Health, 53(4), 257-263.

Taylor, H.L., Jacobs, D.R., Schucker, B., Knudsen, J., Leon, A.S., & Debacker, G. (1978). A questionnaire for the assessment of leisure time physical activities. Journal of Chronic Disease, 31, 741-755.

Taylor, R.J. (1986). Receipt of support from family among Black Americans - Demographic & behavioral differences. Journal of Marriage & Family, 48, February, 67-77.

University of Pittsburgh, University Center for Social and Urban Research. (1994). Connecting the generations: A guide to intergenerational resources. Washington, DC: AARP.

U.S. Department of Health and Human Services. (1991a). Healthy people 2000: National health promotion and disease prevention objectives for the year 2000. Washington, DC: US Government Printing Office.

U.S. Department of Health and Human Services. (1991b). Highlights of the report of the expert panel on blood cholesterol levels in children and adolescents. Washington, DC: Public Health Services, NIH Pub. No. 91-2731.

Walker, S.N., Sechrist, K.R., & Pender, N.J. (1985). The health-promoting lifestyle profile. Health Promotion Research Program, School of Nursing, Northern Illinois University, DeKalb, Illinois.

Walker, S. N., Sechrist, K.R., & Pender, N.J. (1987). The health-promoting lifestyle: Development and psychometric properties. Nursing Research, 36(2), 76-81.

Walker, S.N., Sechrist, K.R., & Pender, N.J. (1995). The Health Promoting Lifestyle Profile II. University of Nebraska Medical Center, College of Nursing.

Walker, S.N., Volkan, K., Sechrist, K.R., & Pender, N.J. (1988). Health-promoting lifestyles of older adults: Comparisons with young and middle-aged adults, correlates and patterns. Advances in Nursing Science, 11(1), 76-90.

Wallston, K. A., & Wallston, B. S. (1978). Development of the multidimensional health locus of control (MHLC) Scales. Health Education Monographs, 6(2), 160-170.

Waltz, C.F., Strickland, O.L., & Lenz, E.R. (1991). Measurement in nursing research, (3rd ed.) Philadelphia: F.A. Davis, Co.

Webber, L.S., Osganian, S.K., Feldman, H.A., Wu, M., McKenzie, T.L., Nichaman, M., Lytle, L.A., Edmundson, E., Cutter, J., Nader, P.R., & Luepker, R.V.(1996). Cardiovascular risk factors among children after a 2 ½-year intervention - The Catch study. Preventive Medicine, 25, 432-441.

Weitzel, M.H. (1989). A test of the health promotion model with blue collar workers. Nursing Research, 38(2), 99-104.

Wilkinson, D. (1993). Family ethnicity in America. In: H.P. McAdoo (Ed.). Family Ethnicity (pp. 15-59). Newberry Park, CA: Sage.

Williams, P.R., Hunt, S.C., Barlow, G.K., Chamberlin, R.M., Weinberg, A.D., Cooper, H.P., Carbonari, J.P., & Gotto, A.M. (1988). Health family trees: A tool for finding and helping young family members of coronary and cancer pedigrees in Texas and Utah. American Journal of Public Health, 78(10), 1283-1286.

Williams, R.L., Thomas, S.P., Young, D.O., Jozwiak, J.J., & Hector, M.A. (1991). Development of a health habits scale. Research in Nursing and Health, 14, 145-153.

Wilson, J.O. (1994) Intergenerational readings/resources, 1980-1994. (3rd ed.) Pittsburgh: Generations Together, University of Pittsburgh.

Wilson, M.N, (1986). The Black extended family: An analytical consideration. Developmental Psychology, 246-258.

Wilson, M.N. (1989). Child development in the context of the Black extended family. American Psychologist, 44(2), 380-385.

Winkelstein, M.L. & Feldman, R.H.L. (1993). Psychosocial predictors of consumption of sweets following smoking cessation. Research in Nursing and Health, 16, 97-105.

Winkleby, M.A., Flora, J.A., Kraemer, H.C. (1994). A community-based heart disease intervention: Predictors of change. American Journal of Public Health, 84(5), 767-772.

Wu, Y-W., Slakter, M.J. (1989). Analysis of covariance in nursing research. Nursing Research, 38(5), 306-308.

Zwiren, L.D. (1992). Children and exercise. In: Shepard, R.J., and Miller, H.S. (Eds). Exercise and the heart in health and disease. New York: Marcel Dekker.

Appendix A

CITY OF BALTIMORE

KURT L. SCHMOKE, Mayor

HEALTH DEPARTMENT

PETER BEILENSON, M.D., M.P.H., Commissioner
210 Guilford Avenue
Baltimore, Maryland 21202

February 21, 1997

Donna Behler
Geriatric Service/GRECC (512/18)
Veterans Affairs Medical Center
[redacted]

Dear Ms. Behler:

Re: "Intergenerational Health Promotion in African Americans"; #BCHD.E.97.01.14.03

Under the Expedited Review Process, I have again reviewed your application with the changes requested, find them to be complete, and make the following recommendation:

Approve the proposal as submitted. No changes.

Attached is a copy of the final Reviewer's Form. You should keep this letter on file with the original application to show that you have successfully met the requirements of the Department's Institutional Review Board.

Thank you for your attention to this process. I wish you luck with the completion of your doctoral thesis project and would be interested to hear about the results.

Sincerely,
[redacted]
Peter Beilenson, M.D., M.P.H.
Commissioner of Health
Committee Chair

llt
enc.

Mail correspondence to the Human Subjects Review Committee
210 Guilford Avenue, 2nd floor
Baltimore, MD 21202-3696

UNIVERSITY OF MARYLAND
AT BALTIMORE
INSTITUTIONAL REVIEW BOARD

655 W. Baltimore Street,
Baltimore, MD 21201-1559

BRB 14-016
email: [redacted]
voice: (410) 706-5037

Date: Thursday, January 30, 1997

TO: KAREN DENNIS, PhD/RN
ACADEMIC SERVICES
c/o Tammy Bremer, Research Svcs-151, VAMC

FROM: UMAB Institutional Review Board
ASSURANCE Number: **M1174-01NR**

RE: IRB PROTOCOL #1296035

"INTERGENERATIONAL HEALTH PROMOTION IN AFRICAN-AMERICANS"

Expires: 01/30/00 Report required *once* yearly

Response to correspondence dated: 01/24/97

This is to certify that the Institutional Review Board has reviewed your response to their queries and fully approved your protocol. The enclosed stamped consent form is valid until the next anniversary of this protocol.

You must notify the IRB if the project is altered in any way (change in location, personnel, number of subjects, age of subjects, or any change in research protocol). If you have any questions, please do not hesitate to contact the Office for Research Subjects by email ([redacted]*) or by phone (at* [redacted]*).*

[redacted]

Paul Fishman, M.D., Ph.D
Chairman, IRB

School of Nursing

UNIVERSITY OF MARYLAND
AT BALTIMORE

DEPARTMENT OF ACUTE AND LONG-TERM CARE

CONSENT FORM

TITLE OF RESEARCH: Intergenerational Health Promotion in African-Americans.

Investigators: Karen E. Dennis, PhD, RN, FAAN
Work Phone: (410)[redacted]
Donna M. Behler, RN, MSN, C-FNP
Work Phone: (410)[redacted]

PARTICIPANT'S NAME: _____

PURPOSE OF STUDY

We are interested in learning how children share health promotion information presented in school with their older relatives.

PROCEDURES

Your child will select a grandparent or older adult partner to take part in this project. The partner must be able to read or understand what is read to him/her. The partner must be able to walk without assistance and eat most foods. You are asked to help the student complete The Family Health Tree. Both the student and the grandparent partner will complete a Heart Healthy Questionnaire, a Physical Activity record, and a 24-hour food record on two occasions.

The student will take part in a 2- to 4-week program scheduled about one hour per week during regular classroom time. Heart Power™ was introduced July, 1996 following several years of research by the American Heart Association. It was developed for the upper elementary school student. Topics relate to health promotion and reducing cardiovascular risk factors. Classes include: Heart Healthy (What the heart does, how the heart and lungs work...); Healthful Choices (food choices, eating plans, feelings about food, peer pressure, family influences...); Physical Activity (heart health fitness achieved, activity worksheets); and Tobacco Free (effects of smoking, health risks, peer pressure..) A variety of educational materials will be provided. Take-home activities will be given to share with family members. The classes will be presented by Nurse Practitioners and/or nursing students from the School of Nursing, University of Maryland at Baltimore.

Questionnaires. Your child will be asked to fill outa questionnaire to fill out about eating and physical activity. There are no right or wrong answers and all responses are confidential. Each questionnaire takes about 15 minutes to complete. The physical activity record and the 24-hour food record will be completed in class and at home. The student will return the records for review by the investigators.

