ASSESSING FACILITATING FACTORS AND BARRIERS TO BODY MASS INDEX SCREENING AMONG SCHOOL NURSES

DISSERTATION

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By

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ABSTRACT

Child obesity among school age children is epidemic in the United States (U.S.). A critical review of literature was completed that concluded that Body Mass Index (BMI) screening for early identification and growth surveillance is needed for successful school-based obesity prevention intervention programs. This study used total survey design methods to identify the BMI screening practices of school nurses (SNs) and to identify the facilitating factors and barriers to BMI screening in public elementary schools among school age populations. Focus groups were used to identify current BMI screening practice in terms of facilitating factors and barriers. Survey methods were used to determine the validity of the barriers and facilitating factors identified in the focus groups. An adapted version of the Health People 2010 Determinants of Health Model guided this research.

Results from 3 focus groups with SNs (N=25) working in public elementary schools indicated that SN BMI screening practice was conditional to policy, school social

and physical environments, risk/protection, and access to quality health care. Themes related to geographic area emerged. All SNs described teachers as the most important facilitating factor. Suburban SNs identified that gym teachers were especially important to their BMI screening process. Urban SNs collectively agreed that trained personnel such as aides would be very helpful for data collection and BMI conversion. Rural SNs were also interested in collaborative work but focused on assisting one another as opposed to hiring assistance.

Primary barriers voiced by SNs included lack of privacy, time, and policy. School size and amount of space the SNs had to assess a child were barriers, but for rural SNs this assumed there was a specific area designated as a clinic. For suburban SNs, having space to obtain BMIs located near a gym class was important. Urban SNs focused their concerns primarily on school organization and the logistic of obtaining data. Age and grade level had an effect on how rapidly data were collected. Geography in terms of the number and distance of schools that any one nurse is assigned affects the time a nurse can collect data.

Subsequent to the focus group work a survey entitled the Body Mass Index Screening Survey (BMI-SS) was developed to allow for a more thorough assessment of SN BMI screening practices. Total survey design methods were used to establish face and content validity as well as baseline reliability. Face validity was established by subjective determination using 3 SN in a focus group discussion. Content validity was established with a Content Validity Index (.80) by 3 SN experts and 10 clinicians. Reliability was established through test-retest by 10 SN certification students. Administration of the survey to a randomly selected group of SNs is recommended so that data can be used to support policy and obesity intervention standards for care of school age children.

The effort given to this work is dedicated to my God, myself, my family, fellow nurses, and all people who battle obesity--- especially children.

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I was privileged to have had the support of Dr. Randi Love. She helped me to clarify ideas and develop my project. Her knowledge about public health and prevention strategies is limitless. She is a dynamic and compassionate educator.

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Stalter, A. M. (2004). Vulnerable populations. In J.J. Fitzpatrick & Meredith Wallace (Eds.), *Encyclopedia of nursing research* (pp. 627-628). New York: Springer.

FIELDS OF STUDY

Major Field: Nursing

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CHAPTER 1

INTRODUCTION

Childhood overweight and obesity have been epidemic in the United States (U.S) for about the past decade (1998-2008) (Ogden, Carroll & Flegal, 2008). Primarily, the long term consequences of childhood overweight/obesity include adult cardiovascular, diabetic, and mental health conditions. The National Children's Study (NCS), lead by the National Institute of Child Health and Human Development, the Centers for Disease Control and Prevention (CDC), the Environmental Protection Agency, and the National Institute of Environmental Health Sciences focuses on the study of children ages 0-4 years. The NCS aims to reduce gestational exposures that include maternal food stuffs, inactivity, and weight gain during pregnancy (Landrigan, et al, 2006). A plethora of obesity prevention research has explored school-age children in the context of family, community, and school settings. The Special Turku Coronary Risk Factor Intervention Project for Children (STRIP), Pathway, and Dietary Intervention Study in Children (DISC) programs are multi-center collaborative trials with on-going involvement with national endorsements that concentrate on school age populations (Caballero et al, 2003; Kaitosaari et al, 2003; Talvia et al, 2006). Results from these and other national studies indicate there is ample primary prevention intervention programming but there is a general lack of secondary prevention intervention programs available in public elementary schools (Moyer, 2005).

Since April 2000, Body Mass Index (BMI) has been adopted by most government and professional organizations as the accepted method of screening for obesity. Controversy exists in whether early identification over overweight and obesity among school age populations are preventive without empirical evidence to support curative intervention (U.S. Preventive Services Task Force (USPSTF), 2005a). This position is based on an association between a negative body image in early adolescence with adult depression and anxiety (USPSTF, 2005b).

This dissertation examines BMI screening of school age children in public elementary schools, specifically barriers to school nurse practice. This research was guided by an adaptation of the Health People 2010 (HP 2010) Determinants of Health Model and aimed to identify multiple factors of BMI screening as a health service in public elementary schools (United States Department of Health and Human Services [USDHHS], 2000). The first component of the dissertation was an integrated review of the literature. The second component of the dissertation was two studies. The results of the integrated review and two studies are presented in Chapters 2-4. Each of these chapters was developed as independent manuscripts for submission to peer-reviewed nursing publications. The aims of each study are presented in Table 1.1.

Results of the integrated review are presented in Chapter Two. In essence, many school-based obesity intervention programs have been designed, but few meet established clinical benchmarks, and implement the full array of clinical practice guidelines. Further, early obesity identification and follow up are essential to reduce long-term adult health risks.

In Chapter Three, the results of a qualitative study that used focus groups of school nurses to identify barriers to BMI screening of school age children (ages 5-12 years) in public elementary schools is presented. Subsequent to the focus group study, a survey was developed to identify barriers to BMI screening in public elementary schools. The reliability and validity of the survey were established and are presented in Chapter Four. A summary of the findings from this dissertation are presented in Chapter Five. Key findings, limitations of each study and implications for further research on BMI screening as obesity preventive practice for specialized nurses who care for school-age children are discussed.

Table 1.1. *Aims of each study according to chapter*

Chapter	Title	Purpose	Aims or Research Questions
2	Child Obesity: Scientific Inquiry into Clinical Practice Guidelines	To present an integrative research review of published literature (1998-2008) related to school-based obesity prevention programs for children 5-12 years old.	1) To determine if the significant findings of published school-based obesity prevention intervention programs for 5-12 year olds meet established clinical benchmarks; 2) To determine if published school-based programs employ National Association of Pediatric Nurse Practitioners (NAPNAP) Healthy Eating and Activity Together (HEAT) Clinical Practice Guidelines for School Age Children.

continued

Table 1.1. *Continue*

Chapter	Title	Purpose	Aims or Research Questions
3	School Nurses Perspectives on Barriers to Body Mass Index (BMI) Screening Practice	To identify barriers and facilitating factors of BMI screening practices among Ohio public elementary school nurses (SNs) who worked in as urban, rural or suburban geographic areas.	1). What are the BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?; 2). What policy factors serve to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?; 3). What factors in the physical environment serve to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban

continued

Table 1.1. *Continue*

Chapter	Title	Purpose	Aims or Research Questions
			public elementary schools in Ohio?; 4). What factors in the social environment serve to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?; 5). What school risk/protection factors serve as to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?; and, 6). What access to quality health care factors

continued

Table 1.1. *Continue*

Chapter	Title	Purpose	Aims or Research Questions
			serves to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?
4	Establishing baseline validity and reliability of a BMI Screening Survey	To psychometrically assess a developed survey aimed at identifying school nurse BMI screening practice, facilitating factors, and barriers in public elementary schools	1). To establish face validity; 2). To establish content validity; 3). To establish reliability of a newly developed survey designed to identify SN BMI screening practice, facilitating factors, and barriers

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CHAPTER 2

CHILD OBESITY: SCIENTIFIC INQUIRY INTO PRACTICE GUIDELINES

ABSTRACT

Childhood obesity and overweight are epidemic in the United States (U.S.), but are not new phenomena. An overabundance of obesity research has explored children from the perspective of disease treatment. A systematic review of 14 Pub Med identified studies was conducted to identify the current body of scientific knowledge as it applies to obesity prevention intervention programs for school age children. Inclusion criteria were published in January 1998 through June 2008, children ages 5-12, public elementary schools, and obesity prevention intervention programs (1,288 studies). Six systematic reviews/meta-analyses, 7 randomized control trials (RCTs), and 1 integrative research (IR) review were critically reviewed. Thirty-four school-based obesity prevention intervention programs were identified and analyzed according to established clinical benchmarks for 1.) daily dietary intake servings; 2.) 11,000 to 12,000 steps per week represented 60 minutes per day of moderate/vigorous physical activity; and, 3.) fasting capillary glucose serum level of 80-100 mg/dl. Those programs meeting the clinical

benchmarks were compared to National Association of Pediatric Nurse Practitioners (NAPNAP) Healthy Eating and Activity Together (HEAT) Clinical Practice Guidelines to determine if guidelines were applied to prevention programs. Two of the 33 programs had statistically significant results, met established clinical benchmarks, and employed NAPNAP HEAT Clinical Practice Guidelines. Only one program applied a Clinical Practice Guideline that focused on early identification and measurement contingent on a BMI above the 95^{th} percentile for age and sex. Implementation of NAPNAP HEAT guidelines in school settings through school nurse collaboration was a practice recommendation. More research is needed to improve the quality of obesity intervention programs available to school age children.

Introduction

Child overweight and obesity are epidemic. Prevalence among school age children has seen the most dramatic increase with one in five U.S. children affected by overweight or obesity (Ogden et al., 2006). Minority and low income children are even more vulnerable, with four in six children affected (Ogden, Carroll, & Flegal, 2008). The purpose of this chapter is to present an integrative research review of the empirical evidence published between January 1998 and June-2008 inclusive, related to school based obesity prevention programs for children 5-12 years old. A critical evaluation of the empirical information influencing the development, prevention, and intervention of childhood obesity, specifically school-age children 5 to 12 years of age in public elementary school settings will be presented. The aims of the review were: 1) to determine if the significant findings from published school-based obesity prevention intervention programs for 5-12 year olds meet established clinical benchmarks; and, 2) to determine if published school-based programs employ National Association of Pediatric Nurse Practitioners (NAPNAP) Healthy Eating and Activity Together (HEAT) Clinical Practice Guidelines for School Age Children.

Critical Review Guidelines

Initially studies were examined using guidelines established by Ryan-Wenger (1992). Although dated, the guidelines are consistent others such as Cooper (1998), Gangong (1987), Polit and Beck (2006), and Whittemore and Knafl (2005). Ryan-Wenger's (1992) guidelines include components essential for evaluating integrity of research methods. Each component involves an in-depth, systematic, iterative, rigorous, and analytical approach that underscores logical flow and internal consistency between stages of the research process. The components are comprised of publication information and credibility, setting, theoretical underpinnings, study design, confounders, samples, data collection methods, instrumentation, interventions, significance of outcomes, and conclusions or interpretations of findings regarding current state of the science. Outcomes from the studies were then analyzed in light of established clinical outcomes and practice guidelines. Clinical outcomes and practice guidelines impacted conclusions and recommendations were then generated for future research.

Methods

Search strategies

A systematic review was conducted to analyze global evidence from published literature on school-based obesity prevention intervention programs. In November 2008, an excess of 144,000 unduplicated research articles spanning years 1927 through June 2008 were identified via www.scholar.google.com using key terms "child" and "obesity." Research from the mid-twentieth century onward reports significant links between obesity and serious health issues such as hypertension, cardio and cerebral vascular diseases, myocardial infarct, cardiac arrest, stroke, and mental illnesses such as depression, bipolar disease, and panic anxiety (Dawber, Moore, & Mann, 1957;; Freedman, Dietz, Srinivasan, & Berenson, 1999; Kannel, Dawber et al., 1961; Richey, 1937; Strauss & Pollack, 2001; Stunkard, Faith, & Allison, 2003). In addition, obesity has also been identified as a precursor to diabetes type II, kidney disease, and cancer (Colditz et al., 2002; Kannel & McGee, 1979; Rose et al., 1974).

Most of the work cited prior to 1979 reference findings from The Fels Longitudinal Study, The British 1946 National Birth Cohort Study, and/or The Framingham and Aberdeen Children studies (Douglas & Blomfield, 1958; *Maternity in Great Britain*, 1948) (See Table 2.1). Based on the original works, several important studies were published between 1980 and the late 1990s. These studies included The Muscatine, Minneapolis Children's Blood Pressure, The Bogalusa Heart Study, The National Health and Nutrition Examination Surveys (NHANES) I-III (1971-1997) and The Princeton School Study (Braddon, Rodgers, Wadsworth & Davies, 1986; Wadsworth & Kuh, 1997) (See Table 2.2). Findings from these studies have provided a foundation for the current scientific state of childhood obesity.

Over this past decade (1998 through June 2008), a surfeit of research has examined child overweight and obesity. A search through the Cumulative Index to

Nursing and Allied Health Literature (CINAHL) database provided 51,338 non-duplicated journal articles with 2,410 peer-reviewed, evidenced-based articles using key words “conception to 12 years of age.” An advanced search through Elton B. Stephens Company (EBSCOhost) for electronic journals set for “research reviews” produced 1,363 reviews for the same parameters.

Selection of studies

Following identification of the 1,363 research reviews, additional conditions were placed upon the selection process. The additional conditions included both inclusion and exclusion conditions. See Figure 2.1 for flow chart on the selection of articles.

Exclusion criteria

Studies were excluded based on the following criteria (a) focus on conception to 3 years of age, (b) focus on other non-school age populations such as pre-kindergarten (age 4 years) or on children ages 12-18 years, (c) non-school based obesity prevention intervention programs, and (d) observational and descriptive studies. Based on these exclusion criteria, 1,349 articles were excluded.

Inclusion criteria

Studies selected for this integrated literature review were (a) published between January 1998-June 2008 inclusive; (b) written in English language; (c) assigned a Pub Med identification number; (d) studies classified as randomize control trial (RCT), case control, cohort, systematic review/meta-analysis, integrated research (IR) review; (e) involved school-based obesity prevention intervention programs, and (f) included children ages 5-12 years.