BENEFITS, RISKS OR DISCOMFORT

Students and their partners will receive numerous educational materials. They will also have the opportunity to participate in creative activities. This project has the potential of promoting heart healthy behaviors and decreasing risks of cardiovascular disease in the future. Minimal physical discomfort may occur in older adult partners with participation in self-selected physical activity.

655 West Lombard Street
Baltimore, Maryland 21201-1579
410 706 5736 / 410 706 0344 FAX

COSTS AND COMPENSATION

There is no fee for participation, nor is there any monetary compensation.

CONFIDENTIALITY

All data collected from the Family Health Tree, questionnaire and food/physical activity records will be kept confidential. An identification number will be assigned each student and older adult partner and are known only by the investigators. Your child's name will not be given out.

UNIVERSITY STATEMENT:

During his/her participation in this research, if your child suffers physical injury, the University of Maryland at Baltimore or the elementary school will provide acute medical treatment and provide subsequent referrals to appropriate health care facilities. Acute treatment will be charged to your insurance carrier, to any other party responsible for your treatment costs, or to you. The University of Maryland at Baltimore can not provide any monetary compensation due to any injury suffered during this research study. Information regarding research may be obtained from the IRB Coordinator, UMAB, 655 West Baltimore Street, Baltimore, Maryland 21201, (410)[redacted]

If you agree that your child may join this study, please sign your name below.

NOT VALID WITHOUT THE
IRB STAMP OF CERTIFICATION

_____

[redacted]

VOID ONE YEAR FROM ABOVE DATE
RPN NO. 1296035

Subject's signature

_____

____I have read and understand the information on this form.

____I have had the informaion on this form explained to me.

_____
Signature of Parent/Guardian
(When applicable)

_____
Witness to consent procedures*

_____
Signature of Investigator

_____
Date

Consent Form01/23/97 1:17 PM

School of Nursing

UNIVERSITY OF MARYLAND
AT BALTIMORE

DEPARTMENT OF ACUTE AND LONG-TERM CARE

CONSENT FORM

TITLE OF RESEARCH: Intergenerational Health Promotion in African-Americans.

Investigators: Karen E. Dennis, PhD, RN, FAAN
Work Phone: (410) [redacted]
Donna M. Behler, RN, MSN, C-FNP
Work Phone: (410) [redacted]

[redacted]

PARTICIPANT'S NAME: _____

PURPOSE OF STUDY

We are interested in learning how children share health information presented in school with their older relatives.

PROCEDURES

Your student has selected you as an older adult to take part in this project as his/her partner. To take part, you must be able to read or understand what is read to you. You must be able to walk without assistance. You should be able to eat most foods. You are asked to help the student complete The Family Health Tree. In addition, both you and the student will complete the Heart Healthy Questionnaire, a Physical Activity record, and a 24-hour food record on two occasions.

The student will participate in a 2 to 4-week Heart Power™ program scheduled for about one-hour per week during regular classroom time. Heart Power ™ was introduced in July, 1996 by the American Heart Association following several years of research. It was developed for the upper elementary school student. Topics relate to health promotion and reducing cardiovascular risk factors. Classes include : Heart Healthy (What the heart does, how the heart and lungs work...); Healthful Choices (food choices, eating plans, feelings about food, peer pressure, family influences...); Physical Activity (heart health fitness achieved, activity worksheets); and, Tobacco Free (effects of smoking, health risks, peer pressure..) A variety of educational materials will be provided. Take-home activities to share with the family will be given. The classes will be presented by Nurse Practitioners and/or nursing students from the School of Nursing , University of Maryland.

Questionnaires. You will be given a questionnaire to fill out about your eating and physical activity behaviors. This will take about 15 minutes. There are no right or wrong answers and all information is confidential. The physical activity record and the 24-hour food record are to be completed at home and will be returned by the student.

BENEFITS, RISKS OR DISCOMFORT

Students and grandparents will receive numerous educational materials. They will have the opportunity to participate in creative activities. This project has the potential of

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promoting heart healthy behaviors. It may also decrease the risks of cardiovascular disease in the future. Minimal discomfort may occur with participation in self-selected physical activity.

COSTS AND COMPENSATION

There is no fee for participation, nor is there any monetary compensation.

CONFIDENTIALITY:

All data collected from the Family Health Tree, questionnaire and food/physical activity records will be kept confidential. An identification number will be assigned each student and grandparent and are known only by the investigators. Your name will not be given out.

UNIVERSITY STATEMENT:

During your participation in this research, if you suffer physical injury, the University of Maryland at Baltimore or the elementary school will provide acute medical treatment and provide subsequent referrals to appropriate health care facilities. Acute treatment will be charged to your insurance carrier, to any other party responsible for your treatment costs, or to you. The University of Maryland at Baltimore cannot provide any financial compensation due to any injury suffered during this research study. Information regarding research may be obtained from the IRB Coordinator, UMAB, 655 West Baltimore Street, Baltimore, Maryland 21201, (410) [redacted].

If you agree to join this study, please sign your name below.

NOT VALID WITHOUT THE
IRB STAMP OF CERTIFICATION

_____

[redacted]

VOID ONE YEAR FROM ABOVE DATE
RPN NO. 1296035

Subject's signature

_____

____I have read and understand the information on this form.

____I have had the information on this form explained to me.

_____
Signature of Parent/Guardian
(When applicable)

_____
Witness to consent procedures*

_____
Signature of Investigator

_____
Date

School of Nursing

UNIVERSITY OF MARYLAND
AT BALTIMORE

DEPARTMENT OF ACUTE AND LONG-TERM CARE

STUDY ASSENT FOR 5TH GRADE ELEMENTARY SCHOOL CHILDREN

A. PURPOSE:
We are interested in learning how children share information they receive in school with their older relatives.

B. PROCEDURES:
You will select a grandparent or older adult to be your partner in this project. Your partner must be able to read or understand what is read to him/her. Your partner must be able to walk without help and be able to eat most foods. You and your partner will be asked to complete a short form about eating and physical activity. This will take about 15 minutes. You will also keep a food record and a physical activity record for one day. With the help of your family members, you will fill in a Family Health Tree.

C. BENEFITS:
You will have the chance to learn about heart healthy eating and physical activity. You will be given many educational handouts to share with your family.

D. RISKS
There are no risks to taking part in this project. Students do not have to take part in the project. They will be treated the same as those who do take part.

Please sign your name if:
1. You are sure that you understand what we are asking of you;
2. All of your questions have been answered; and,
3. You are willing to take part in the project.

_____
Subject's signature

655 West Lombard Street
Baltimore, Maryland 21201-1579
410 706 5736 / 410 706 0344 FAX

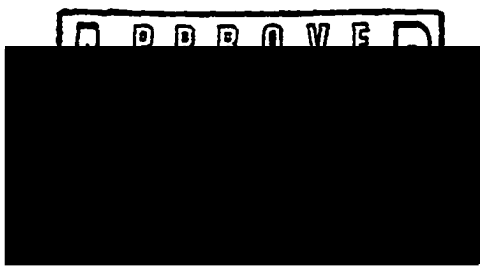
____I have read and understand the information on this form

____I have had the information on this form explained to me.

_____
Signature of Parent/Guardian
(When applicable)

NOT VALID WITHOUT THE IRB STAMP OF CERTIFICATION

_____
Witness to consent procedures*



_____
Signature of Investigator

_____
Date

VOID ONE YEAR FROM ABOVE DATE
RPN No. 1296035

*Optional unless subject is illiterate or unable to sign

NOTE: Copies of this Consent Form with original signatures must be a) retained on file by the Principal Investigator; and b) given to the subject. A copy must be deposited in the patient's medical record (if any).

Appendix B

WORKSHOP #1

HEALTHY HEART WORKSHOP

Objectives:

1. Explain that blood is pumped through the body in a closed system. It supplies nutrients and oxygen to the cells, and returns to the heart.
2. Explain the lungs exchange carbon dioxide in the blood for oxygen.
3. State that a healthy heart is a pump with valves allowing blood to flow in only one direction.
4. Distinguish between arteries and veins and describe their different functions.

Overview:

- The heart is located in the center of the chest.
- Adult's heart is a little larger than a fist with the other hand around it.
- Heart is a voluntary muscle.
- Works with the rest of the circulatory system to pump blood carrying oxygen and other nutrients throughout the body.

Prepare:

1. Have students read "It is Still" p. 4 in Who Invented Running. Several books will be shared. One student will read the poem aloud.
2. 4 stethoscopes to share.

Explore:

- Have you ever heard your heartbeat?
- What do we mean when we say that our heart beats? (Pumps blood; contracts and relaxes) Put hands to chest, sit quietly, feel hearts beat.
- What is another way to tell how fast your heart is beating? (Check your pulse)
- You are feeling the blood being pumped by the heart through the arteries that lie close to the surface of the skin.
- You can check pulse at other places on their bodies, e.g., neck.
- Have they had a health care provider, NP, MD, listen to their heartbeats with a stethoscope?

In pairs have students take turns to listen to each other's hearts (genders separate)
Do they hear the lub dub sound?

Prepare: Have student read "What is the Heart" p. 5 in reader.

Guest: African-American athlete (former boxer) currently a college student. Discusses importance of heart healthy diet and physical activity. Participates in demonstration with human hearts, lung, and arteries.

Display poster "How your Heart and Lungs Work"

- Where is your heart located? (Slightly left of the middle of the chest, between the two lungs. The tip of the heart touches the front wall of the chest).
- The heart is a pump. What is it made of? (Muscle).
- How do you think your heart is different from other muscles in your body, such as your arm muscles? (It works all the time by itself, you cannot control it). A muscle a person doesn't control is an involuntary muscle, a muscle a person can control is a voluntary muscle. (Students stand, use arms and legs. Then, ask them to use their heart muscle).
- Heart pumps blood. Blood flows in blood vessels, which transport it around the body. The blood's job is to carry oxygen from the lungs and other nutrients throughout the body.
- Take your pulses again. Hearts are always beating. Pumps blood that carries oxygen and other nutrients to all parts of our bodies.
- When we perform physical activity, the body needs more oxygen and other nutrients. So, the pulse increases.
- Display plastinated human hearts from University of Maryland School of Medicine Anatomical Facility (one normal and one with a triple by pass), human right lung, and arteries (with and without plaque deposits). Encourage students to observe, touch. Have several students describe what they observe.

Explore: Poster "How Your Heart and Lungs Work"

- Students take a deep breath and release it. What is the name of the part of the body that holds air when we breathe in? (The lungs). What is the important gas that our bodies get from air? (oxygen). What gas do we breathe out as a waste product? (carbon dioxide).

Our bodies get energy from the chemical reaction inside body cells. When oxygen combines with sugar in our cells to create energy, another gas is formed called carbon dioxide. Too much of this gas is poisonous to our cells. So, our bodies must do two things: 1.take in oxygen; and, 2. get rid of carbon dioxide.

Using poster:

- Show capillaries (tiny blood vessels with thin walls; oxygen and carbon dioxide can pass easily through these thin walls).
- Blood from the heart flows into the lungs. Is the blood that flows into the lungs from the heart full of oxygen or full of carbon dioxide? (carbon dioxide). What happens to the blood in the lungs? (carbon dioxide is exchanged for oxygen through the capillaries)
- The blood collects oxygen in the lungs, returns it to the heart and is pumped throughout the body. Ass the blood flows throughout the body, it also collects carbon dioxide. When the blood id back in the lungs, the carbon dioxide goes through the capillary walls. Then it is breathed out through the lungs.

The healthy heart is a pump with valves allowing blood to flow in only one direction

(use road map as an example)

- Look inside wrists. How would you describe the way your blood vessels are joined together? Blood vessels in the body are similar.
- Refer to Circulatory poster. What is the name of the vessels that carry blood away from the heart (arteries). What is the largest artery (aorta). Smallest blood vessels? (capillaries). What is the name of the blood vessels that carry blood back to the heart (veins).
- Blood moves around the body in a figure 8. Blood with oxygen comes from the lungs to the heart and then travels and exchanges oxygen for carbon dioxide throughout the body in capillaries. Blood with carbon dioxide goes back to the heart through veins and then travels to the lungs to get rid of the carbon dioxide.
- Sound of a heartbeat is a two-part sound caused by the heart muscle contracting and relaxing. You know that the blood flows away from the heart in arteries and back to the heart in veins. Do you wonder why blood doesn't flow back through the arteries? The heart has valves. Valves are similar to trap doors that allow only one-way movement.
- Using stethoscopes: hear the heartbeat as a "lub dub" sound. First sound "Lub" is a long, booming sound. Caused by the bottom chambers of the heart, the ventricles contracting and the valves from the top part of the heart, the atria, closing. The second sound, "dub" is a short beat with a snapping sound. It is caused by the bottom chambers of the heart relaxing and the valves to the arteries closing.

TAKE-HOME ACTIVITIES TO SHARE WITH OLDER ADULT PARTNER:

1. Take pulses of family members to include adult partner. Babies have faster pulses while older people have slower pulses.
2. Activity Sheet 5. and 6. Heart Word Game and Label the Heart's Parts
3. Write down goal of activity to do with adult partner on card. When you complete the activity, sign your name and have your partner do the same. These cards will be put in the special shoe box for part of the drawing.
4. Completion of the Family Health Tree (found in your blue heart folder on the left side)

WORKSHOP #2
HEALTHFUL CHOICES

Objectives:

1. State the influence of peer pressure on personal health decisions.
2. Recognize that proteins, fats, carbohydrates, water, vitamins, and minerals are key elements found in food and the human body. Each one helps the body grow and stay healthy.
3. Recognize that a healthy eating plan helps the body grow and stay healthy.
4. Identify external factors, such as parents, friends, and advertising, that influence choices about food.
5. Recognize that the ability to make responsible health decisions helps people feel good about themselves.
6. Identify factors that affect a person's health decisions.
7. Describe the logical steps in the decision-making process.
8. Recognize that it's sometimes necessary to say "no" to make good decisions.
9. Express positive feelings about healthful food choices.

Overview:

- Proteins are made of amino acids.
- Sugar, starches, and fibers are carbohydrates.
- Nutrients are substances found in food that the body needs to build, maintain, and repair tissues; control bodily processes; obtain energy; and promote growth.
- The essential nutrients are proteins, carbohydrates, fats, vitamins, and minerals.
- Fats have the highest energy content (calories).
- Vitamins and minerals are required in small amounts.
- Eating a variety of foods from the basic food groups is the best way to ensure that the body's nutritional needs are being met.
- AHA recommendations for a healthy diet are: up to 6 ounces of cooked lean meat, poultry or fish; five or more servings of fruits and vegetables; 2 to 4 servings of nonfat or low fat milk products; 6 or more servings of breads, cereals, pasta, and starchy vegetables, and very few fats, oils, nuts, and sweets. Only 3-4 egg yolks per week.
- Cholesterol is a fatty substance found in the body's blood and cells. It is also found in foods from animals.
- High levels of low density lipoprotein (LDL) cholesterol in the blood can lead to atherosclerosis (clogging of the arteries) and heart attack.
- The body makes all the cholesterol that it needs so a diet low in cholesterol (no more than 300 mgm/day) and saturated fats is recommended.

Prepare:

1. Pass out Who Invented Running readers. Select a student to read the poem "The Spratt Family".

Explore:

- What information about healthful eating does this poem give? (too much fat is not a good choice; low cholesterol foods are good choices)
- What is cholesterol? (fatty substance found in some foods like meat, egg yolks)
- Why is it important to carefully choose the foods we eat? (bodies need certain nutrients; choose foods with those nutrients, only small amount of fat is necessary to provide essential fatty acids; sugar only adds calories so we need only a few of these.
- How do you decide which foods to eat? (parents, TV, offered in cafeteria, tastes good...)
- What healthful food do you like best?
- Is there a food that you eat at home that you don't like to eat?

(Write students responses on the board).

- Pretend that you are a parent. What advice would you give to someone who doesn't like food that contains a lot of important nutrients, such as green vegetables? (just take one bite, add a low-fat item to the food to make it taste better...)

Prepare:

1. Have a student read "Food Fight" in the reader.

Explore:

- What is a good way to find out what a packaged food contains? (read the label)
- What information does a Nutrition Facts label provide? (amts. of various nutrients and calories including fats, sugar, and sodium [salt] a person should have each day and how much of each item the particular food provides.)
- Why is it important to check the serving size on a food label? (Amts. of nutrients are based on serving size. A person may eat a smaller or larger portion).
- In the article, which food is a better choice based on calories from fat: vegetable soup or peanut butter? (vegetable soup). Which is a better choice based on cholesterol? (equal); salt? sugar?
- What are the nutritional values of your selected food?

- Divide students into groups of four (or if seated at tables use intact tables). Give each group several boxes/food labels. Ask the individual groups to evaluate the information on the labels and identify which foods are very high in nutrients such as proteins, carbohydrates and fats.
- Share information with whole class.