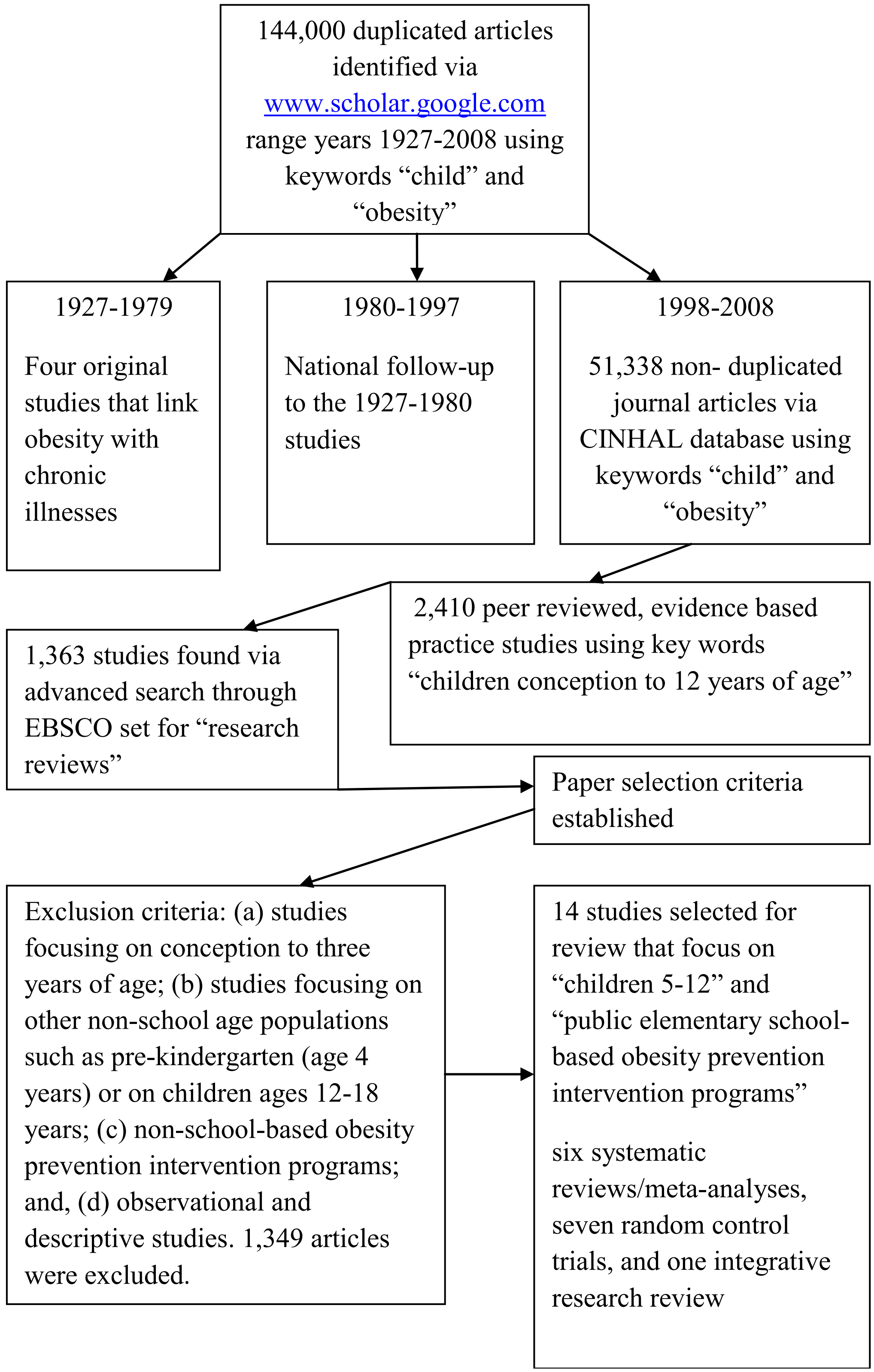

Figure 2.1. Flow chart on the selection of studies for review

The critical analysis of this review will concentrate on the 14 studies that met the inclusion and exclusion criteria. The 14 studies were confirmed via cross-referencing a list obtained using the same parameters from the Cochrane Database of Systematic Reviews. The 14 studies consisted of six systematic reviews/meta-analyses, seven random control trials (RCTs), and one integrated research (IR) review (See Table 2.3). The studies are presented according to type of study, author, title, publication journal, and year.

Duplicate publications. Consistent with Ryan-Wenger's (1992) guidelines to rigorously review articles for originality and replication, the 14 studies that met the inclusion and exclusion criteria were carefully reviewed for duplicated reports on specific school-based obesity prevention intervention programs. When duplicated program reports were identified, an iterative process was used to determine validity of data. The 14 studies included in this study appraised 223 articles from which 16 duplicated publications were identified (Figure 2.2). Therefore, those 16 duplicated publications were re-read, cross-referenced, and re-analyzed in order to identify any missing information or discrepancies as well as to report valid data. For example, 9 of the 209 articles critically reviewed within the six systematic review/meta-analyses were duplicated (See Table 2.4). Similarly, four articles critically reviewed within the IR review article were also presented in the six systematic reviews/meta-analyses. What was unique about the IR work was that the programs were described according to program duration, and such reporting was lacking upon review of the meta-analyses (See Table 2.5). Further, two RCT articles reported on the same program and population within

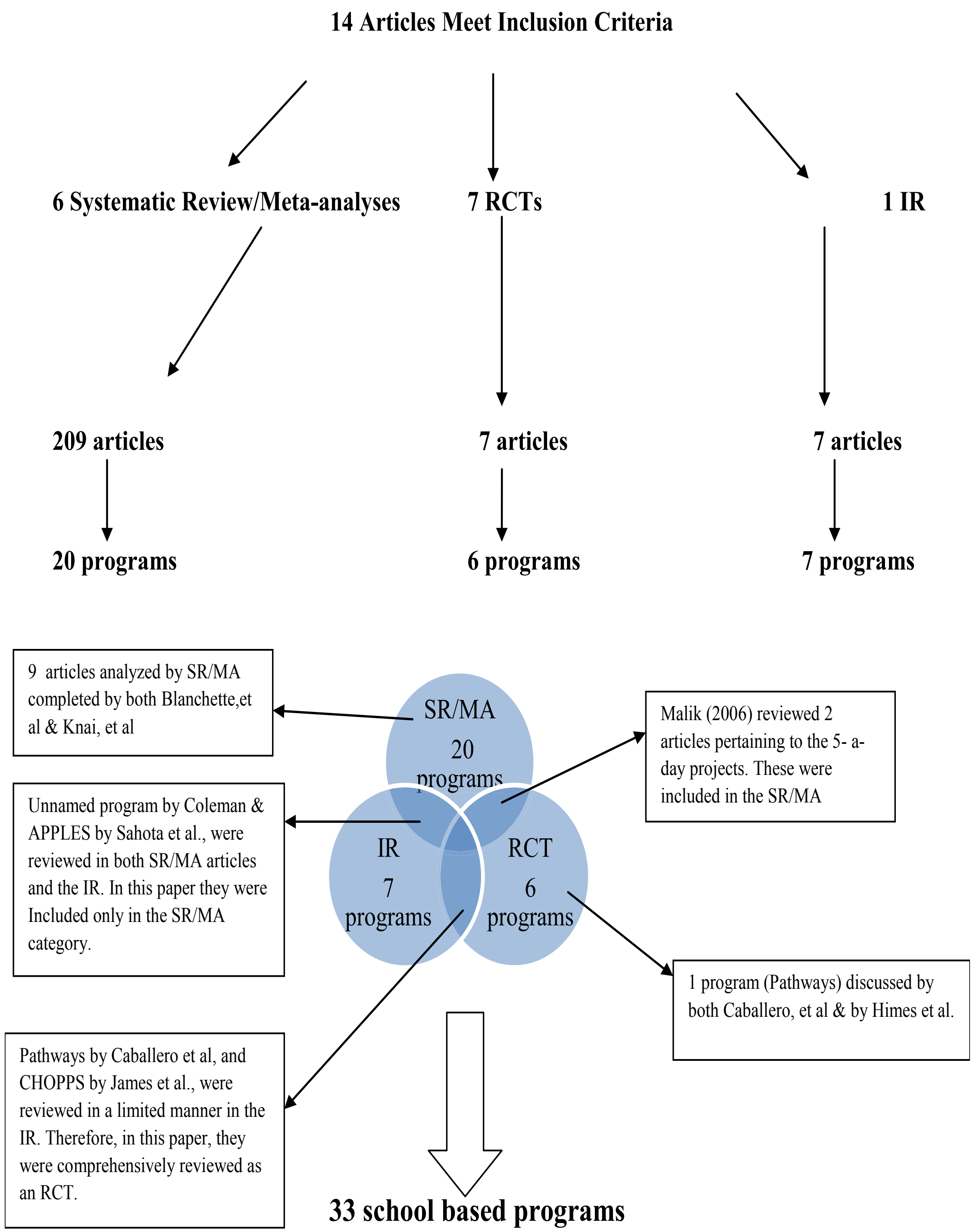

Figure 2.2. Process for identifying and managing duplicated publications

the seven RCT study category. However, the authors reported on the program from different perspectives. For example, one of the two RCT articles provided explicit details about the population and the other study provided specifics about intervention strategies. Another distinction was that the seven RCTs were published later than the articles incorporated into the six systematic reviews/meta-analyses. Two articles were identified in both the IR and RCTs. They were reviewed in a limited manner in the IR and were comprehensively reviewed as RCTs in this paper. For all 16 of the duplicated publications, data were reported so as to not inflate results.

As a result, 33 school-based obesity prevention intervention programs were identified (See Table 2.6). Twenty school-based obesity prevention intervention programs were identified from the 209 articles included in the systematic review/meta-analyses, six school-based obesity prevention intervention programs were identified from the RCTs, and seven school-based obesity prevention intervention programs were identified from the IR.

Results

Publication information and credibility of the 14 reviewed studies

Systematic reviews/meta-analyses. The six studies used over 17 databases and search engines to obtain information on 209 articles (See Tables 2.7 & 2.8). The authors most frequently used Medline (60%) to retrieve the articles and the articles spanned years 1966-2005 (See Table 2.9). All of the authors (n=6) addressed validity assessment. Validity was determined by assessment tools, co-author consideration processes, trained abstractors, and/or by effect (See Table 2.10).

RCTs. Each of the seven RCT studies was published in different journals between the years 2001-2005. The journals were all peer-reviewed, research based journals.

IR. Zenzen and Kridli's (2008) IR provides the most recently published integrated review of school-based obesity prevention intervention associated with school-age child obesity. The seven articles that focused on children ages 5-12 years were critically reviewed for this study (See Table 2.11).

Summary. All 14 studies were published in peer-reviewed, scientific, and credible journals. Each article can be obtained through electronic databases. One study is the most current review on the topic of school-based obesity prevention intervention programs directed at school age children ages 5-12 years.

Settings

Systematic reviews/meta-analyses. Four of these studies included school-based programs implemented in both the U.S and countries outside of the U.S. One article did not report a specific location; however, the setting location was described as "coded" (See Table 2.12).

RCTs. Programs (n=6) were executed in the U.S (n=5), United Kingdom (U.K.) (n=1), and Western France (n=1) (See Table 2.13). Of those school-based program studies implemented in the U.S., three were conducted in the southwest region and two were conducted in Appalachian territories.

IR's. Four of these 7 studies reported that school-based programs took place in the U.S. The remaining three studies were described to have taken place in Chile, Germany, and the U.K. (Table 2.14). In addition, three studies were reported to have taken place in multi-site settings that included a total of 49 public elementary schools (Zenzen & Kridli, 2008).

Summary. Of the 14 studies reviewed, 11 (78.53%) were executed in all regions of the U.S. excluding the northeastern and southeastern states. Three (21%) of the 14 studies were executed in Europe, specifically the U.K., England, Wales, Western France, Germany, Spain, Norway, and Denmark. The remaining study was executed in Chile. In addition, although all 33 school-based obesity prevention intervention programs were implemented in multiple school settings, only Zenzen and Kridli (2008) reported the number of multi-site schools where studies were implemented.

Theoretical underpinnings

Systematic reviews/meta-analyses. Approximately 10 percent of the 19 school-based programs referred to a theoretical framework. The two frameworks described included Social Cognitive Theory and McKinlay's Population Based Health Promotion Model (Ammerman, Lindquist, Lohr, & Hersey, 2002; Blanchette & Brug, 2005). One review used a framework to organize data, but did not report on theories used to guide school-based programs (Blanchette & Brug, 2005).

RCTs. Three of the six school-based programs not report use of a theoretical framework. Conversely, two theoretical frameworks were reported by three of seven articles. The theories which included American Indian Culture and Practices, Self Determination Theory, and Social Ecological Theory were used in combination with Social Cognitive or Learning Theory (See Table 2.15). Two articles referred to sole use of Social Cognitive Theory. One research team incorporated family theory into their study, but did not define that family theory was used.

IR. Three of the 7 school-based programs identified by the seven IR studies reported use of theoretical frameworks (Zenzen & Kridli, 2008). One study employed two frameworks (Transtheoretical Model and Social Cognitive Theory [Hawley, Beckman & Bishop, 2006]). One study used Social Cognitive Theory, and one study used an unnamed framework by Gillespie (1981) (Warren, Henry, Lightowler, Bradshaw & Perwaiz, 2003; Wheling-Weepie & McCarthy, 2005). The remaining four studies were not reported to have used a theoretical framework (Table 2.16).

Summary. Of the 14 studies reviewed, that represent 33 school-based obesity prevention intervention programs, eight (24.2%) programs employed theoretical frameworks to guide interventions. Social Cognitive (Learning) Theory was used most frequently (n=4). Other theories were used to guide populations-based approaches, specifically subgroups such as family, cultures, and children in schools (n=2). In these cases, some studies used two theories where Social Cognitive (Learning) Theory was most often combined with another theory.

Study designs

Systematic reviews/meta-analyses. A number of study designs were reported. Study designs included but were not limited to cross-sectional, prospective cohort, RCT, and non-RCT. A detailed examination of reported designs is presented in Table 2.17. Design diversity was reported as a major limitation to reviewing the articles (Ammerman, Lindquist, Lohr, & Hersey, 2002; Blanchette & Brug, 2005). Duration was difficult to determine. However, all studies were longitudinal in nature having at least two waves of measurement. It was not clear if the studies were repeated measures or time series because many variables, sometimes up to twenty were reported. Data collection times ranged from 12 days to eight years where the most frequently reported data collection time periods were 3 to 5 months, 12-24 months, and 3 to 8 years.

RCTs. Duration was 1 to 3 school years. Data collection ranged 6 months to 3 academic years. The most frequently reported data collection point 1 academic year.

IR. All 7 studies included in the IR were reported as either RCT (n=4) or non-RCT (n=2) in design. One study used a dual design of experimental and non-experimental means (Muller, Asbeck, Mast, Lagnase, & Grund, 2001). (See Table 2.18).

Summary. All of the 14 studies reviewed, used various RCT study designs. The duration of the studies was designed around school years, and the most frequently reported duration was one academic school year.

C*onfounders*

Systematic reviews/meta-analyses. Confounding variables were identified as a major limitation in all six systematic reviews/meta-analyses studies reviewed. Confounders were access and availability of resources, parent modeling behavior, peer influences, television advertising/marketing campaigns, school snacks, policy, and publication bias. Table 2.19 identifies how control of confounding variables was addressed by the systematic reviews/meta-analyses articles.