Prepare: Activity Sheet #7 "What's in Foods"

- What important nutrients do we get from lean meat, poultry and fish? (Protein, B vitamins, iron, minerals)
- What important nutrients are found in vegetables and fruits(CHO, vitamins, minerals, and fiber). Why are fruits and vegetables good choices? (low cal., low fat and sodium, no cholesterol).
- What are some healthful milk products? (low-fat milk, skim milk, non-fat and low fat cheese) What important nutrients are found in milk products? (pro., calcium, vitamins and minerals)
- What are nutrients found in breads, cereals, pasta, and starchy vegetables? (CHO, vitamins, iron, and fiber)
- Why are all the nutrients important to our bodies? (Help our bodies grow and stay healthy, and they give us energy.
- It is important to eat foods from all these different groups to make sure that we get the best combination of nutrients.
- Show *Food Guide Pyramid.* Using food models, ask students where particular item would fit in the pyramid. Give examples of soul food. Where do these items fit on the Food Guide Pyramid?

Prepare:
Have students read "Snack Attack" in their heart power readers.

Explore:

- What is your favorite snack? Is it a healthful choice?
- People choose a particular snack. What is the reason that they eat this snack? (advertised on TV, friend likes it...)
- Have you ever had a friend eating a snack that you would not have chosen if you had been on your own? Ex: You go to a store in your neighborhood with a friend to buy a snack. Your friend teases you because you buy pretzels instead of a Snickers candy bar. What would you do?
- Refer again to the Food Guide Pyramid. With assorted snack foods on each table, have students decide where the foods should be located, e.g., carrots, grapes, crackers, peanut butter, cookies, candy. Students and teachers are invited to share the snacks.

TAKE-HOME ACTIVITIES TO SHARE WITH OLDER ADULT PARTNER:

1. Write down goal of activity to do with adult partner on card. When you complete the activity, sign your name and have your partner do the same. These cards will be put in the special shoe box for part of the drawing.
2. Go on a kitchen expedition with your adult partner. Help him/her read the labels on the foods in cabinets and in the refrigerator. What is the fat content of ice cream or milk in the refrigerator? What is the cholesterol content in eggs? What is the protein content in peanut butter?
3. Complete Activity Sheet #8 "Be Choosy", #1 "Healthy-Heart Menus", & #9 "Rate that Snack" with your adult partner.

WORKSHOP #3
PHYSICAL ACTIVITY

Objectives:

1. State the influence of peer pressure on personal health decisions.
2. Identify how heart-healthy fitness is achieved and maintained.
3. Identify external factors, such as parents, friends, and advertising, that influence choices about physical activity.
4. Recognize that the ability to make responsible health decisions helps people feel good about themselves.
5. Identify factors that affect a person's health decisions.
6. Express positive feelings about physical activity choices.

Guest: Todd Behler, college football player.

Overview:

- Regular physical activity is an important part of people's overall health and especially their cardiovascular health.
- Being fit fights off disease, improves the strength of the heart and the efficiency of circulation, improves breathing, and enhances self-image.
- It aids in posture, firm muscles, and helps reduce fat.
- Aerobic exercise is any exercise that condtitions the heart and the lungs, such as running, jumping rope, bicycling, or dancing. These activities involve continuous use of the large muscles in the arms and legs.
- People can achieve maximum heart fitness by performing any vigorous activity for at least a total of 30 minutes a day at least 3-4 times a week.
- Doing moderate physical activities for 30 minutes on most days also provides some health benefits to the heart. It is important to include some physical activity as part of a daily routine.

The FIT Formula

F=Frequency (days per week)
I=Intensity (how hard-easy, moderate, vigorous)
T=Time (amount for each session or day)

Prepare:

Have a student read "Who Invented Running" (handout) from the Heart Power! reader.

- What is the reason that people ran millions of years ago? (Survival)
- What reasons does the poem give for running today? (Stay fit; have fun)

- What kinds of physical activities do students participate in? (List on newsprint paper. Names of activities, # of students participating in each. Use Physical Activity Record as a guide). Many different activities that people do for fun and fitness.
- Organized physical activities (Basketball, football, hockey)
- Neighborhood activities (bicycling, roller skating, in-line skating, jumping rope)
- Activities at a community center?

HOW DOES ACTIVITY HELP YOU?

Prepare:

Have students read "Why Should I Exercise" handout from Heart Power! reader.

- What are some good reasons why you should exercise? (look good, breathe easier, improve circulation)
- How does physical activity make you look good? (gives more muscles, less fat, helps you feel fit)
- When you participate in your favorite activity, are you usually thinking that you are making your heart stronger?
- Suppose you just played a tough basketball game or danced real hard. How do you feel?
- Why do you feel good even though you may be tired? (Health benefits to heart, lungs, circulation, muscles)
- Everybody feels bad sometimes. We may be angry, frustrated. Did you ever shoot baskets or run around outside when you were feeling upset? How did that make you feel?

Have students interview several classmates to start using activity #10. Poll results in chart format. Students will continue this activity with adult partner and other family members.

HOW CAN I STAY FIT?

Prepare: Read "Fit for Fun" in the reader (p.19-21)

- What is aerobic exercise? (continuous, makes heart and lungs work hard)
- How much do you need to help your hearts get stronger (at least 30 minutes peer day for 3-4 times a week)

Which activities that you mentioned earlier are aerobic?

- What should you do before you begin a vigorous exercise? (warm up)
- What should you do after vigorous exercise? (Cool down and stretch).

(Todd leads stretching and other exercises varying in intensity)

If possible, have students take a one-minute pulse, jump rope for one minute and immediately take their pulses again. Did the heart work harder? (pulse increased and they were breathing faster)

What Factors Affect Exercise Habits?

- What are some reasons that you want to do the physical activities you do often? (admire someone, persuaded by friends, parents, enjoyment.
- Negative side of peer pressure. Sharde is a girl who loves to do all sorts of physical activities (bicycling, dancing, basketball...) She has a new friend, Amy, who prefers to listen to music in her room, or watch the video. Sharde stops doing several of the activities she enjoys to spend time with her friend. Has she made a smart choice?.

Take-home activities

- Write down goal of activity to do with adult partner on card. When you complete the activity, sign your name and have your partner do the same. These cards will be put in the special shoe box for part of the drawing.
- Complete Activity Sheet #10, "Why do People Exercise" with family members/friends.
- Complete activity IQ with adult partner.

WORKSHOP #4
TOBACCO-FREE

Objectives:

1. Identify the immediate physical effects of smoking on smokers and others.
2. Recognize the health risks of smoking.
3. Identify the social consequences of smoking.
4. Recognize that the decision to smoke is influenced by advertising.
5. State the purposes of peer influence on health choices.
6. Recognize that it's important to say "no" to make good decisions.

Overview:

- Cigarette smokers experience many chronic health problems, such as coughing, shortness of breath, and frequent respiratory infections.
- Cigarette smoking contains a highly addictive drug - nicotine.
- Nicotine in the body has 3 immediate physical effects: it increases at-rest heart rate, temporarily elevates blood pressure, and constricts blood vessels.
- Cigarette smoke also contains carbon monoxide. When inhaled, the carbon monoxide in cigarette smoke causes a decrease in oxygen distributed to the brain, heart, and other parts of the body.
- Up to 60 percent of adult smokers began smoking by the age of 13.
- Children are influenced to smoke by adults around them who smoke, by their peers, and by the media (movies and advertising).

Activity 1:

Prepare: Have students read "Smoking in the Cellar" from the HeartPower! reader.

Explore:

- Why do you think the 4 boys decide to try smoking cigarettes? (Bored, daring, adventure...)
- Why do the boys go to the cellar to smoke? (So they won't get caught)
- Do you think that the boy who is speaking would have tried smoking if he had been by himself?

- What happens to the boys when they smoke? (Cough, choke, can't breathe well)
- Why does Lumpy turn green (sick to his stomach).
- Have you ever been in a room where people are smoking? What does it do to your body? (Coughing, stinging eyes, difficult breathing...)

- Do you think that the boy who is speaking in the poem will smoke a cigarette again? Why or why not?
- Being around smoke makes your body feel bad. What does this tell you about cigarette smoke? (Not good for you).

On newsprint, write the word SMOKING. Ask students what words come to mind when they think about cigarette smoke?

Activity 2:
Prepare: Read "No Ifs, ands or Butts" in the Heartpower! Reader.

- What facts did you learn from the articled that you didn't know before? (Complete activity sheet #12 "Smoker's Math").
- What addictive substance is found in cigarettes? (Nicotine).
- Nicotine had 3 immediate effects on a smoker: makes the heart beat faster; temporarily increases the BP,; makes the blood vessels near the skin smaller. These can lead to serious heart problems.
- What does addictive mean? (Body becomes physically used to a substance. Your body wants more and needs more of the substance).
- Why is this important to know before a person smokes a cigarette? (Once you start it will be hard to stop).
- What other harmful things are found in cigarettes? (A radioactive substance and hundreds of other chemicals. Also contains carbon monoxide- a gas that causes a decrease in oxygen throughout the body)
- Why is smoking especially dangerous to children? (Their lungs are still growing).
- What can happen to children who are exposed to smoke from other people's cigarettes? (Get sore throats, coughs, serious lung disease, heart disease)

On newsprint paper, summarize by writing a heading "Reasons Not to Smoke".

Activity 3:
Prepare: Activity sheet #14, "Smart Kids, Dumb choices".

- Have students role play the situations. Have pairs of students choose one of the characters.
- One reason smoking isn't cool (Show animal poster from American Cancer Society) is that it annoys and even harms other people.

Activity 4:
Prepare: Cigarette advertisements from a variety of magazines

- Did you ever want to buy something because of what you saw in an ad? (Shoes, food, videos...)
- What do the women and men in the smoking advertisements look like? What are they doing?
- What do the advertisers think you will do when you see the glamorous people in the ads? (Smoke so that you can be like them)
- What else do you notice in the ads? (Warning label)

- Why do cigarette makers advertise something that they know is harmful (to make money)

Steps to follow for student's decision-making...1. gathering info; 2. Evaluating info; 3. Arriving at decisions based on what they have learned.

Activity #5 The Lung Machine (from the American Cancer Society)

Students will view the lungs in the machine one by one. Handouts from the ACS are also provided.

Take-home activity to share with family and adult partner:

- Write down goal of activity to do with adult partner on card. When you complete the activity, sign your name and have your partner do the same. These cards will be put in the special shoe box for part of the drawing.
- Interview your adult partner and 3-4 other relatives using activity #13 "Smoking Survey". Review completed "Smoker's Math" activity with partner.

Appendix C

INTRODUCTION TO STUDENTS

1. Introduce self and any other participants (try to look happy even when all the children are talking, you feel put upon by the investigator, you're having a bad hair day...).

My name is _____. Your class has been selected to be part of an exciting project that's all about how to keep our hearts healthy. How many of you want to have a healthy heart? We also want to find out how 5th grade students like you can share information with older people in your family. How many of you have an older relative or family friend with whom you can share information?

Today we are going to do several things. First of all, you each have been given a special "Heart" folder that has your special code on it. Please put your name by the heart on the cover of the folder.

1. On the inside of the folder on the left side there are three consent forms. These are for you, your parent, and your older adult partner to sign saying that it is OK for you to take part in this project. Please take out YOUR form (STUDY ASSENT). I will read this to you. (Read form). For those students in the intervention schools (Gilmor and Pinderhughes) add that the students will have four workshops, one each week during class time, that feature Heart Healthy topics: all about the heart, healthy food choices, physical activity, and tobacco-free.

Please take the other consent forms home to your parents and your grandparent or older adult partner to read about the project and for them to sign. It is very important that you return these forms by _____ (date you will pick up their food records and the forms completed by the grandparent partner.

2. For each of the forms we have for you to fill out, their is one for your grandparent partner. Your forms are on the right side and your grandparent partner's are on the left in front of the consent forms. Please take out YOUR heart Healthy Questionnaire. It will have your special code number on it. (Read the instructions from the cover sheet). After introducing section I., students can proceed to answer the questions at their own pace. Some students may need individual help. I reiterate that we want to know what THEY think and that it is important that they complete the whole questionnaire. The HHQ takes about 20 minutes to 1/2 hour the first administration.

3. The Physical Activity checklist is the second item to complete (instruction attached)

4. Begin the Food Record completion (instructions attached).

5. The Family Health Tree envelop and newsprint paper on which to draw the tree will be included in the folder, however, as time is a factor and this activity requires additional space, glue sticks, crayons, and potential disaster control, this can be a take-home activity for the control school and reiterated during workshop I for the intervention schools. A sample tree will be shown (and if helpful could be kept in the health center for reference).

Please collect the completed HHQs, Physical Activity sheets, and Assent Forms from the students. Remind the students that you will pick up their completed Food Record plus their "partner's" HHQ, Food Record, and Physical Activity Record. The heart pencil in their folder is theirs to keep. Also, the plastic heart man (in your folder) will be given to each student who returns their forms.

For each school, students who complete the forms and the take-home activities will be eligible to win the grand prize of a pair of athletic shoes for the student and his/her adult partner (one set per school). Small incentives will be given each week for those in the intervention schools.

Dear Student,

Please talk to your family members to gather the information to complete your **Family Health Tree**. If you cannot find the answer to an item just mark "not sure" or write "don't know".

Thank you!

Dear Family Members,

Please help your student complete this project. It is part of a program on **heart healthy behavior**. The FAMILY HEALTH TREE was originally developed by the Baylor College of Medicine in Houston and used at the University of Utah. The FAMILY HEALTH TREE shows lifestyle behaviors as well as health problems that may run in your family.

DESCRIPTION OF CONDITIONS

HEART PROBLEMS: These include angina pectoris (angina), chest pain that originates in the heart but is not a heart attack. The pain is caused by a partial blockage in the coronary arteries and goes away with rest and/or medication.

HEART ATTACK: A heart attack is caused by a partial or complete blockage of an artery supplying blood to the heart muscle. Symptoms can include chest pressure or fullness, chest pain, nausea, sweating, weakness and/or breathing difficulty lasting from a few minutes to an hour.

HIGH BLOOD CHOLESTEROL: Cholesterol is a soft, fat-like substance essential for basic functions of the human body. Too much cholesterol leads to build-ups of substances deposited on the walls of arteries, causing strain on the heart.

STROKE: A stroke is a brain attack. Stroke is caused by blockage or rupture of an artery carrying blood to the brain. It usually causes sudden problems with speech or movement.

DIABETES: Diabetes is present when the body cannot keep blood sugar from going too high. Blood sugar is controlled with special diets and/or medication.

CANCER: Cancer is an uncontrolled growth of abnormal cells that starts in one location and may spread to other parts of the body. Cancer types are classified by their starting place, for example, colon, lung, breast.

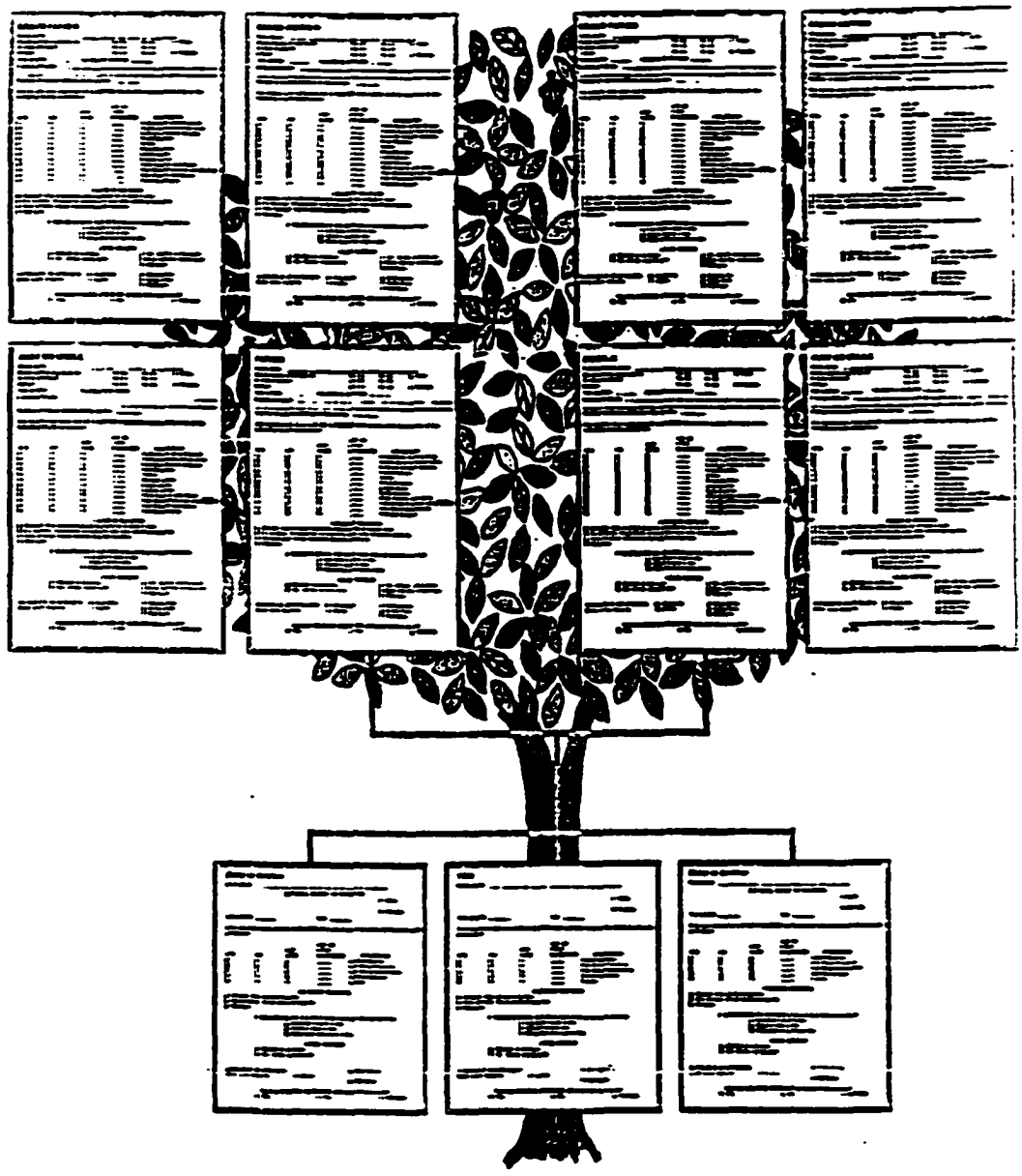
If you have any questions about completing the Family Health Tree, please call. Thank you for your support.