RCTs. Confounding variables in school-based obesity prevention programming were also reported in all seven RCTs. The variables were under-reporting of dietary intake using 24 hour diet recall, mediation potential, and/or interference of environments outside of treatment settings. Environments outside of intervention settings were described as home, school or after school care settings. Other confounding variables were grocery costs, accessibility and availability of healthful foods, parent modeling behavior, parent-child feeding practices, peer influence, television advertising/marketing campaigns, school snacks, policy, and publication bias.

IR. No specific confounders were identified. Home environments, specifically parental control of fat and sugar intake, time spent watching television, and/or playing video games were reported as fundamental to successful school programs.

Summary. Confounding variables were reported in all 14 studies. School external environmental influence was the primary reason for concern. Specific variables identified by the researchers were influences from a parent, after school care, television, and peers. Publication bias was also presented as a confounding variable by both meta-analyses and RCT authors.

Samples

Systematic reviews/meta-analyses. Of the 209 articles included in the six systematic reviews/meta-analyses, about 130,000 people (ages 4-99 years) were studied. The age range exceeds 5-12 year olds because some articles report an ongoing report from original cohorts dating back as far as 1966. General characteristics per systematic reviews/meta-analyses article are described in Table 2.20. However, due to the variation of reporting by authors, overall sample characteristics for the six systematic reviews/meta-analyses cannot be presented in terms of race, age, sex, or ethnicity.

Nineteen (9%) of the 209 articles included populations aged 5-12 years who were studied in school settings. From these 19 studies, three focused on 5-8 year olds and 9 focused on 9-12 year olds. Eight studies focused on 5-12 year olds who received intervention in school settings (See Table 2.21). Some studies were more exact in describing samples; One defined the sample as a “home ec” class, one defined the sample as Boy Scouts, and one defined the sample as Junior Girls Scouts. Each of these studies is grouped in 9-12 year old category.

RCTs. General characteristics of the seven RCT samples are provided in Table 2.22. The total sample size is 5744. Girls represented 38.4% (n=2207), and boys represented 37.04% (n=2128) of the total sample. The 24.5% (n=1409) of the total sample not reported is represented by two studies that also did not report gender. Neither of these samples was also described as Boy Scouts or Girl Scouts.

None of the seven RCT studies reported socioeconomic data. However, race and ethnicity were reported. Two studies reported Euro-American or Caucasian populations of 50% or greater and four studies involved school-based obesity intervention programs designed specifically for ethnic groups. Ethnic groups were Native American Indians, French, Mexican-Americans, and Flemish populations. Three studies reported intervention programs designed specifically for cultural groups. Cultural groups were rural Appalachian kindergartners, Pennsylvania Dutch school age children, and southwestern English school age children. Age was reported as range or by median age at baseline or end of data collection points.

IR. Table 2.23 provides the general characteristics of the samples identified in the seven IR studies. In total 5,791 children ages 5-12 years were studied. Because gender and race were not reported by Zenzen and Kridli (2008) further description is not provided.

Summary. Of the 14 studies reviewed which represent 33 school-based obesity prevention intervention programs, over 11,535 school age children 5-12 years in grades 1-6 participated in the studies. The distribution of characteristics for ethnicity, gender, race, and socioeconomic background are lacking.

Data collection methods

Systematic reviews/meta-analyses. A variety of data collection methods were used. Data collection methods included standardized assessments, health histories, history of behavior, food knowledge, activity knowledge, and intake patterns. Standardized assessments will be discussed in instrumentation. Health histories were body weight, BMI percentile, family history, risk for obesity, and obesity related diseases. History of food intake behavior was determined by lunch plate observation, food diaries, interviews with parents and children about asking behaviors, taste preferences, home availability of fruits and vegetables, and 1 to 3 day food and activity diaries. Food knowledge was measured by understanding of requirement and intent to eat 5 fruit and vegetable servings per day, attitude about healthy foods, and affect. Activity knowledge was determined by survey. Intake patterns were measured through 24 hour diet recall, parental consumption of fruits and vegetables serving count records for fat, fruit, fiber, carbohydrate, and vegetable intake.

RCTs. Data collection methods varied widely and included the same methods as identified in the systematic reviews/meta-analyses. Additional measures were related to physical exam and physical activity. Physical exam measures were triceps and sub-scapular skin-fold, bioelectrical impulse analysis, hip-waist ratio, and serum fasting capillary glucose levels. Physical activity measures used step count logs.

IR. These studies also used data collection methods consistent of standardized assessments, health histories, history of food intake behavior, food knowledge, activity knowledge, and intake patterns. Additionally, these studies used measures for physical endurance, specifically, the shuttle run test and assessment of lower back flexibility. Television watching time logs and a survey for dietary restraint were also used.

Summary. All (n=14) of the articles used standardized assessments, 24 hours diet recall, face to face interviews, food diaries for fat, fiber, fruit, and vegetable intake, and anthropometric measures such as BMI, skin-fold thickness, and waist circumference. One of the RCT studies used serum samples, and, several RCT and IR studies used step counts and other physical activity measures.

Instrumentation

Systematic reviews/meta-analyses. Several standardized assessment tools were used to collect data. Standardized assessment tools used most frequently were the Child Feeding Questionnaire (n=22), Bob and Tom's Method of Assessing Nutrition (n=22), and Free Access Procedure (n=22). Standardized assessment tools used least frequently were the Determinants of Food Behavior Questionnaire (n=1) and the Knowledge, Attitudes and Practices Questionnaire (n=1). These tools were not described in terms of scoring, reliability, validity, and interpretive parameters.

Twenty-four hour diet recall, observation of plate waste, videos of at home meals, and interview methods were all reported at less than 1%. Most of the studies using food diaries (69.7%; n=30) were school-based studies and focused primarily on soft drink counts. Eighteen (94.7%) of the school-based obesity prevention intervention programs measured fruit and vegetable intake per numbers of daily servings. Fifty-four percent (n=79) of the 209 studies collected body weight information where weight was measured in percent body weight, BMI, or percentiles.

RCTs. The instruments used in the seven RCTs were the same as those identified in the systematic reviews and meta-analyses. About a third of the programs identified in the seven RCTs (n=2), collected physical assessment data. One school based program used BMI percentiles as an indicator for drawing serum fasting capillary glucose levels. Anthropometric measures included percent body fat via bioelectrical impulse analysis, waist-hip ratio, skin-fold, and pounds or kilograms. Additionally, physical activity was measured according to step log counts per week. No discussions were noted that indicated these were reliable and valid measures. However, clinical evidence was provided for use of fasting capillary glucose as a measure of blood sugar, validity and reliability were not reported.

IR. With regard to instrumentation use for the seven IR studies reviewed, over half (n=4) of the studies used BMI as a measure of obesity. BMI was reported as an accurate measure of obesity (Barlow & Dietz, 1998). One of the 4 studies that used BMI to measure body fat also used skin fold and waist circumference as measures of obesity (Warren, Henry, Lightowler, Bradshaw, & Perwaiz, 2003). These measures were not described in terms of reliability or validity.

Nutrition knowledge/behavior was assessed by four of the seven studies where one was reported as “validated.” Two studies measured food intake by self-report one of which included both parent and child reports. The validity and reliability of self-report was not described. Five studies measured physical activity via knowledge/behavior, where one was reported as “validated.” Physical activity was assessed through a step log (n=1), shuttle run test (n=1), lower back flexibility (n=1), and self-report (n=1). Again, reliability and validity of these measures were not described. The Food Frequency Questionnaire (n=1), Fat Intake Questionnaire (n=1), and Global Self Worth Survey (n=1) were the standardized assessments that were reported. The validity and reliability of these instruments were not described.

Summary. Many instruments were used to measure the data collected in the 14 studies reviewed that represented 33 school-based obesity prevention intervention programs. The Food Frequency Questionnaire was used most frequently (n=6). Food intake was most frequently assessed using 24 hour diet recall (n=12) and measures for nutrition knowledge varied. The most frequently used anthropometric measure was the BMI (n=12). Physical activity was assessed via step logs (n=2). In general, survey tools were not described in terms of scoring, reliability, validity, and interpretive parameters. This was especially true of 24 hour diet recall and measures for nutrition knowledge. Fasting capillary glucose levels were established according to clinical evidence, yet not defined as the gold standard. Zenzen and Kridli (2008) identified the BMI as the most accurate measure of obesity and referenced Barlow and Dietz (1998). In general, data regarding validity and reliability of instruments were missing.

Intervention strategies

Systematic reviews/meta-analyses. The 19 school-based obesity prevention intervention programs included a variety of strategies including classroom, school-wide, trained leaders/teachers, peers, cafeteria staff, parent participation, policy, and community involvement (See Table 2.24). The majority (n=16) of the programs used classroom strategies as part of interventions. Curricular components of diet, physical activity, perks and fun, and healthy lifestyle were implemented in single and combination. Some lessons were provided in specials classes such as "home ec" or physical education. Three programs did not describe classroom strategies.

Community was also included as a strategy for intervention and included an extensive array of applications (n=9). Examples include family fun events college ball team Internet support, ethnic events, sports programs for overweight children, and after school care integration. Eight of the 20 school based programs implemented school-wide strategies. These strategies included using kiosks for information, another used food "clubs," and others used prizes or rewards for proper food selection. The most frequently used strategy was to provide physical activity opportunities for children.

Trained teachers or leaders were used as intervention strategies (31.5%) to oversee programs. These leaders included special resource teachers, nutritionists, parent volunteers, researchers, and teachers. Food staff was used to reinforce food selection in the cafeteria (31.5%).

Some programs (n=6) used newsletters to update parents on child participation requirements and to request assistance with certain aspects of the program. Parent assisted homework assignments were used in two of the programs. No school policy was implemented in any of the school-based obesity prevention intervention programs, yet Boy Scout, Girl Scout, Norwegian Food Program, and Danish Food Program for snacks used national policies in program delivery (n=3).

RCTs. The six school-based obesity prevention intervention programs identified in the seven RCT studies also used a variety of strategies such as classroom, school-wide, trained leaders/teachers, peers, cafeteria staff, parent participation, policy, and community involvement (Table 2.25).

Food staff intervention strategies were described as point of purchase (POP) or as “low fat meal prep,” by two programs. Three programs defined parent participation as completion of enrollment and homework packets, use of snack packs and participation in community cooking classes. In four programs, community involvement was defined as a broad category that included ethnic/cultural philosophy or events (n=1), Internet support (n=1), after school care integration (n=1), and college ball team mascot (n=1).

IRs. The seven IR school-based studies also used a variety of strategies such as classroom, school-wide, trained leaders/teachers, parent participation, and community involvement were implemented (Table 2.26). Peers, cafeteria staff, and policy were not reported strategies. One study reported classroom strategies as physical activity and recess. School-wide intervention strategies were defined as kiosks (n=1) and playground and "lunch time club" (n=1). One study reported use of nutritionists that emphasized increasing of food and vegetable consumption. Six did not report any use of trained leaders/teachers. Two studies used parents to increase physical activity, , and one involved parents to decrease television watching time (n=1). Community involvement was described as a family fun night by one study and as a sports program for overweight children in another study.

Summary. Twenty-eight of the 33 school-based obesity prevention intervention programs used classroom strategies. Of these, 24 programs reported that classroom strategies were implemented in sessions/lessons. The focus of these lessons included nutrition and physical education. From 1 to 50 sessions ranged in time from 30-60 minutes over a 2 week to 3 year span. Some lessons were provided in specials classes such as "home ec" or physical education. Thirteen programs implemented school-wide strategies where the most frequently used strategy was to provide physical activity opportunities (n=5) for children. Eleven programs used trained teachers or leaders to oversee the program. The most frequently used leaders were special resource teachers (n=3). Eleven programs used food staff to reinforce food selection in the cafeteria. The most common use of food staff was for POP reinforcement (n=4). Nineteen programs used parent participation via newsletters to update parents on child participation requirements (n=4).

No school policy was implemented in any of the school-based obesity prevention intervention programs. About 12% (n=4) of the programs did include national policy specific to value based program support (n=2) and free food program rules (n=2). Community was included as a strategy for intervention in 15 programs. Strategies included an extensive array of applications including family fun events (n=3), college ball team mascot (n=1), Internet support (n=1), ethnic events (n=1), sports programs for overweight children (n=1), and after school care integration (n=1).

Curricular components

Systematic reviews/meta-analyses. The 19 school-based obesity prevention intervention programs used four basic curricular components. These curricular components included diet, activity, perks or fun, and healthy lifestyle education (See Table 2.27). Some studies used a combination of components in separate waves, but no one study used all 4 curriculum components. Eight programs employed 3 out of 4 curricular components and six programs employed 2 out of 4 curricular components. The most frequent combination was diet and perks or fun (n=5).

Curricular components (RCTs). The same four basic curricular components and combinations as were identified in the RCTs as were in the systematic reviews/meta-analyses (See Table 2.28).

Curricular components (IRs). The seven IR school-based obesity prevention intervention programs provided similar curricular components as the systematic reviews/meta-analyses and/or RCTs (Table 2.29). The combinations of components used were also consistent, however; three programs employed all four components in combination and one program used only one component.

Summary. All of the 33 school-based obesity prevention intervention programs used curricular components. Twenty-seven programs employed diet, 12 programs employed activity, 25 employed perks and fun, and 17 used healthy life style education components in program curriculum. All four components were integrated into 3 of the 33 programs. Fourteen programs used a combination of three components. Dual combinations most frequently included diet with perks and fun (n=5). One program used one curricular component change that was classified as "cafeteria changes only."

Outcomes

Systematic reviews/meta-analyses. Forty-three positive changes were recorded in all of the school-based studies (n=19). Of those positive changes, 15 were statistically significant and represented 10 school-based programs. All of the statistically significant results included fruit and vegetable serving intake. Other statistically significant results included self-efficacy (n=1), knowledge (n=2), preference (n=1), health conscious parental attitudes (n=1), total fat (n=1), saturated fat (n=1), relationship between encouragement and choice (n=2), and not reported (n=3).

Outcomes for RCTs. Twenty positive changes were recorded in all of the school-based studies (n=6). Of those positive changes, 11 were statistically significant and represented all six school-based programs. Statistically significant results included dietary intake related variables (n=8), fasting capillary glucose levels (n=1), knowledge (n=1), physical activity (n=1), preference (n=1), and intent (n=1).

IRs. Twenty-seven positive changes were recorded in all of the school-based studies (n=7). Of those positive changes, 11 were statistically significant and represented four of the school-based programs (n=6). Significant findings were related to knowledge (n=6), physical activity (n=3), and behavior (n=2).