Donna Behler, RN, MSN, CFNP
University of Maryland School of Nursing
Tel: (410) [redacted]

FAMILY HEALTH TREE OF:

_____

Family Health Tree



YOU

Name (first) _____ ☐ Male ☐ Female

Date of Birth (Month/Day/Year) _____/____/_____

Have you ever been told by a **HEALTH CARE PROVIDER** that you have had any of the following health problems?

YES	NO	NOT SURE	CONDITION
☐	☐	☐	Heart Problems
☐	☐	☐	High Blood Pressure
☐	☐	☐	High Blood Cholesterol
☐	☐	☐	Diabetes (sugar)
☐	☐	☐	Cancer (type) _____

CIGARETTE SMOKING

☐ Smoking cigarettes daily
☐ Smoking cigarettes when offered
☐ Tried smoking in the past
☐ Never smoked

USUAL WEIGHT

☐ Slender or Average ☐ 10 - 49 lbs overweight

ALCOHOLIC BEVERAGES (Beer, Wine, Liquor)

☐ Never ☐ Sometimes

Moderate to vigorous **PHYSICAL ACTIVITY** for at least 20 minutes, 3 times a week (for example running, roller skating, swimming, jumping rope)

☐ Yes ☐ No

GRANDMOTHER

Name (first) _____

Year of Birth _____ Age at Death _____

Cause of Death _____

Has she ever been told by a **HEALTH CARE PROVIDER** that she has had any of the following health problems?

YES	NO	NOT SURE	CONDITION
☐	☐	☐	Heart Problems
☐	☐	☐	Heart Attack
☐	☐	☐	Stroke
☐	☐	☐	High Blood Pressure
☐	☐	☐	High Blood Cholesterol
☐	☐	☐	Diabetes (sugar)
☐	☐	☐	Cancer (type) _____

CIGARETTE SMOKING

☐ Smoking cigarettes now
☐ Smoked cigarettes in past
☐ Never smoked cigarettes
☐ Not Sure

USUAL WEIGHT

☐ Slender or Average ☐ 10 - 49 lbs overweight
☐ 50 - 100 lbs overweight ☐ Over 100 lbs overweight
☐ Not Sure

ALCOHOLIC BEVERAGES (Beer, Wine, Liquor)

☐ Never ☐ Sometimes ☐ Not Sure

Moderate intensity **PHYSICAL ACTIVITY** for at least 20 minutes, 3 times a week (for example, brisk walking, dancing,)

☐ Yes ☐ No ☐ Not Sure

Heart Healthy Questionnaire

We want to know what **you** think about the foods you eat and your physical activity.

- This is not a test. There are no right or wrong answers.
- Read each item carefully and circle your choice.
- Please do not skip any items.
- All of your answers are private. No one else will see them.

Thank you very much for completing this questionnaire!

What is your first name? _____

When were you born? _____/_____/_____
day month year

Where do you go to school ?_____

Heart Healthy Questionnaire

We want to know what **you** think about the foods you eat and your physical activity.

- This is not a test. There are no right or wrong answers.
- Read each item carefully and circle your choice.
- Please do not skip any items.
- All of your answers are private. No one else will see them.

Thank you very much for completing this questionnaire!

What is your first name? _____

What is your grandchild's first name?_____

When were you born? _____/_____/_____
day month year

Where does your grandchild go to school ?_____

What is the highest grade of education you have completed?_____

How often do you see your grandchild? _____

I. For each item below, please circle the answer that shows what **you** think.

1. I like to exercise.	NO	NOT SURE	YES
2. I like to eat vegetables.	NO	NOT SURE	YES
3. Exercising makes me feel better.	NO	NOT SURE	YES
4. When I snack, I like to eat fruit.	NO	NOT SURE	YES
5. I like extra salt on my food.	NO	NOT SURE	YES
6. I exercise because it keeps my body healthy.	NO	NOT SURE	YES
7. I like to eat food that is greasy.	NO	NOT SURE	YES
8. If I want to, I can exercise with friends.	NO	NOT SURE	YES
9. I like to drink skim milk instead of regular milk.	NO	NOT SURE	YES
10. It's good to exercise 3 to 5 times a week.	NO	NOT SURE	YES

II. How sure are you that you can do the following? If you think you cannot, circle NOT SURE. If you think that maybe you can, circle MAYBE. If you're positive, you can, circle VERY SURE.

1. Try new fruits and vegetables.	NOT SURE	MAYBE	VERY SURE
2. Keep walking for 15 to 20 minutes without stopping.	NOT SURE	MAYBE	VERY SURE
3. Eat food without adding salt from a shaker.	NOT SURE	MAYBE	VERY SURE
4. Drink 1% or skim milk instead of regular milk.	NOT SURE	MAYBE	VERY SURE
5. Exercise 3 to 5 times a week.	NOT SURE	MAYBE	VERY SURE
6. Eat fruit for a snack instead of sweets.	NOT SURE	MAYBE	VERY SURE
7. Eat fried chicken without the skin on it.	NOT SURE	MAYBE	VERY SURE
8. Improve your fitness by walking 3 to 5 times a week for 20 minutes.	NOT SURE	MAYBE	VERY SURE
9. Stick to your exercises even when you are tired.	NOT SURE	MAYBE	VERY SURE
10. Exercise with others even if they seem too slow or too fast.	NOT SURE	MAYBE	VERY SURE

III. For each item below, please circle that answer that shows what **you** think.

I think eating low fat foods is difficult because

1. I do not like the taste.	NO	NOT SURE	YES
2. They cost too much.	NO	NOT SURE	YES
3. I do not have them at home.	NO	NOT SURE	YES

I think eating fresh vegetables is difficult because

4. I do not like the taste.	NO	NOT SURE	YES
5. They cost too much.	NO	NOT SURE	YES
6. There is no place nearby to get them.	NO	NOT SURE	YES
7. There is no place to store them	NO	NOT SURE	YES

I think that eating food without extra salt is difficult because

8. I do not like the taste.	NO	NOT SURE	YES

I think that exercise is difficult because

9. It hurts.	NO	NOT SURE	YES
10. I do not have any one to exercise with me.	NO	NOT SURE	YES
11. It takes too much time.	NO	NOT SURE	YES
12. There is no safe place.	NO	NOT SURE	YES
13. Equipment costs too much.	NO	NOT SURE	YES
14. I have a handicap.	NO	NOT SURE	YES

IV. Circle the choice that best describes **you**. Circle only one answer for each item.

Which choice best describes you?

1. I do not think about eating 5 or more servings of fruits and vegetables a day.
2. I am think about eating 5 or more servings of fruits and vegetables a day within the next month.
3. I plan to start eating 5 or more servings of fruits and vegetables a day within the next month.
4. I eat 5 or more servings of fruits and vegetables each day.

Which choice best describes you?

1. I do not think about exercising 3 or more times a week.
2. I am thinking about exercising 3 or more times a week within the next month.
3. I plan to start exercising 3 or more times a week within the next month.
4. I exercise 3 or more times a week.

Which choice best describes you?

1. I do not think about eating food without adding salt from the shaker.
2. I am thinking about eating food without adding salt from the shaker within the next month.
3. I plan to start eating food without adding salt from the shaker within the next month.
4. I eat food without adding salt from the shaker.

What choice best describes you?

1. I do not think about eating foods with less fat (like baked potatoes instead of french fries).
2. I am thinking about eating foods with less fat within the next month.
3. I plan to start eating foods with less fat.
4. I eat foods with less fat.

V. For each item below, please circle the answer **you** choose.

1. The fruit and vegetable group is in the top section of the food guide pyramid.	TRUE	FALSE
2. Walking fast is healthy exercise.	TRUE	FALSE
3. Eating too much fat can make you more likely to get heart disease.	TRUE	FALSE
4. Plain popcorn is better for you than popcorn with butter and salt.	TRUE	FALSE
5. Exercise helps you lose weight.	TRUE	FALSE
6. Exercise should be fun.	TRUE	FALSE
7. Most fast food restaurants have more high fat foods than low fat foods.	TRUE	FALSE
8. Exercise makes your heart muscle stronger.	TRUE	FALSE
9. During exercise your heart rate slows down.	TRUE	FALSE
10. Canned vegetables are as healthy as fresh.	TRUE	FALSE

HHQ Scoring Instructions

Items are scored as:

I. Attitudes; and III. Barriers
- No =1
- Not sure =2
- Yes =3

II. Self-efficacy
- Not sure =1
- Maybe =2
- Very sure =3

IV. Stages of change
- precontemplation =1
- contemplation =2
- preparation =3
- action =4

V. Knowledge
- True
- False

correct answer =1; incorrect answer =0

I. Attitudes: physical activity (1,3,6,8,10; 15 total); nutrition (2,4,5,7,9; 15 total)
II. Self-efficacy: physical activity (2,5,8,9,10; 15 total); nutrition (1,3,4,6,7; 15 total)
III. Barriers: physical activity (9, 10, 11, 12, 13, 14; 18 total); nutrition (1,2,3,4,5,6,7,8; 24 total)
IV. Stages of change: physical activity (B; 4 total); nutrition (A,C,D; 12 total)
V. Knowledge: physical activity (2,5,6,8,9; 5 total); nutrition (1,3,4,7,10; 5 total).

Total possible score: 128; negative items are reverse scored.

♥ INSTRUCTIONS-HOW TO KEEP A FOOD RECORD

The student and family member food records are tools to assess the quality and quantity of the individual's 24-hour dietary intake. As portion sizes are very difficult for children (and many adults), the focus will be on the quality of the food. The following instructions describe the procedure to teach children how to keep the food record.

A. The following materials are needed for each session:

1. For each child:
   A. One food record for child
   B. One food record to take home for grandparent partner

2. Sample Food Record on large piece of poster board

3. Food models
   A. Empty milk cartons from cafeteria (if available)
   B. Breakfast foods
      1. Cereal box
      2. Milk carton
      3. Orange juice carton
      4. Bread wrapper
      5. Margarine container

   C. Lunch foods
      1. One lunchmeat package
      2. One mayonnaise jar
      3. One mustard jar
      4. One apple
      5. One cookie bag
      6. One juice box

   D. Dinner foods
      1. Food models of chicken, sliced meat, mashed potatoes, rice, greens, sliced fruit, pie, cake slices...

B. PREPARATION BEFORE CLASS

1. Make a mock-up of the Food Record form to hang on blackboard. The mock-up must be large enough for the student to see.

C. TEACHERS

1. Explain the purpose of the activity.
2. Review the Food Record with the teacher.

3. Ask that the teacher emphasize the importance of completing the Food Record.

D. FOOD RECORD INSTRUCTION SESSIONS.

1. Some children may have difficulty understanding the instructions. You may need to spend more time with these children and divide the instructions into smaller steps.

E. DIALOGUE: INTRODUCTION

My name is _____. I (we) want to learn what children in the fifth grade ear and drink. We would also like to learn what their older relatives (like grandparents) eat and drink too.

The reason we want to know this is to help everyone have healthy hearts. I need your help today. I will give you a Food Record to fill out. You will also be given one to have your grandparent partner fill out too. You will need to help your partner fill out his/her Food Record. We would like you to write down everything you eat and drink today.

Each of you should have a food record with a special code on it. Please put your name on the folder by the heart sticker.

Please look at your Food Record. There are three columns. In the first column you write down what you eat. In the second column you write down more about what you eat. In the third column, you check the box that tells where you eat.

G. FILLING OUT THE FOOD RECORD FOR BREAKFAST

We want you to write the exact names of the foods you eat and drink on the Food Record. Even if you only take one bite or one sip, you should write it down. Write as neatly as you can so that we will be able to read it when it is complete. A good idea is to write down the food as soon as you eat it so that you won't forget. We want you to tell us as much about the food as you can. If it comes from a jar or a box, copy down the name on the label.

Let's begin by writing down what you ate for breakfast.

I will tell you what I had for breakfast and show you how to write it on my Food Record. For my breakfast I had: _____. Here's what I would write on my food record.

Now, please write down what you ate for breakfast. (Give a few minutes and select one or two students to share with class).

H. FILLLING OUT THE RECORD FOR LUNCH

We want you to write down the names of all the foods you eat for the rest of the day until you go to bed tonight. If you have a snack after school, write down what you ate. Write down the foods you ate for dinner. Remember, there are no right or wrong answers so fill out as much as you can. Spell the name of the food the best you can. If you eat lunch from the school cafeteria, describe the food the best you can. For example, if you ate pizza, you write down "pizza" Under "The Food I Ate" column. In the description column you write the kind of pizza it was.

I. FILLING OUT FOR DINNER

If you eat at home tonight, write down the names of the food you eat. If someone made the food, ask them to describe how it was cooked. For example, if your mother cooks chicken, ask if it is fried, baked, or broiled. If you eat vegetables, write down whether there was butter, margarine, ham, salt, in the cooking.

K. SUMMARY

We are interested in everything you eat and drink from the time you get up in the morning until you go to bed tonight. Remember to write down what you eat or drink as soon as you eat them so that you won't forget. Take your Food Record with you wherever you go today. Be sure to bring back your record tomorrow and that of your grandparent partner by _____.

Do you have any questions? Thank you for your help in this study. I can already see that you are doing a GREAT job!

L. COLLECTING FOOD RECORD FORMS

Collect the Food Record forms from the students the next school day. Review the records for any glaring problems. Complete the SUMMARY OF FOOD RECORD ADMINISTRATION SHEET and give to investigator.

G. STUDENT INTERVIEW

Select 1-2 students from each classroom. Review their completed Food Records with them and those of their grandparent partner. Focus on the completion of the record in lieu of the quality of food choices. Please make comments on the administration sheet.

Food Record for _____

Student:

Please write down the names of all the foods you eat and drink today, _____, from the time you wake up to the time you go to bed at night, on the lines in the first column. Check the box where you ate the food. Thank you.

		Where did you eat this food? Check one			
Food I Ate or Drank	**Description of Food** brand names, amount, use of dressings (filled out by student or family member)	**At Home**	**At School**	**Restaurant**	**Other**
Breakfast					
Lunch					
Snacks					
Dinner					
Snacks					

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Food Record for _____

Family Member:

Please write down the names of all the foods you eat and drink today, _____, from the time you wake up to the time you go to bed at night, on the lines in the first column. Check the box where you ate the food. Thank you.

		Where did you eat this food? Check one.			
Food I Ate or Drank	**Description of Food** brand names, amount, use of dressings (filled out by student or family member)	**At Home**	**At School**	**Restaurant**	**Other**
Breakfast					
Lunch					
Snacks					
Dinner					
Snacks					

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INSTRUCTIONS-HOW TO COMPLETE THE PHYSICAL ACTIVITY RECORD

The purpose of the self-administered Physical Activity Record is to collect information from the students and their grandparent partners about their physical activities during the previous weekday (school day for children).

The Physical Activity Record will be administered in the classroom. The day before the administration should have been a school day.

A. EQUIPMENT

1. Physical Activity Records for each student and grandparent partner
2. Pencils

B. PREPARATION BEFORE CLASS

1. Make a mock-up of the Physical Activity Record for the student to hang on the blackboard. The mock-up should be large enough for the students to see.

C. TEACHERS

1. Contact classroom teacher a few days before administration to confirm schedule and review activity.

D. PHYSICAL ACTIVITY RECORD INSTRUCTION SESSIONS

Some students may have difficulty understanding the instructions. You may need to spend more time with these children and divide the instructions into smaller steps.

E. DIALOGUE: INTRODUCTION

(If part of an ongoing class do following the Food Record and before the Heart Healthy Questionnaire).

My name is _____. I (we) want to learn what children kind of physical activity children in the 5th grade like to do. We also want to learn what type of physical activity their grandparent partners like to do.

The reason we want to know this is to help everyone have healthy hearts. We need your help today. I will give you a Physical Activity Record to fill out. You will also be given one to give to your grandparent partner. You will need to help your partner fill out his/her record.