Summary. Of the 33 school-based obesity prevention intervention programs, 88 positive changes were reported. Of these, 46 (52.2%) were reported as statistically significant. Eighteen (39.1%) of significant results were related to daily dietary intake. Nine (50%) of the significant findings related to diet considered daily fruit and vegetable servings. Other significant results were related to knowledge (n=9), behavior/attitude/intent (n=4), preference/efficacy/choice/encouragement (n=4), physical activity (n=3), and fasting capillary glucose (n=1).

Clinical Benchmarks

Ryan-Wenger's guidelines recommend making certain that findings outcomes are compared to current science. Thus, outcomes were categorized into six distinct areas: dietary intake, glucose level, physical activity, knowledge and behavior. Current science was defined by government standards or most current empirical evidence. Clinical benchmarks were established as comparison indicators for meeting or not meeting scientific standards.

Dietary intake

Dietary intake clinical benchmarks were established as 5 fruits and vegetable servings per day; 2.0-3.0 fruit servings per day; 2.0-3.0 vegetable servings per day; maximum daily saturated fat intake of 20 grams (10% total daily caloric intake; a maximum daily total fat intake of 65 grams (or 35% total daily caloric intake); a maximum daily total carbohydrate intake of 300 grams (14 grams of fiber per 1000 calories); and, zero sweet intake according to the Dietary Guidelines for Americans (2005).

Fasting capillary glucose

The clinical benchmark of fasting capillary glucose levels of 80-110 mg/dl as within normal limits was established according to Weiss, Dzuira, Burget, Tamborlane, & Yackel et al. (2004) and The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus (2002).

Physical activity

The benchmark of 11,000-12,000 steps per week was used as an indicator for child physical activity as supported by Tudor-Locke & Bassett (2004) and is equivalent to 60 minutes of moderate to vigorous exercise per day (Corbin & Pangrazi, 2003).

Knowledge and behavior

No clinical benchmarks could be established for knowledge and behavior specific to food preference, nutrition knowledge, or intent to select and eat healthy foods.

Systematic reviews/meta-analyses. All of the significant findings (n=15) were compared to the established clinical benchmarks (Table 2.30). Of the significant findings identified in the systematic reviews/meta-analyses, two programs represented clinical benchmarks that were met. For 13 programs, it was not possible to determine if clinical benchmarks were or were not met due to insufficient reporting of baseline data. Of the clinical benchmarks that were met (n=2), one school-based program, 5-a-day Cafeteria Plus, was represented (Story et al,, 2000). Five-a-day Cafeteria Plus reported that the mean number of fruit choices increased to 4.0 servings per day and the mean number of vegetable choices increased to 2.2 servings per day post intervention. Even though no baseline data were reported, outcomes were above minimum daily serving intake.

RCTs. All of the significant findings (n=11) were compared to established clinical benchmarks (Table 2.30). One program, Bienestar, reported one significant finding that represented one clinical benchmark that was met (Trevino et al., 1998). The benchmark consisted of lowering fasting capillary glucose levels to 80-110 mg/dl. Conversely, three clinical benchmarks were not met by two of school based programs. These programs included CARDIAC-Kinder and Christchurch obesity prevention program in schools (CHOPPS) (Cottrell et al., 2005; James et al, 2004). Seven of the significant findings were unable to be determined as met or unmet due to insufficient reporting of data.

IR. Two of the significant findings (n=11) were compared to the established clinical benchmarks (See Table 2.30) Of these, none could be determined as met or not met due to an insufficient reporting of baseline data. The remaining nearly nine findings were not compared to clinical benchmarks because none were established (n=7) or the benchmark used was not considered the best indicator or measure of the outcome (n=2). For example, increased activity levels post intervention was determined by metabolic equivalent of task scores (METS). According to Byrne, Hill, Hunter, Weinsier, and Schutz (2005), METS is a scientific convention that has gained widespread application, but it is not the best indicator of improved physical activity. In essence, none of the school-based programs identified in the IR review (n=7) with statistically significant findings met any established clinical benchmark.

Summary. Three of the 46 statistically significant findings met clinical benchmarks. The clinical benchmarks were indicative of dietary intake and energy metabolism, specifically fruit and vegetable servings and blood glucose levels. These originated from two school-based programs, 5-a-day Cafeteria Plus and Bienestar (Story et al., 2000; Trevino et al., 1998). In contrast, three statistically significant findings did not meet clinical benchmarks. These were represented by the school-based programs Cardiac-Kinder and CHOPPS where the common benchmark was related to sugar and soda intake above zero (Cottrell et al., 2005; James et al, 2004). Cardiac-Kinder also fell below clinical child physical activity benchmarks (Cottrell et al., 2005). Insufficient data were reported concerning 18 of the significant findings and so a determination could not be made concerning meeting/not meeting clinical benchmarks (Table 2.32).

NAPNAP HEAT Clinical Practice Guidelines for School-Age Children

Forty NAPNAP HEAT Clinical Practice Guidelines were used to evaluate school-based obesity prevention intervention programs in terms of quality nursing care (See Appendix A). The 40 clinical practice guidelines are divided into five sections: Early Identification; Developmental and Communication Consideration; Nutrition Essentials, Optimal Feeding, and Eating Behavior; Physical Activity and Sedentary Behavior; and, Advocacy. Each section is then divided into nursing skill sets and culturally appropriate recommendations. Studies were assessed for the nursing skill sets and not assessed for culturally appropriate recommendations.

Section 1 Early Identification encompasses seven skill sets: history, measurements, physical exam, education, and a recommendation for Native American mothers who have a history of diabetes. Section 2 Developmental and Communication Consideration is comprised of 10 skill sets: assessment, education, and three culturally appropriate recommendations. Section 3 Nutrition Essentials, Optimal Feeding, and Eating Behavior encompasses seven skill sets: assessment, education, and two culturally appropriate recommendations. Section 4 Physical Activity and Sedentary Behavior is comprised of five skill sets: assessment, education, and two culturally appropriate recommendations. Section 5 Advocacy contains 11 skill sets with responsible behaviors for: school age children, parents and teachers, and providers.

Section 1 Early Identification

Systematic reviews/meta-analyses. None of the 7 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by any of the 19 school-based programs identified in the systematic reviews/meta-analyses that reported statistically significant findings and that met clinical benchmarks.

RCTs. One of the 7 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by one of the school-based programs. The guideline and skill set was Measurement 5, performance of a fasting glucose test. Conditions for obtaining a fasting capillary glucose level is for a school age child to have a BMI of > than or equal to 95%. The clinical benchmark of 80-110 dl/ml was met by the program, Bienestar (Trevino et al, 1998).

IRs. None of the 7 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by any of the seven school-based programs identified in the IR review.

Section 2 Developmental and Communication Considerations

None of the NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented in any of the 19 school-based programs identified in the systematic reviews/meta-analyses that reported statistically significant findings and that met clinical benchmarks. This was also true of the 6 school-based programs identified in the RCTs and for the 7 school-based programs identified in the IR review.

Section 3 Nutrition Essentials, Optimal Feeding, Eating Behaviors

None of the 7 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by any of the 19 school-based programs identified in the systematic reviews/meta-analyses that reported statistically significant findings and that met clinical benchmarks. In addition, none of the 7 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by the six school-based programs identified in the RCTs that reported statistically significant findings and that met clinical benchmarks. Further, none of the 7 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by any of the 7 school-based programs identified in the IR review.

Section 4 Physical Activity and Sedentary Behavior

In regards to the 19 school-based programs identified in the systematic reviews/meta-analyses that reported statistically significant findings and that met clinical benchmarks, none of the 5 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented. With respect to the seven RCTs that reported statistically significant findings and that met clinical benchmarks, none of the 5 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented. And, in reference to the 7 school-based programs identified in the IR review, none of the 5 NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented. .

Section 5 Advocacy

Systematic reviews/meta-analyses. Two of the 11 NAPNAP HEAT Clinical Practice Guidelines and skill sets from Section 5, Advocacy, were implemented by one school-based program. The school-based program included 5-a-day Cafeteria Plus (Story et al., 2000). Interventions involving school age children established school environments conducive to healthy eating and regular physical activity (Skill set 1) and executed changes in curriculum that involved in-school advertising (color coded cafeteria selections) and that offered overweight prevention efforts (Skill set 3). Interventions involving parents and teachers led efforts demanding school lunches that provided a variety of healthy foods, emphasized proper portion size, and minimized foods that were high in fat and calories and that were low in nutrient value (Skill set 6a-c).

RCTs. None of the eleven NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by the six school-based programs identified in the RCTs that reported statistically significant findings and that met clinical benchmarks.

IR. None of the eleven NAPNAP HEAT Clinical Practice Guidelines and skill sets was implemented by any of the 7 school-based programs identified in the IR review.

Summary. Of the 33 school based programs that reported significant findings and that met clinical benchmarks two programs were compared to each of the 40 NAPNAP HEAT Clinical Practice Guidelines sections and skills sets. The school based program, Bienestar, employed NAPNAP HEAT Clinical Practice Guideline Section 1 Early

Identification through the skill set of Measurement, specifically of fasting capillary glucose levels. Fasting capillary glucose levels were obtained subsequent to measurement of a BMI equal to or above 95th percentile. The school-based program, Five-a-day Cafeteria Plus, applied NAPNAP HEAT Clinical Practice Guideline Section 5 Advocacy, through school age children, teachers, and parents who advocated for changing in school lunch choices that included fruit and vegetable selections (Table 2.30).

Discussion

Ryan-Wenger's (1992) guidelines for a critiquing research reports was used to complete a critical analysis of 14 studies that included six systematic reviews/meta-analyses, seven RCTs, and one recently published IR review. The review established that the 14 studies were obtained from credible resources as evidenced by thorough reviews of databases, use of assessment tools to validate selection of articles, and publication of articles in peer-reviewed, scientific journals. The articles used a variety of research designs to yield limited data on variables such as improved dietary intake and physical activity. In all, 33 school-based programs were identified from 244 articles. In addition, this is the first known study to examine if NAPNAP HEAT Clinical Practice Guidelines are aligned with significant findings from school-based obesity prevention intervention programs that met established clinical benchmarks. Each of the study aims will be briefly summarized.

Aim 1, School-based obesity prevention intervention programs. Overall, most school-based programs reported a positive impact on knowledge, attitudes, and behavior. Lacking is the statistical evidence to support that such outcomes are long-term and found to reduce the prevalence of obesity among children (Sharma, 2006). Establishing clinical significance of school-based interventions for the long-term management of obesity among school age populations is crucial to public health policy (Swinburn, Gill & Kumanyika, 2005).

The 33 school-based programs presented in this study were identified from an extensive and rigorous review of literature. Each program was evaluated based on established clinical benchmarks and nursing clinical practice guidelines, a fundamental approach to determining quality and accurate outcomes (Harris et., al, 2001; Lohr, 1995). An important finding from this study was that only two programs were statistically significant, met established clinical benchmarks, and implemented clinical practice guidelines. These school-based obesity prevention intervention programs were Bienestar and 5-a-day Cafeteria (Trevino et al., 1998; Story et al., 2000).

The Bienestar program was distinctive because it executed early identification measures, specifically fasting capillary glucose levels that were contingent upon BMI results above 95th percentiles. No other school-based program was identified as using BMI screening as a measure that influenced statistically significant outcomes.

Five-a-day Cafeteria Plus was unique because it increased fruit and vegetable selection and consumption based on manipulation of environment, as well as, advocacy for improved lunches by involving children, teachers and parents.

Aim 2, Programs that met Clinical Practice Guidelines for School Age Children. Each program was compared to established clinical benchmarks and clinical practice guidelines. The NAPNAP HEAT Clinical Practice Guidelines served as a quality indicator for nursing care because they were established by NAPNAP work groups and focused on evidence-based practice rationale for the purpose of “primary prevention of obesity through healthful nutrition practices, encouraging increased physical activity, and supporting positive lifestyle choices” (Journal of Pediatric Health Care [JPHC], S4, 2006). The Clinical Practice Guidelines were developed to address current public health practice trends including early identification, culture, and advocacy (JPHC, 2006).

In essence, of the 33 school-based obesity prevention intervention programs that reported 46 significant findings, two programs met three established clinical benchmarks and implemented two clinical practice guidelines. None of the programs employed all established clinical practice guidelines for school age children. Of particular interest is the school-based program, Bienestar. Early Identification was implemented in the form of measurement as exemplified by fasting capillary glucose levels that were within normal levels post-intervention. Remarkably, there are six other clinical practice guidelines contained in Section 1 Early Identification that were not addressed by this or any other school-based program. In addition, fasting capillary glucose levels are contingent on BMI above 95^{th} percentile, and no data were provided on BMI status post-intervention.

Noteworthy is that no school-based obesity prevention intervention programs with significant findings and that met established clinical benchmarks implemented Sections 2-4 of the NAPNAP HEAT Clinical Practice Guidelines. This finding may be related to the fact that studies were published before the NAPNAP HEAT Clinical Practice Guidelines were available. It may also be attributed to a lack of sufficient reporting where many programs omitted baseline data. For example, although insufficient data were presented for soda intake, 13 schools implemented Section 3 Nutrition Essentials, Optimal Feeding, Eating Behaviors via Education skill sets. The clinical benchmark for soda intake was reported as not met. Classroom curriculum for diet education was a common strategy used by most of the programs. Even with classroom education, zero servings of soda pop intake were not met. Henry and Garcia (2005) advocate zero tolerance school policy for student soda consumption as a response to "pouring rights" contracts with soft drink companies because of the desperate need for the preservation of student health. Further, soda intake fulfills only one of 7 multi-factored Clinical Practice Guidelines and skill sets within Section 3.

There is a lack of evidence supporting implementation of Section 4 Physical Activity and Sedentary Behavior. This is problematic. In part, this is because the clinical benchmark for increasing steps per week (11,000-12,000) via education and parent participation was not met. This approach addressed only one of five Clinical Practice Guidelines and skill sets. This means that even with parent participation the program, CARDIAC-Kinder, fell short of recommended daily activity needs for children (Cottrell et al., 2005).

Five-a-day Cafeteria Plus successfully implemented Section 5 Advocacy in the form of school age children, parent, and teacher involvement. Another important skill set for the Clinical Practice Guideline is to include providers in the approach to increase daily intake of fruits and vegetables. The National Association of School Nurses advocates for school policy banning vending machine use during school hours (Sheehan & Yin, 2006). Despite advice from the national level regarding vending machines, provider skill sets for nutrition advocacy and the banning soft drink consumption in schools were not evident.

According to Harris, Helfand and Woolf (2001), programs that establish statistically significant results, meet clinical benchmarks, and that include Clinical Practice Guidelines are consistent with best practice standards. Results from this study suggest aspects of Bienestar and 5-a-day Cafeteria Plus have attributes of best practice. This is not to suggest that other school-based programs that were reviewed do not have best practice attributes. These were the only programs to have provided the data to compare outcomes to established clinical benchmarks and NAPNAP HEAT Clinical Practice Guidelines.

It was also observed that no NAPNAP HEAT Clinical Practice Guidelines address the following: assessment of bowel patterns, food allergy; food-drug interactions; diseases associated with genetic clustering of obesity traits; sexual abuse victimization; and, multi-handicap conditions or children with learning disabilities. Each of the listed situations has been found to complicate weight management interventions (Butte, Cai, Cole & Comuzzie, 2006; Gustafson & Sarwer, 2004; Harris, Jang, & Tsunoda, 2003; Latner & Stunkard, 2003; Locke et al., 2000). Lastly, there is no NAPNAP Clinical Practice Guideline to advise nurses on weight loss protocol or to refer nurses to the American Academy of Pediatrics or American Medical Association recommendations for pediatric weight loss. Clarification and direction is needed for nurses to establish safe energy gaps for weight reduction, weight loss of 1-2 pounds per week, or referral to another health care provider needs clarification (Field et al., 2001; O'Brien, Holubkov, & Reis, 2004; Wang, Gortmaker, Sobol, & Kuntz, 2006).

Review limitations. Two limitations to this research are related to methods. The first limitation is that the literature search did not encompass search engines that provided more international sources. Although articles reviewed here included global examples, a majority of the articles represented school-based programs that were implemented in the U.S. Diversity in subgroups, cultures, ethnicities, races, and lifestyle is not well described. Cooper (1984) cautioned that inadequate sampling can result in poor validity if "multiple channels" or a full range of databases are not used to critically review. Some international databases that could provide additional articles that are not part of the PubMed Identification system are: Biblioline; GlobalEDGE; Center for Rehab Research Information and Exchange (referred to as CIRRIE); Proquest Info; International Occupational Health Information (referred to as ILO-CIS); and, International Bibliographic Information on Dietary Supplements (referred to as IBIDS).

The second limitation is that of publication bias. Sutton, Duval, Tweedie, Abrams and Jones (2000) noted that systematic reviews/secondary analyses and integrative reviews frequently pool study results, report findings based on article submission length restrictions, and fail to perform sensitivity analyses of missing studies. Macaskill, Walter, and Irwig (2001) suggest using funnel plots, a common method of determining presence of publication bias, to determine if publication bias is present in an article. Funnel plots use a log scale that includes sample sizes to determine true treatment effects. Pocock and Elbourne (2000) suggest that the prudent, time consuming, and rigorous practice is to go back to original studies and check reported results. Either approach would improve the credibility of the findings.

Recommendations

Key findings from this integrative research review include that (1) BMI as an early identification measure for obesity facilitated significant findings that met fasting capillary glucose levels; and (2) when applied to school-based programming and school communities, deficiencies in NAPNAP HEAT Clinical Practice Guidelines were evident. It is recognized that NAPNAP HEAT Clinical Practice Guidelines were aimed at primary care and not a school communities. However, because school communities are settings where obesity intervention is being applied, two fundamental recommendations are offered. The recommendations are: (1) Work groups revisit the Clinical Practice Guidelines for School Age Children and revise them to include allergy concerns, nutrition and activity knowledge bases and reassessments, and children with learning disabilities and victims of sexual abuse so that accurate health histories can be obtained; and, (2) School-based obesity prevention intervention programs employ routine BMI screenings (Section 1, Early Identification, Measurement) as a means of monitoring program success.

Zenzen and Kridli (2008) identified that the most effective school-based obesity prevention intervention programs need to be guided by behavioral theory, use experimental design, include modifications for diet and exercise, involve parents, educate about healthy lifestyle, and use BMI as a measure to determine long-term success. It is crucial that a program be of a duration that allows for cues (by parents at home, cafeteria staff at school lunch time, nurses providing health care intervention, and adults in classroom or afterschool programs) to influence children and for children to respond to reinforcements. For example, a program that is long enough to show changes in weight from healthy eating and physical activity. The findings from this research validate that much knowledge has been gained about prevention intervention programming and that more information is needed to understand effective school-based obesity prevention intervention programs. Reproducibility and exhibition of a program that is capable of producing ideal weight with long-term results is ideal but is probably not realistic because of the multiple factors affecting child obesity.

Findings from this integrative review indicate that statistically significant long-term aggregate level changes in nutrition and exercise are not evident. The results of this review suggest that including BMI screening in school-based obesity prevention intervention programs is important practice, but additional studies need done in order to determine that BMI screening has long term prevention. The results also suggest that advocating for improved dietary selections and physical activity are also important practice considerations. Findings from this review also suggest that implementation of NAPNAP HEAT Clinical Practice Guidelines 2-4 are not being reported or assessed in published and successful school-based obesity prevention programming. Likewise, the NAPNAP HEAT Clinical Practice Guidelines are lacking in terms of assessment of more vulnerable and chronic school age children.

Because nurse practitioners have created and led health care providers to a best practice standard with the NAPNAP HEAT Guidelines, it is recommended that they implement what Halfon and Hochstein (2002) referred to as collaborative reform. In the case of school-based obesity programs, nurse practitioners are vital to HEAT initiatives and implementing the Advocacy Clinical Practice Guidelines for school age children. However, school nurses are also crucial to HEAT Clinical Practice Guideline implementation. A collaborative arrangement where pediatric nurse practitioners lead the nursing team in the implementation of NAPNAP HEAT Clinical Practice Guidelines and where school nurses lead the school community in wellness reform is recommended. Ideally, the collaborative should create school-based obesity prevention intervention programs that have positive outcomes for nutritious intake, energy expenditure that build cardiac strength and that manage weight, while meeting established clinical benchmarks, and implementing Clinical Practice Guidelines.

Where the goal of public health best practice is to develop and implement evidence-based practice into efficient and effective programs, finding one program that meets the needs of all school age children is an unrealistic challenge (Brownson et al, 2003). So, NAPNAP HEAT Clinical Practice Guidelines can be used as indicators for quality nursing care of school age children with overweight/obesity concerns and to design programs that meet health concerns for more vulnerable subgroups of school age children. Because nurse practitioners wrote the guidelines, and school nurses promote and protect child health in the school setting, a collaborative effort is important to combat child obesity through best practice standards.

Table 2.1. *Review of literature: Original studies that link obesity with chronic illnesses (n=4)*

Author(s)	Title of Article	Journal, Volume, Page Number, and Year
Dawber, T, Moore, F., & Mann, G.	Coronary heart disease in the Framingham Study.	*American Journal of Public Health*. *47*, 4–24. (1957).
Douglas, J., & Blomfield, J.	Children Under Five. (A report on the British 1946 National Birth Cohort Study)	London: Allen and Unwin Ltd. (1958).
MacKenzie, H.	The city of Aberdeen. The Third Statistical Account of Scotland.	Edinburgh, UK: Oliver and Boyd, (1953).
Richey, H.G.	The relation of accelerated, normal and retarded puberty to the height and weight of school children	*Monographs of the Society for Research in Child Development*, *2*(1), *i*-67. (1937).

Table 2.2. *Review of literature: Critical observational studies related to child obesity completed prior to 1998 (n=13)*

Author(s)	Title of Article	Journal, Volume, Page Number, and Year
Bao, W., Srinivasan, S., Valdez, R., Greenlund, K., Wattigney, W., & Berenson, G.	Longitudinal changes in cardiovascular risk from childhood to young adulthood in offspring of parents with coronary artery disease: Bogalusa Heart Study.	*Journal of American Medical Association*, *278*(21), 1749-54. 1997.
Berenson, G., et al.	Atherosclerosis of the aorta and coronary arteries and cardiovascular risk factors in persons aged 6 to 30 years and studied at necropsy (Bogalusa Heart Study).	*American Journal of Cardiology*, *70*(9), 851-8. 1992
Clarke, W., Woolson, R., & Lauer, R.	Changes in ponderosity and blood pressure in childhood: the Muscatine Study.	*American Journal of Epidemiology*, *124*(2), 195-206. 1986.

continued

Table 2.2. *Continue*

Author(s)	Title of Article	Journal, Volume, Page Number, and Year
Ezzati R.M., Massey J.T., & Waksberg, J.	Sample design: Third National Health and Nutrition Examination Survey.	Vital Health Stat 2 1992. Publication Number 113.
Freedman, D., Srinivasan, S., Harsha, D., Webber, L., & Berenson, G.	Relation of body fat patterning to lipid and lipoprotein concentrations in children and adolescents: the Bogalusa Heart Study.	*American Journal of Clinical Nutrition*, *50*(5), 930-9. 1989
Gillum, R.F., Elmer, P.J., & Prineas, R.J.	Changing sodium intake in children. The Minneapolis Children's Blood Pressure.	*Hypertension. 3*,698-703. 1981.

continued

Table 2.2. *Continue*

Author(s)	Title of Article	Journal, Volume, Page Number, and Year
Jiang, X., Srinivasan, S., Webber, L., Wattigney, W., & Berenson, G.	Association of fasting insulin level with serum lipid and lipoprotein levels in children, adolescents, and young adults: the Bogalusa Heart Study.	*Archives of Internal Medicine*, *155*(2), 190-6. 1995.
Mahoney, L., Burns, T., Stanford, W., Thompson, B., Witt, J., Rost, C. et al.	Coronary risk factors measured in childhood and young adult life are associated with coronary artery calcification in young adults: the Muscatine Study.	*Journal of the American College of Cardiology*, *27*(2), 277-84. 1996

continued

Table 2.2. *Continue*

Author(s)	Title of Article	Journal, Volume, Page Number, and Year
McDowell A, Engel A, & Massey, J.	Plan and operation of the Second National Health and Nutrition Examination Survey: 1976-1980.	Vital Health Stat 1 1981. Publication No.: 15.
Morrison, J., James, F., Sprecher, D., Khoury, P., & Daniels, S.R.	Sex and race differences in cardiovascular disease risk factor changes in schoolchildren, 1975–1990: the Princeton School Study.	*American Journal of Public Health. 89,* 1708–1714. 1999.
Myers, L., Coughlin, S., Webber, L., Srinivasan, S., & Berenson, G.	Prediction of adult cardiovascular multifactorial risk status from childhood risk factor levels. The Bogalusa Heart Study.	*American Journal of Epidemiology*, *142*(9), 918-924. 1995.

continued

Table 2.2. *Continue*

Author(s)	Title of Article	Journal, Volume, Page Number, and Year
National Center for Health Statistics, Centers for Disease Control and Prevention.	Plan and operation of the Health and Nutrition Examination Survey, United States 1971-73.	Vital Health Stat 1 1973. Publication No.: 10.
Rosenbaum, P., Elston, R., Srinivasan, S., Webber, L., & Berenson, G.	Cardiovascular risk factors from birth to 7 years of age: the Bogalusa Heart Study. Predictive value of parental measures in determining cardiovascular risk factor variables in early life.	*Pediatrics*, *80*(5):2, 807-816. 1987

Table 2.3. *Articles reviewed according to type study, name of article, journal, and year (n=14)*

Author(s)	Type of Study	Title of Article	Journal, Volume, Page Number, and Year
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	SR/MA	The efficacy of behavioral interventions to modify dietary fat and fruit and vegetable intake: a review of the evidence.	*Preventive Medicine*, *35*(1), 25-41. 2002
Blanchette, L., & Brug, J.	SR/MA	Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption.	*Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. 2005
Caballero, B. Clay, T., Davis, S., Ethelbah, B., Holy Rock, B., Lohman, T., et al.	RCT	Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian schoolchildren.	*American Journal of Clinical Nutrition*, *78*(5), 1030. 2003

continued

Table 2.3.*Continue*

Author(s)	Type of Study	Name of Article	Journal and Year
Cottrell, L., Spangler-Murphy, E., Minor, V., Downed, A., Nicholson, P., et al.	RCT	A Kindergarten Cardiovascular Risk Surveillance Study: CARDIAC-Kinder	*American Journal of Health Behavior*, *29*(6) 595-606. November-December 2005.
Faith, M., Scanlon, K., Birch, L., Francis, L. , & Sherry, B.	SR/MA	Parent feeding strategies and their relationships to child eating and weight status	*Obesity Research*,*12*(11), 1711-1722. 2004.
Hendy, H., Williams, K., & Camise, T.	RCT	"Kids Choice" school lunch program increases children's fruit and vegetable acceptance.	*Appetite*, *45*(3), 250-263. 2005.

continued

Table 2.3.*Continue*

Author(s)	Type of Study	Name of Article	Journal and Year
Himes, J., Ring, K., Gittelsohn, J., Cunningham-Sabo, L., Weber, J., Thompson, J. et al.	RCT	Impact of the Pathways intervention on dietary intakes of American Indian school children.	*Preventive Medicine*, *37*(6): 2, S55-S61. 2003.
James, J., Thomas, P., Cavan, D., & Kerr, D.	RCT	Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial.	*British Medical Journal*, *328*(7450), 1237. 2004
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	SR/MA	Getting children to eat more fruit and vegetables: a systematic review.	*Preventive Medicine*, *42*(2), 85, 2006.

continue

Table 2.3.*Continue*

Author(s)	Type of Study	Name of Article	Journal and Year
Malik, V., Schulze, M., & Hu, F.	SR/MA	Intake of sugar-sweetened beverages and weight gain: a systematic review.	*American Journal of Clinical Nutrition*, *84*(2), 274-288. 2006.
McArthur, D.	SR/MA	Heart healthy eating behaviors of children following a school-based intervention: a meta-analysis.	*Issues in Comprehensive Pediatric Nursing*, *21*(1), 35-48. 1998
Trevino, T.R.	RCT	Impact of the Bienestar School-Based Diabetes Mellitus Prevention Program on Fasting Capillary Glucose Levels A Randomized Controlled Trial.	*Archives of Pediatrics and Adolescent Medicine*, *158*(9), 911. 2004.

continue

Table 2.3.*Continue*

Author(s)	Type of Study	Name of Article	Journal and Year
Turnin, M., Tauber, M ., Couvaras, O., Jouret, B., Bolzonella, C., Bourgeois, O., et al.	RCT	Evaluation of microcomputer nutritional teaching games in 1,876 children at school.	*Diabetes and Metabolism* (2001). September; 27(4):1, 459-64.
Zenzen, W. & Kridli, S.	IR	Integrative review of school-based childhood obesity prevention programs	*Journal of Pediatric Health Care*, in press, 1-17, 2008.