F. FILLING OUT THE PHYSICAL ACTIVITY RECORD

To tell us about the physical activity you did yesterday, you have a list of activities to help you remember. What day was yesterday?

Physical activity (some people call it exercise) is any movement of your body such as when you move your arms and legs. You do some physical activity when you move from place to place (like walking, running). Can you name some other physical activities?

We're going to ask you how long you did each activity yesterday. We want to see how many you did for 5 minutes or more. Discuss times of common activities: Recess (more than 5 minutes?); brushing teeth (less than 5 minutes?), Song on a CD (less than 5 minutes?) Eating lunch (more than 5 minutes?).

LIST OF ACTIVITIES

Look at the list of physical activities. Have you heard of most of them? Put a check mark by each activity you did IF it was at least 5 minutes. For every activity you did less than 5 minutes, leave it blank in the box.

Don't put the same activity twice. For example, if you played soccer for 15 minutes, put a check next to soccer, not next to running (even though you ran in soccer).

Remember, there are no right or wrong answers. It is important in all of the forms we give you to be very honest.

The list of activities need to be looked at three times-before, during, and after school.

1. Before school-think about what you did yesterday. From the time you woke up until you sat down in class. Now we will go down the list of activities for before school. (Go through the list, top to bottom). Read the number of the activity. For the first few activities use the complete prompts: **Did you do _____ for 5 minutes or more yesterday before school?**

Explain "other" Include name of activity, minutes. (karate, wrestling. Students also put videos, computers, etc. I don't exclude anything for this exercise as the items can be omitted during the coding).

2. During school. Did you do any special activities? Think about physical education, recess, after lunch. Now we will go through the list again. By now you are doing a great job!

If your activity is not on the list, where do you put it? Yes, under "Other".

3. After school. This covers the whole time from when you left school at the end of the school day until you went to sleep. Think about all the places you went yesterday and all the things you did. What did you do after school? How did you get home? Did you play outside? Now we will go down the list one last time.

Did you do _____ for 5 minutes or more yesterday after school?

Now you are finished with this record. Now you are ready to help your grandparent partner complete his/her form. It is a little different than yours. Please take a look at it and see if you have any questions.

We will now collect your forms. Make sure that your name is on them. You did a great job!

Name_____ **Date** _____

Physical Activity Record

Student: Please check each activity that you did for at least 5 minutes **yesterday**. Thank you.

Activity	Before School	During School	After School
1. Bicycling			
2. Swimming laps			
3. Gymnastics: bars, beam, tumbling, trampoline			
4. Exercise: push-ups, sit-ups, jumping jacks			
5. Basketball			
6. Baseball/Softball			
7. Football			
8. Soccer			
9. Volleyball			
10. Racket Sports: badminton, tennis			
11. Ball Playing: Four Square, dodge ball, kickball			
12. Games: chase, tag, hopscotch			
13. Outdoor Play: climbing trees, hide and seek			
14. Water Play: (swimming pool, ocean or lake)			
15. Jump Rope			
16. Dance			
17. Outdoor Chores: mowing, raking, gardening			
18. Indoor Chores: mopping, vacuuming, sweeping			
19. Mixed Walking/Running			
20. Walking			
21. Running			
22. Roller skating, line skating			

Other: (physical activity classes, lessons or teams)			
23.			
24.			

METS

Name_____ **Date** _____

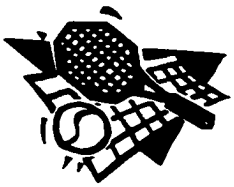
Physical Activity Record

Student: Please check each activity that you did for at least 5 minutes **yesterday**. Thank you.

Activity		Before School	During School	After School
1. Bicycling	4.0			
2. Swimming laps	8.0			
3. Gymnastics: bars, beam, tumbling, trampoline	4.0			
4. Exercise: push-ups, sit-ups, jumping jacks	8.0			
5. Basketball	6.0			
6. Baseball/Softball	5.0			
7. Football	8.0			
8. Soccer	7.0			
9. Volleyball	3.0			
10. Racket Sports: badminton, tennis	7.0			
11. Ball Playing: Four Square, dodge ball, kickball	5.0			
12. Games: chase, tag, hopscotch	5.0			
13. Outdoor Play: climbing trees, hide and seek	5.0			
14. Water Play: (swimming pool, ocean or lake)	6.0			
15. Jump Rope	10.0			
16. Dance	4.5			
17. Outdoor Chores: mowing, raking, gardening	4.8			
18. Indoor Chores: mopping, vacuuming, sweeping	3.5			
19. Mixed Walking/Running	6.0			
20. Walking	3.5			
21. Running	8.0			
22. Roller skating, line skating	7.0			

Other: (physical activity classes, lessons or teams)			
23.			
24.			

Name_____ **Date** _____



Physical Activity Record

Family member: Please check each activity that you spent at least 5 minutes doing **yesterday**.

Activity	Morning	Afternoon	Evening
1. Bicycling			
2. Swimming laps			
3. Exercise: push-ups, sit-ups, jumping jacks			
4. Baseball/Softball			
5. Football			
6. Racket Sports: badminton, tennis			
7. Child care: feeding, lifting, playing with children			
8. Dancing			
9. Outdoor Chores: mowing, raking, gardening			
10. Indoor Chores: mopping, vacuuming, sweeping			
11.Mixed Walking/jogging			
12. Walking: 3 miles per hour			
13. Running			
14. Basketball			

Other physical activity (classes, teams)			
14.			
15.			

Name_____ **Date** _____

METS

Physical Activity Record

Family member: Please check each activity that you spent at least 5 minutes doing **yesterday**.

Activity		Morning	Afternoon	Evening
1. Bicycling	4.0			
2. Swimming laps	8.0			
3. Exercise: push-ups, sit-ups, jumping jacks	8.0			
4. Baseball/Softball	5.0			
5. Football	8.0			
6. Racket Sports: badminton, tennis	7.0			
7. Child care: feeding, lifting, playing with children	3.0			
8. Dancing	4.5			
9. Outdoor Chores: mowing, raking, gardening				
10. Indoor Chores: mopping, vacuuming, sweeping	3.5			
11.Mixed Walking/jogging	6.0			
12. Walking: 3 miles per hour	3.5			
13. Running	8.0			
14. Basketball	6.0			

Other physical activity (classes, teams)			
14.			
15.			

POSTTEST ADMINISTRATION TO STUDENTS

1. Introduce self and any other participants.

My name is _____. As you remember, your class has been selected to be part of an exciting project that's all about how to keep our hearts healthy. How many of you want to have a healthy heart? We also want to find out how 5th grade students like you can share information with older people in your family. How many of you selected an older relative or family friend with whom you can share information?

Today we are going to do several things. First of all, each of you were given a special "Heart" folder that has your special code on it. This same code will be on the papers you receive today. We apologize if we didn't spell your name correctly.

Please remember to bring back the consent forms from your parents and your grandparent or older adult partner. It is very important that you return these forms by _____ (date you will pick up their food records and the forms completed by the grandparent partner).

2. For each of the forms we have for you to fill out, their is one for your grandparent partner. Please take out YOUR heart Healthy Questionnaire. It will have your special code number on it. (Read the instructions from the cover sheet). After introducing section I., students can proceed to answer the questions at their own pace. Some students may need individual help. I reiterate that we want to know what THEY think and that it is important that they complete the whole questionnaire. The HHQ takes about 20 minutes to 1/2 hour the first administration.

3. The Physical Activity checklist is the second item to complete (instruction attached)

4. Begin the Food Record completion (instructions attached).

5. The Family Health Tree envelop and newsprint paper on which to draw the tree were included in your folders. Please try to complete these trees and return them with your completed questionnaires.

Please collect the completed HHQs and Physical Activity sheets
Remind the students that you will pick up their completed Food Record plus their "partner's" HHQ, Food Record, and Physical Activity Record.

For each school, students who complete the forms and the take-home activities will be eligible to win the grand prize of a pair of athletic shoes for the student and his/her adult partner (one set per school). Students at Pinderhughes will be given a sports eraser at the completion of this session as well as receiving a "heart" when they return all of the questionnaires.

Teachers who have participated in this project will receive a Pepper Center tee shirt from the GRECC (Geriatric Research Evaluation and Clinical Center at UMAB). Also, the winning partner from each of the three schools will receive a tee shirt.

Please ask the teachers about the possibility of a student-older partner get-together in which there will heart healthy snacks and physical activity orchestrated by the students. I will coordinate this with the master teachers at al. if feasible.

The date for the drawing will be coordinated with the respective master teacher from each school. I will make sure that you are present to participate in this activity. Again, your participation in this project is GREATLY appreciated.