Notes: SR/MA= Systematic reviews/meta-analyses, RCT = Random Control Trials, IR= Integrated Research

Table 2.4. S*ystemic reviews/meta-analyses: Articles in identified in more than one journal article (n=9)*

Articles	Found in
Baronowski, T., Davis, M., Resnicow, K., Baronowski, J., Doyle, C., Lin, L., Smith, M., & Wang, D.T. (2000). Gimme 5 fruit, juice, and vegetables for fun, and health: outcome evaluation. *Health Education Behavior, 27,* 96-111.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. S*ystemic reviews/meta-analyses: Articles in identified in more than one journal article (n=9)*

Articles	Found in
Cullen, K.W., Bartholomew, L.K., & Parecel, G.S. (1997). Girl scouting: an effective channel for nutition education. *Journal of Nutrition Education Behavior*. *29*, 86-91.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Davis, M., Baronowski, T., Resnicow, K., Baronowski, J., Doyle, C., Lin, L., Smith, M., Wang, D.T., Yaroch, A., & Herbert, D. (2000). Gimme 5 fruit, juice, and vegetables for fun, and health: outcome evaluation. *Health Education Behavior, 27,* 167-176.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Foerster, S., Gregson, J., Lane Beall, D., Hudes, M., Magnuson, H., Livingston, S., Davis, M., Block Joy, A., & Garbolino, T. (1998). The California children's 5-a-day power play! Campaign: evaluation of a large scale social marketing initiative. *Family Community Health, 21*, 46-64.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Lowe, C.F., Horne, P.J., Tapper, K., Bowdery, M., & Egerton, C. (2004). Effects of peer modelling and rewards-based intervention to increase fruit and vegetable consumption in children. *European Journal of Clinical Nutrition 58,* 510-522	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Perry, C.L., Bishop, D., Taylor, G.L., Murray, D., Warren Mays, R., Dudovitz, B., Smyth, M., & Story, M. (1998). Changing fruit and vegetable consumption among children: the 5-a-day power plus program in St. Paul, Minnesota. *American Journal of Public Health, 88,* 603-609.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Reynolds, K.D., Franklin, F.A., Leviton, L., Maloy, J., Harrington, K., Yaroch, A.L., Person, S., & Jester, P. (2000). Methods, results and lessons learned from process evaluation of the high 5 school-based nutrition intervention. *Health Education Behavior, 27,* 177-186.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Stables, G.J., Young, E.M., Howerton, M.W., Yaroch, A.L., Kuester, S., Solera, M.K., Cobb, K., & Nebeling, L. (2005). Small school-based effectiveness trials increase vegetable and fruit consunmption among youth. *Journal of American Dietetic Association, 105*, 252-256.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

continued

Table 2.4. *Continue*

Articles	Found in
Story, M., Warren Mays, R., Bishop, D., Perry, C., Taylor, G., Smyth, M. & Gray, C. (2000). 5-a-day power plus: process evaluation of a multicomponent elementary school program to increase fruit and vegetable consumption. *Health Education Behavior, 27*, 187-200.	Blanchette, L., & Brug, J. (2005) Determinants of fruit and vegetable consumption among 6-12-year-old children and effective interventions to increase consumption. *Journal of Human Nutrition and Dietetics: The Official Journal of the British Dietetic Association*, *18*(6), 431-443. and Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: a systematic review. *Preventive Medicine*, *42*(2), 85.

Table 2.5. *Duplicate* a*rticles from Zenzen and Kridli's (2008) integrative review associated with children ages 5-12 year (n=4)*

Caballero, B. Clay, T., Davis, S., Ethelbah, B., Holy Rock, B., Lohman, T., et al. (2003). Pathways: a school-based, randomized controlled trial for the prevention of obesity in American Indian school children. *American Journal of Clinical Nutrition*, *78*(5), 1030.
Coleman, K., Tiller, C., Sanchez, J, Heath, E., Sy, O., Milliken, G., et al. (2005). Prevention of epidemic increase in child risk of overweight in low-income schools: The El Paso coordinated approach to child health. *Archives of Pediatrics & Adolescent Medicine, 159*, 217-224.
James, J., Thomas, P., Cavan, D., & Kerr, D. (2004). Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. *British Medical Journal*, *328*(7450), 1237.
Sahota, P., Rudolf, M., Dixey, R., Hill, A., Barth, J., & Cade, J. (2001). Randomised controlled trial of primary school based intervention to reduce risk factors for obesity. *British Medical Journal, 323*, 1029-1032.

Table 2.6. *School-based obesity prevention intervention programs according to type study reviewed (n=33)*

Systematic review/meta-analyses	RCT	IR
Gimme 5	Pathways	JIFF
5-a-day	CARDIAC -Kinder	Hawley (no name)
Squire's Quest!	"Kids Choice"	Kain (no name)
FVMM (Norway)		KOPS
Eat 5 Badge	CHOPPS	PLAY
Fruits and Vegetables Subscription (Denmark)	Bienestar	Be Smart
5 a day Power Play	MNTG	Wheling-Weepie & McCarthy
Food Dudes		
5-a-day Power Plus (Minnesota)		

continued

Table 2.6. *Continue*

Systematic review/meta-analyses	RCT	IR
Cafeteria Power Plus Project		
High 5 Project		
Integrated Nutrition Projects 1996 (wave 1)		
Integrated Nutrition Projects 1997 (wave 2)		
Integrated Nutrition Projects 1998 (wave 3)		
Give Me 5 Project		
NEAPS		
Eat well & Keep moving		
APPLES		

continued

Table 2.6. *Continue*

Systematic review/meta-analyses	RCT	IR
5-a-day Cafeteria Plus		
CATCH		

Notes. RCT= Random Control Trial, IR= Integrated Research, JIFF= Jump Into Foods and Fitness, FVMM= Fruits and Vegetables Make the Marks KOPS= Kiel Obesity Prevention Study, CHOPPS= Christian Church Obesity Prevention Program in Schools, PLAY= Promoting Lifestyle In Youth, MNTG=Microcomputer Nutritional Teaching Games, NEAPS= Nutrition Education at Primary School, APPLES= Active Program Promoting Lifestyles in Schools, CATCH= Coordinated Approach to Child Health

Table 2.7. *Data bases and search engines used in systemic reviews/meta-analyses (N=10)*

Author(s)	Data bases and search engines
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	Medline, EMBASE, PsychINFO, CINHAL, AGELINE, AGRICOLA
Blanchette, L., & Brug, J.	PubMed, PsychINFO
Faith, M., Scanlon, K., Birch, L., Francis, L. A., & Sherry, B.	Medline, PsychINFO
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	PubMed, CAB Abstracts, The Cochrane Library, Web of Knowledge, IBSS, PsychINFO (BIDS), EMBASE, AGRICOLA, LILACS, ID21, ERIC, SIGLE, INGENTA
Malik, V., Schulze, M., & Hu, F.	Medline
McArthur, D.	Ancestry method, Consultation, facsimile and email from experts, Medline, browsing of electronic journals

Table 2.8. S*ystemic reviews/meta-analyses: Total number of studies reviewed by author (n=6)*

Author(s)	*Number of studies*
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	92
Blanchette, L., & Brug, J.	38
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., & Sherry, B.	22
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	15
Malik, V., Schulze, M., & Hu, F.	30
McArthur, D.	12
Total	209

Table 2.9. S*ystemic reviews/meta-analyses: Time spans for studies reviewed by author (n=6)*

Author(s)	Time span
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	1975-2002
Blanchette, L., & Brug, J.	1990-2005
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., & Sherry, B.	?-2003
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	Published in Pomerleau, 2005
Malik, V., Schulze, M., & Hu, F.	1966- May 2005
McArthur, D.	1996-1998

Table 2.10. S*ystemic reviews/meta-analyses: Methods/processes used to determine validity of articles by author (n=6)*

Author(s)	Methods/ processes to determine validity of articles
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	Trained abstractors used a form, primary investigator supervised, discrepancies resolved via author discussion
Blanchette, L., & Brug, J.	Discrepancies resolved via author discussion
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., & Sherry, B.	Discrepancies resolved via author discussion
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	Quality assessment tool used by two reviewers with inter-rater reliability of 0.96 agreement
Malik, V., Schulze, M., & Hu, F.	“qualitative in nature”
McArthur, D.	18 point validity assessment used by researcher and a cohort of researchers, discrepancies resolved via author discussion. No interrater reliability reported

Table 2.11 *Articles from Zenzen and Kridli's (2008) associated with children ages 5-12 years, included (n=7)*

Cason, K., & Logan, B.N. (2006) Educational intervention improves 4th grade school children's nutrition and physical activity knowledge and behaviors. *Topics in Clinical Nutrition, 21*, 234-240.

Hawley, S., Beckman, H., & Bishop, T. (2006). Development of an obesity prevention and management program for children and adolescents in rural setting. *Journal of Community Health Nursing, 23*, 69-80.

Kain, J., Uauy, R., AlbalaVio, F., Cerda, R. & Leyton, B. (2004). School-based obesity prevention in Chilean primary school children: Methodology and evaluation of a controlled study. *International Journal of Obesity, 28,* 438-493.

Muller, M., Asbeck, I., Mast, M., Lagnase, K., & Grund, A. (2001). Prevention of obesity- more than an intention. *International Journal of Obesity, 25*(Suppl 1), S66-S74.

Pangranzi, R., Beghle, A., Vehige, T., & Vack, P. (2003). Impact on promoting healthy lifestyle activity for youth (PLAY) on children's physical activity. *Journal of School Health, 73*, 317-321.

continued

Table 2.11 *Continue*

Warren, J., Henry, C. Lightowler, H., Bradshaw, S., & Perwaiz, S. (2003). Evaluation of a pilot school programme aimed at the prevention of obesity in children. *Health Promotion International, 18*, 287-296.
Wheling-Weepie, A. & McCarthy, A. (2002). A healthy lifestyle program: Promoting child health in schools. *The Journal of School Nursing, 18*, 322-328.

Table 2.12. S*ystemic reviews/meta-analyses: Locations for studies reviewed (n=6)*

Author(s)	Location (s)
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	North America, Europe, Australia
Blanchette, L., & Brug, J.	Texas, Norway, Denmark, California, England, Wales, Minnesota, Colorado, Missouri
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., &Sherry, B.	Coded, not reported
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	U.S., Ireland, U.K.
Malik, V., Schulze, M., & Hu, F.	Norway, Southwest U.S., Boston, California, UK, Rocky Mountain region, Spain
McArthur, D.	Arizona

Notes. U.S.= United States of America, U.K.= United Kingdom

Table 2.13. *RCT review: Locations for studies reviewed (n=6)*

Author(s)	Location (s)
Caballero, B.	Arizona, New Mexico, South Dakota
Cottrell, L., Spangler-Murphy, E., Minor, V., Downes, A., Nicholson, P. , & Neal, W.	West Virginia
Hendy, H., Williams, K., & Camise, T.	Rural Pennsylvania
Himes, J., Ring, K., Gittelsohn, J., Cunningham-Sabo, L., Weber, J., Thompson, J. et al.	Arizona, New Mexico, South Dakota
James, J., Thomas, P., Cavan, D., & Kerr, D.	U.K.
Trevino, T.R.	San Antonio, Texas
Turnin, M., Tauber, M ., Couvaras, O., Jouret, B., Bolzonella, C., Bourgeois, O., et al.	Western France

Notes. RCT= Random Control Trial, U.K. = United Kingdom

Table 2.14 *IR review: Locations for studies reviewed (n=7)*

Author(s)	Location (s)
Cason, K., & Logan, B.N.	South Carolina
Hawley, S., Beckman, H., & Bishop, T.	Rural Kansas
Kain, J., Uauy, R., AlbalaVio, F., Cerda, R. & Leyton, B..	5 schools in Chile
Muller, M., Asbeck, I., Mast, M., Lagnase, K., & Grund, A.	6 schools in Germany
Pangranzi, R., Beghle, A., Vehige, T., & Vack, P.	**35 schools in Arizona**
Warren, J., Henry, C. Lightowler, H., Bradshaw, S., & Perwaiz, S.	3 schools in U.K.
Wheling-Weepie, A. & McCarthy, A.	Midwest, U.S.

Note. IR= Integrated Research, U.S.= United States, U.K. = United Kingdom

Table 2.15. *RCT review: Theoretical underpinnings*

Author(s)	Theoretical frameworks
Caballero, B.	Social Learning Theory & Principles of Native American Indian culture and practices
Cottrell, L., Spangler-Murphy, E., Minor, V., Downes, A., Nicholson, P., & Neal, W.	Family theory
Hendy, H., Williams, K., & Camise, T.	Self Determination Theory & Bandura's Self Efficacy Theory
Himes, J., Ring, K., Gittelsohn, J., Cunningham-Sabo, L., Weber, J., Thompson, J. et al.	None
James, J., Thomas, P., Cavan, D., & Kerr, D.	None
Trevino, T.R.	Social Cognitive Theory & Social Ecological Theory
Turnin, M., Tauber, M ., Couvaras, O., Jouret, B., Bolzonella, C., Bourgeois, O., et.al.	None

Note. RCT= Random Control Trial

Table 2.16 *IR review: Theoretical underpinnings*

Author(s)	Theoretical frameworks
Cason, K., & Logan, B.N.	None reported
Hawley, S., Beckman, H., & Bishop, T.	Transtheoretical Model & Social Cognitive Theory
Kain, J., Uauy, R., AlbalaVio, F., Cerda, R. & Leyton, B..	None reported
Muller, M., Asbeck, I., Mast, M., Lagnase, K., & Grund, A.	None reported
Pangranzi, R., Beghle, A., Vehige, T., & Vack, P.	None reported
Warren, J., Henry, C. Lightowler, H., Bradshaw, S., & Perwaiz, S.	Social Cognitive Theory
Wheling-Weepie, A. & McCarthy, A.	Gillespie

Note. IR= Integrated Research

Table 2.17. *Systemic reviews/meta-analyses: Study designs of articles reviewed (n=6)*

Author(s)	Study designs
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	RCTs and non-RCTs
Blanchette, L., & Brug, J.	None reported
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., & Sherry, B.	Cross sectional (19:22)
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	RCT (11:15), non RCT (4:15)
Malik, V., Schulze, M., & Hu, F.	Cross-sectional (15:30), prospective cohort (10:30), clinical trials (5:30)
McArthur, D.	RCT's within subject design, Non-control group with pretest and time series required two groups with unit of measurement

Note. RCT= Random Control Trial

Table 2.18. *IR review: Study designs of articles reviewed (n=6)*

Author(s)	Study designs
Cason, K., & Logan, B.N.	Non-RCT
Hawley, S., Beckman, H., & Bishop, T.	RCT
Kain, J., Uauy, R., AlbalaVio, F., Cerda, R. & Leyton, B..	RCT
Muller, M., Asbeck, I., Mast, M., Lagnase, K., & Grund, A.	RCT and non-RCT
Pangranzi, R., Beghle, A., Vehige, T., & Vack, P.	RCT
Warren, J., Henry, C. Lightowler, H., Bradshaw, S., & Perwaiz, S.	RCT
Wheling-Weepie, A. & McCarthy, A.	Non-RCT

Note. IR= Integrated Research, RCT= Random Control Trial

Table 2.19. S*ystemic reviews/meta-analyses: Control of confounding variables addressed in articles (n=6)*

Author(s)	Control of confounding variables
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	None
Blanchette, L., & Brug, J.	Implied as a limitation, school and national policy was influential
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., & Sherry, B.	Not mentioned, conclusion was that different research designs will resolve parent child feeding strategies
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	Not mentioned but attempts were made to identify exposures
Malik, V., Schulze, M., & Hu, F.	Addressed with great detail specifically to diet intake and activity behavior, and access to snack foods.
McArthur, D.	Not mentioned

Table 2.20. S*ystemic reviews/meta-analyses: General characteristics of populations studied in articles*

Author(s)	Characteristics of population
Ammerman, A., Lindquist, C., Lohr, K., & Hersey, J.	No infants, N=3680, 6 years to adults, no other demographics mentioned
Blanchette, L., & Brug, J.	6-12 year olds, multi-ethnic with primarily Hispanic population. Low & diverse SES, included Girl Scouts and Boy Scouts
Faith, M.S., Scanlon, K.S., Birch, L.L., Francis, L. A., & Sherry, B.	Referred to journal website & authors for detailed information. Age 6 considered a significant age, 70% white, 20% African American, 5% Hispanic, 5% Asian. 1388 more girls than boys (N= 4267).
Knai, C., Pomerleau, J., Lock, K., & McKee, M.	Population 200-9000; 66.6% included boys and girls, 33.3% girls only, age range of 5-18 years. Unable to isolate number of 5-12 year olds.
Malik, V., Schulze, M., & Hu, F.	Combined population of 117,973; ages 4-99 years, more girls than boys, no race data. Unable to isolate number of 5-12 year olds.
McArthur, D.	9-11 year olds. No other demographics or information provided

Table 2.21. S*ystemic reviews/meta-analyses: School-based programs according to age/ grade level (n=20)*

School-based obesity prevention intervention programs	5-8 years/ 1st-3rd grades	9-12 years/ 4th -6th grades	5-12 years/ 1st-6th grades
Gimme 5		X	
5-a-day		X	
Squire's Quest!		X	
FVMM (Norway)		X	
Eat 5 Badge		X	
Fruits and Vegetables Subscription (Denmark)			X
5 a day Power Play		X	
Food Dudes			X

continued

Table 2.21. *Continue*

School-based obesity prevention intervention programs	5-8 years/ 1st-3rd grades	9-12 years/ 4th -6th grades	5-12 years/ 1st-6th grades
5-a-day Power Plus (Minnesota)		X	
Cafeteria Power Plus Project	X		
High 5 Project		X	
Integrated Nutrition Projects 1996 (wave 1)	X		
Integrated Nutrition Projects 1997 (wave 2)			X
Integrated Nutrition Projects 1998 (wave 3)		X	
Give Me 5 Project			X
NEAPS			X

continued

Table 2.21. *Continue*

School-based obesity prevention intervention programs	5-8 years/ 1^{st}-3^{rd} grades	9-12 years/ 4^{th} -6^{th} grades	5-12 years/ 1^{st}-6^{th} grades
APPLES			X
Eat well & Keep moving			X
5-a-day Cafeteria Plus	X		
CATCH			X

Note. FVMM= Fruits and Vegetables Make the Marks , NEAPS= Nutrition Education at Primary School, APPLES= Active Programme Promoting Lifestyles in Schools, CATCH= Coordinated Approach to Child Health

Table 2.22. *RCT review: General characteristics of populations studied according to author and project*

Author(s)	Project	Sample size	Gender	Age	Race/Ethnicity	Other
Caballero, B.	Pathways	1409	NR	Mean age 7.6 +/- 0.64 Y	NR (100%)	271 IG 682 CG
Cottrell, L., Spangler-Murphy, E., Minor, V., Downes, A., Nicholson, P., & Neal, W.	CARDIAC-Kinder	50	30 F 20 M	Mean age 5Y; AA only	Caucasian (50%) Rural Appalachian (100%)	15 F CG, 15 F IG, 11 M CG, 9 M IG
Hendy, H., Williams, K., & Camise, T.	"Kids Choice"	346 children	177 F 169 M	Mean age 8.0 +/- 1.4 Y	95% Caucasian	131 1st grade, 95 2nd grade, 120 4th grade

continued

Table 2.22. *Continue*

Author(s)	Project	Sample size	Gender	Age	Race/Ethnicity	Other
Himes, J., Ring, K., Gittelsohn, J., Cunningham-Sabo, L., Weber, J., Thompson, J. et al.	Pathways	1409	NR	Mean age 7.6 +/- 0.64 Y; B	NR (100%)	271 IG 682 CG
James, J., Thomas, P., Cavan, D., & Kerr, D.	CHOPPS	644	320 F 324 M	Age range 7-11 Y; Mean age 8.7 Y	NR	319 CG with 164 F & 155 M, 325 IG with 156 F & 169 M

continued

Table 2.22. *Continue*

Author(s)	Project	Sample size	Gender	Age	Race/Ethnicity	Other
Himes, J., Ring, K., Gittelsohn, J., Cunningham-Sabo, L., Weber, J., Thompson, J. et al.	Pathways	1409	NR	Mean age 7.6 +/- 0.64 Y; B	NR (100%)	271 IG 682 CG
Trevino, T.R.	Bienestar	1419	695 F 724 M	Mean age 9.77 Y; CG 9.79 Y; IG	MA (77%), AA (13%), Asian (6.2%), Other (4%)	706 CG 713 IG

continued

Table 2.22. *Continue*

Author(s)	Project	Sample size	Gender	Age	Race/Ethnicity	Other
Turnin, M., Tauber, M ., Couvaras, O., Jouret, B., Bolzonella, C., et. al.	MNTG	1876	985 F 891 M	Age range 7-12 Y Mean age 9.0 Y	French	31% 3rd grade, 36% 4th grade, 33% 5th grade

Note. RCT= Random Control Trial, NR= Not reported, IG= Intervention/Treatment Group, CG= Control Group, F= Female, M=Male, Y= years, AA=African American, CHOPPS= Christian Church Obesity Prevention Program in Schools, MA= Mexican American, MNTG= Microcomputer Nutritional Teaching Games.

Table 2.23 *IR review: General characteristics of sample by authors and school-based programs (n=7)*

Author(s)	Program Name	Sample Size	Age in years or by grade
Cason, K., & Logan, B.N.	JIFF	130	4^{th} grade
Hawley, S., Beckman, H., & Bishop, T.	No name	65	6^{th} grade
Kain, J., Uauy, R., AlbalaVio, F., Cerda, R. & Leyton, B..	No name	3086	$1\text{-}8^{th}$ grade
Muller, M., Asbeck, I., Mast, M., Lagnase, K., & Grund, A.	KOPS	1640	5-7 years
Pangranzi, R., Beghle, A., Vehige, T., & Vack, P.	PLAY	606	4^{th} grade

continue

Table 2.23 *Continued*

Author(s)	Program Name	Sample Size	Age in years or by grade
Warren, J., Henry, C. Lightowler, H., Bradshaw, S., & Perwaiz, S.	Be Smart	218	5-7 years
Wheling-Weepie, A. & McCarthy, A.	No name	36	4^{th} & 5^{th} grades

Note. 1= Integrative Research, 2= Jump Into Foods and Fitness, 3= Kiel Obesity Prevention Study, 4= Promoting Lifestyle In Youth.

Table 2.24. S*ystemic reviews/meta-analyses: Intervention strategies used in school-based obesity prevention intervention programs(n=20)*

School-based programs	Class room	School wide	Trained teacher/ leader	Food staff	Parents	Policy	Community
Gimme 5	12 sessions x 6 weeks	POP	POP	POP	Newsletter		POP
5-a-day			X		X	Non-school Boy Scouts	Value based
Squire's Quest!	10 sessions						
FVMM (Norway)	7 sessions in "home ec" class				Newsletter	Norway Food Program	

continued

Table 2.24. *Continue*

School-based programs	Classroom	School wide	Trained teacher/ leader	Food staff	Parents	Policy	Community
Eat 5 Badge			X			Non-school Girl Scouts	Value based
Fruits and Vegetables Subscription (Denmark)	Snack times				Newsletter	Danish Food Program	
5 a day Power Play	X	High committ-ment		POP	Newsletter		Ads
Food Dudes	Snack times			X			

continued

Table 2.24. *Continue*

School-based programs	Classroom	School wide	Trained teacher/ leader	Food staff	Parents	Policy	Community
5-a-day Power Plus (Minnesota)	32 sessions x40 minutes	X	X	X	Low		X
Cafeteria Power Plus Project		Cafeteria only		Reward & Events			
High 5 Project	14x 30min Booster session year 2			X	high		External Educational Opportunities

continued

Table 2.24. *Continue*

School-based programs	Class room	School wide	Trained teacher/ leader	Food staff	Parents	Policy	Community
Integrated Nutrition Projects 1996	16-24 lessons		Parent & special resource teacher		X		Family event
Integrated Nutrition Projects 1997	16-24 lessons		Parent & special resource teacher		X		Family event

continued

Table 2.24. *Continue*

School-based programs	Classroom	School wide	Trained teacher/ leader	Food staff	Parents	Policy	Community
Integrated Nutrition Projects 1998	16-24 lessons		Parent & resource teacher		X		Family event
Give Me 5 Project	2 activities		X				
NEAPS	Urban & rural 20 sessions x 10 weeks				Homework		

continued

Table 2.24. *Continue*

School-based programs	Classroom	School wide	Trained teacher/ leader	Food staff	Parents	Policy	Community
Eat well & Keep moving	X			X	X		
APPLES	Physical education	Physical education	X	X			
5-a-day Cafeteria Plus				X			
CATCH	X	Physical education			X		

Notes. FVMM= Fruits and Vegetables Make the Marks, POP= Point of Purchase, NEAPS= Nutrition Education at Primary School, APPLES= Active Programme Promoting Lifestyles in Schools, CATCH= Coordinated Approach to Child Health

Table 2.25. *RCT review: Strategies used in school-based obesity prevention intervention programs*

School-based programs	Class room	School wide	Trained teacher/ leader	Peer leader	Food staff	Parents	Policy	Community
Pathways	2- 45 minute sessions x 2 weeks for 3rd and 4th grades. 5th grade had x 8 weeks	Physical activity with 3- 30 minutes sessions of moderate to vigorous activity			Low fat meal prep POP	Snack packs and cooking classes		Tribal focus

continued

Table 2.25. *Continue*

School-based programs	Class room	School wide	Trained teacher/ leader	Peer leader	Food staff	Parents	Policy	Community
CARDIAC-Kinder						Packet with diet sheets & pedometers		
Kids Choice								Lunch with Penn State
CHOPPS	4- 1 hour sessions	X						Project website
Bienestar	50 sessions over 7 months	Physical education classes			X	X		After school care

continued

Table 2.25. *Continue*

School-based programs	Class room	School wide	Trained teacher/ leader	Peer leader	Food staff	Parents	Policy	Community
MNTG	Games played 1 hour 2x/week x 5 weeks		X					

Notes. RCT= Random Control Trial, CHOPPS= Christian Church Obesity Prevention Program in Schools, MNTG=Microcomputer Nutritional Teaching Games

Table 2.26. *IR review: Strategies used in school-based obesity prevention intervention programs (n=7)*

School-based programs	Class room	School wide	Trained teacher/ leader	Peer leader	Food staff	Parents	Policy	Community
JIFF	1-7 hour lesson units for food, physical activity, science, math and health education	NR	NR	NR	NR	NR	NR	NR
Hawley (no name)	5- 40 minute sessions x 6 weeks during physical education classes	NR	NR	NR	NR	NR	NR	Family Fun Night

continued

Table 2.26. *Continue*

School-based programs	Class room	School wide	Trained teacher/ leader	Peer leader	Food staff	Parents	Policy	Community
Kain (no name)	Physical activity and recess	kiosks	NR	NR	NR	kiosks	NR	NR
KOPS	X	NR	nutritio nists	NR	NR	Increase activity & decrease television watching	NR	Sports program for overweight children

continued

Table 2.26. *Continue*

School-based programs	Class room	School wide	Trained teacher/ leader	Peer leader	Food staff	Parents	Policy	Community
PLAY	X	NR	NR	NR	NR	X physical activity	NR	NR
Be Smart	NR	Playground "lunchtime club"	NR	NR	NR	NR	NR	NR
Wheling-Weepie & McCarthy (No name)	X	NR	NR	NR	NR	NR	NR	NR

Notes. IR= Integrated Research, JIFF= Jump Into Foods and Fitness, NR= Not reported, KOPS= Kiel Obesity Prevention Study, PLAY= Promoting Lifestyle In Youth

Table 2.27. S*ystemic reviews/meta-analyses: School-based obesity prevention intervention program curricular components (n=20)*

School-based obesity programs	Diet	Activity	Perks & Fun	Healthy Lifestyle Education
Gimme 5	X		POP	X
5-a-day	X		Badge & comics	X
Squire's Quest!	X		Games	X
FVMM (Norway)	X		Free or cheap food	
Eat 5 Badge	X		Badge	X
Fruits and Vegetables Subscription (Denmark)			Cheap food(.3 Euro/day)	
5 a day Power Play	X		POP Television ad	

continued

Table 2.27. *Continue*

School-based obesity programs	Diet	Activity	Perks & Fun	Healthy Lifestyle Education
Food Dudes	X		Videos and rewards	X
5-a-day Power Plus (Minnesota)	X		POP	
Cafeteria Power Plus Project			Yearly production and monthly samples	
High 5 Project	X			Homework
Integrated Nutrition Projects 1996	X		Mini lunches and planting activity	
Integrated Nutrition Projects 1997	X		Mini lunches	

continued

Table 2.27. *Continue*

School-based obesity programs	Diet	Activity	Perks & Fun	Healthy Lifestyle Education
Integrated Nutrition Projects 1998	X	X	Family event	
Give Me 5 Project	X			
NEAPS	X	X		Homework
Eat well & Keep moving	X	X		
APPLES	X	X	Tuck shops	
5-a-day Cafeteria Plus			Cafeteria changes	
CATCH	X	X	Cafeteria changes	

Notes. FVMM= Fruits and Vegetables Make the Marks, POP= Point of Purchase, NEAPS= Nutrition Education at Primary School, APPLES= Active Programme Promoting Lifestyles in Schools, CATCH= Coordinated Approach to Child Health

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Table 2.28. *RCT reviews: School-based obesity prevention intervention program curricular components*

School-based obesity programs	Diet	Activity	Perks & Fun	Healthy Lifestyle Education
Pathways	X	X	X	X
CARDIAC-Kinder	X	X	Pedometers	X
Kids Choice	X		X	X
CHOPPS	X		X	X
Bienestar	X	X	Family Fun Fiesta & coupons	X
MNTG	X		Games	X

Notes. RCT= Random Control Trial, CHOPPS= Christian Church Obesity Prevention Program in Schools, MNTG=Microcomputer Nutritional Teaching Games

Table 2.29. *IR reviews: School-based obesity prevention intervention program curricular components (n=7)*

School-based obesity programs	Diet	Activity	Perks & Fun	Healthy Lifestyle Education
JIFF	X	X	NR	X
Hawley (no name)		X	X	X
Kain (no name)		X		
KOPS	X	X		X
PLAY	X	X		
Be Smart	X		X	
Wheling-Weepie & McCarthy (No name)	X			X

Notes. IR= Integrated Research, JIFF= Jump Into Foods and Fitness, NR= Not reported, KOPS= Kiel Obesity Prevention Study, PLAY= Promoting Lifestyle In Youth

Table 2.30. *School-based programs with statistically significance result that met established clinical benchmarks, and NAPNAP HEAT Guideline for School-age Children ages 5-10 years, according to type of study (n=3)*

School-based program	Type of Study	Positive change	Clinical standard/benchmark	NAPNAP HEAT Guideline for School-age Children ages 5-10 years
5-a-day Cafeteria Plus	SR/MA	Mean number fruit choices increased to 4.0 (IG) (P=0.05)	2-3 fruit servings/day (+)	Section 5, School Age Children 1 & 3; Parents & Teachers, 6a-c.
5-a-day Cafeteria Plus	SR/MA	Mean number vegetable choices increased to 2.2 (IG) (P=0.05)	2-3 vegetable servings/day (+)	Section 5, School Age Children 1 & 3; Parents & Teachers, 6a-c.
Bienestar	RCT	FCG after treatment was lower than CG (87.53mg/dl; p=0.03)	80-110 mg/dl (+).	Section 1, Measurement, 5 with conditions

Notes. NAPNAP HEAT= National Association of Pediatric Nurse Practitioners Healthy Eating and Activity Training, SR/MA= Systematic reviews/meta-analyses, IG= Intervention or treatment group, RCT= Random Control Trial, FCG= Fasting capillary Glucose level, (+) = met

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CHAPTER 3

SCHOOL NURSE PERSPECTIVES ON BARRIERS TO BODY MASS INDEX (BMI) SCREENING PRACTICE

ABSTRACT

The National School Nurse Association advocates for Body Mass Index (BMI) screening for early detection, yet little research describes school nurse practice of BMI screening. In this descriptive study, 25 Ohio school nurses participated in three focus groups. An adapted Healthy People 2010 Determinants of Health Model guided the questions. School nurses engaged in multi-phasic screening practice as primary data collection practice. Data collection was contingent on physical environment, workload, staff support. Lack of school system policy was a barrier to BMI screening in terms of data collection, referral, and follow-up. A key facilitating factor was a need for trained help. School size, location and size of clinic, amount of privacy, and safety were components of school physical environment that influenced BMI screening practice. School nurse workload/time demands and availability of affordable referral source were

key access issues. Themes related to geographic area also emerged. Implications for policy included a salient need for reduced school nurse workload.

Introduction

The negative consequence of child obesity has been well documented. Body Mass Index (BMI) screening for early identification of unhealthy childhood weight is supported by Healthy People (HP) 2010 (USDHHS, 2000), Surgeon General's Call to Action (USDHHS, 2001), National Heart, Lung, and Blood Institute (NHLBI) guidelines (National Institute of Health [NIH], 2000), the Harvard Report on Cancer Prevention (HRC) (Colditz, et. al., 2002), the American Pediatric Association (AAP, 2003), and the National School Nurse Association (NSNA) position statement;; (NASNA, 2002). Each encourages BMI screening of children; however, few policy statements exist to steer post-identification intervention (Hendershot, Telliohann, Price, Dake & Mosca, 2008). Requisite in screening practice are accurate measure, effective treatment, and referral for follow up. There are discrepancies as to whether school nurses (SNs), paraprofessionals or trained volunteers should screen children for obesity risk. There are also discrepancies as to when, where, and how often BMI screening of children should take place (Stoddard, Kubik, & Skay, 2008). Because mass screening of children in public school settings is a logical method of early identification of childhood obesity, SNs are in ideal positions to provide BMI screening within schools (HRC, 2000). Little research is available that describes SN practices with regard to BMI screening or identifies facilitating factors and barriers to BMI screening in schools among school age populations. The purpose of the study was to identify barriers and facilitating factors of BMI screening practices among

Ohio public elementary SNs who self-identified the school districts they work in as urban, rural, or suburban geographic areas.

Research Questions

Six research questions were posed. These were:

1. What are the BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?
2. What policy factors serve to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?
3. What factors in the physical environment serve to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?
4. What factors in the social environment serve to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?
5. What school risk/protection factors serve as to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?
6. What access to quality health care factors serves to facilitate or inhibit BMI screening practices of SNs in rural, suburban, and urban public elementary schools in Ohio?

Review of the Literature

Because of financial impact and dormant health risk, the increase in childhood obesity is an urgent public health concern (United States Department of Health and

Human Services [USDHHS], 2001). School based approaches to prevention and treatment of obesity have included nutrition changes, physical education initiatives, and BMI screening (Story, 1999). Expulsion of soda and energy dense snack (junk) food via school policy reform has been one approach to obesity prevention. Policy revision to increase the amount of time children spend actively participating in physical education class competes with curriculum requirements consistent with standardized testing preparation (Frost, 2003). Although no research was found exploring BMI screening as a preventive approach, the United States Preventive Services Task Force (USPSTF) suggests there is insufficient evidence to support that school mandated BMI screening is a childhood obesity prevention intervention (USPSTF, 2005). This claim is made due in part to evidence that negative child labeling has resulted in compromised adult mental health (USPSTF, 2005). In 2007, the American Medical Association (AMA) (2007) released a position statement supporting the need for annual BMI screening of children and adolescents that includes descriptive language of overweight and obesity risk. Prevention intervention is divisive; research investigating challenges related to practice is sparse. Moyer (2005) investigated SNs from Southern Missouri who worked with pre-kindergarten through senior high students and identified that follow-up, referral counseling, and parental involvement were major barriers to BMI screening programs. Hendershot et al. (2008) identified that inadequate school resources and inadequate/inappropriate parental responses were the most common perceived barriers to BMI screening practice in suburban public elementary schools. Further, they identified that mandates (state, district, and school) had a positive influence on the suburban SN's likelihood to measure BMI. Policy, physical environment, social environment, risk/protection, and access to quality health care were not explored as potential barriers to BMI screening of children in public elementary schools. Further research is needed to identify barriers that prevent SNs from effectively screening children affected by obesity.

Theoretical Framework

An adaptation of the HP 2010 Determinants of Health Model (USDHHS, 2001) guided this research. The original model was established to direct US health care professionals in the distribution of choice care to individual citizens and communities (Figures 3.1 & 3.2). The model includes policy/intervention, environment, behavior, biology, and access to quality health care. Health status, which is represented by the behavior and biology of individuals, is influenced by policies/interventions and access to quality health care. The model asserts a relationship between health policy and access to quality health care. Adaptations of the HP 2010 Determinants of Health Model were based on a thorough review of the literature.

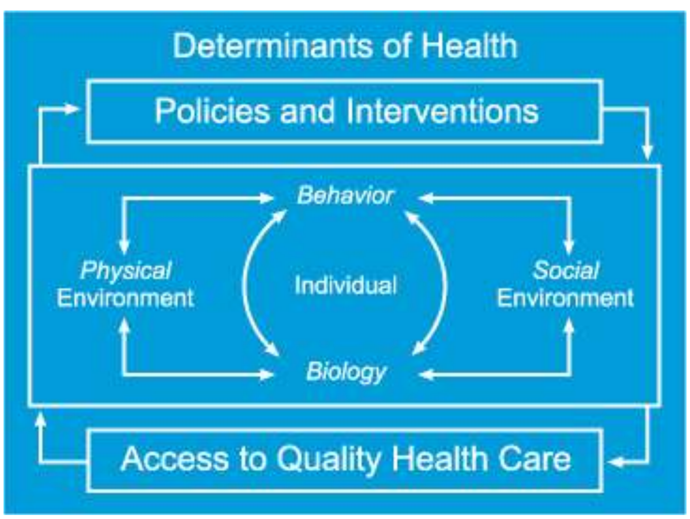

Figure 3.1. Healthy People 2010 Determinants of Health Model

In the adapted HP 2010 Determinants of Health Model, BMI screening program serves as the intervention and is assumed to be an evidence-based, accurate measure of health status for school age children. BMI screening is not assumed to be a preventive intervention. The adapted model proposes that school physical environments are comprised of school size, nurse to student ratio, number of students, and ability to maintain confidentiality. The adapted model also proposes that school social environments are comprised of parent involvement, teacher accessibility, principal support, school board, cost per pupil spent, and after school programs. School physical and social environments are mediated by risk factors. Risk/protection factors include age/grade level of children, demographics of school community, incidence and prevalence of childhood overweight and obesity, number of children on school lunches, and number of hours spent in fitness classes. A relationship between screening policy/intervention and access to quality health care is posited. Policy is defined by international, national, state, and local governing agencies and advisory boards. Access to quality health care for school age children has been documented to be related to school nurse staffing, available referral sources, and child insurance status (Marx, 1998).

Method

Three focus groups (FG) with 6-10 SNs who met the inclusion criteria were convened. Inclusion criteria were: (1) member of the Ohio Association of School Nurses (OASN), (2) active RN license and, (3) employed as a full time (FT) nurse in a public elementary school within the past year.

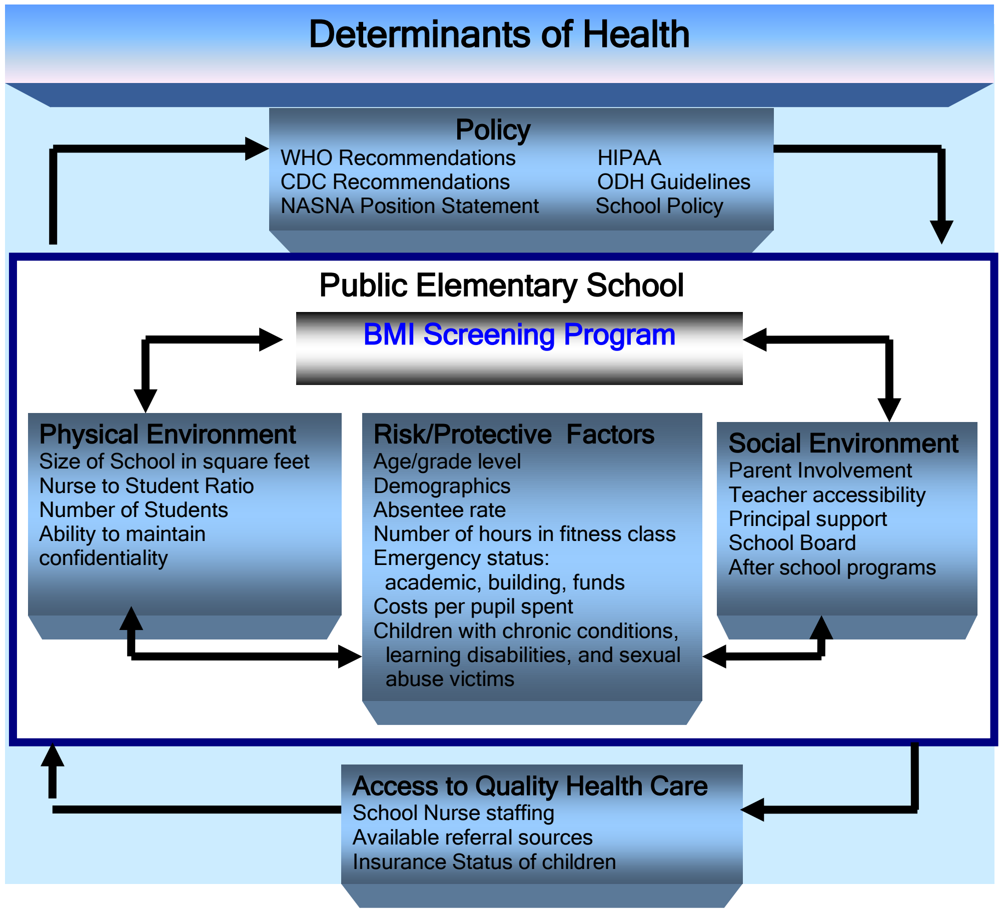

Figure 3.2. Healthy People 2010 Determinants of Health Model adapted for BMI Screening Programs in Public Elementary Schools.

Data were gathered over a 2 year time period (2004-2006). This study was approved by The Ohio State University Institutional Review Board.

Instruments

FG protocol included scripts, a demographic questionnaire, and a semi-structured list of questions. Demographic data included nurse characteristics and school characteristics. The HP 2010 Determinants of Health Model adapted for BMI Screening

Programs in Public Elementary Schools guided the development of semi-structured focus group questions. Drafts of the semi-structured list of questions were reviewed for content validity by two SNs who were not members of the OASN. Suggested revisions were incorporated into the final list of questions. The questions were open ended and designed to identify the facilitating factors and barriers that SNs encounter in BMI screening of children in public elementary school settings. The questions were organized according to the themes of policy, intervention, school physical environment, school social environment, school risk/protective factors, and access to quality health care that were consistent with the HP 2010 Determinants of Health Model adapted for BMI Screening Programs in Public Elementary Schools.

Procedures

Krueger's (1994) recommendations for managing small focus groups were used to guide focus group procedures. Each FG was moderated by the Principal Investigator (PI) and co-moderated by a doctorally prepared researcher or a doctoral student. All sessions were audio-taped using two tape recorders. The moderator led discussions, and the co-moderator wrote field notes. The demographic sheet and informed consent forms were completed by each participant prior to the audio-taped sessions. Immediately after completion of forms, the interview questions were introduced in a systematic and semi-structured fashion. After all FG questions were asked and discussed, the co-moderator orally summarized the topics with the group. Membership feedback was employed as a strategy to clarify meaning and terms of the comments made by the SNs. At the end of the sessions a $20 gift certificates was disbursed to each participant.

Data Management

Immediately following the FG discussions, recordings were transcribed verbatim into electronic documents by the PI. The documents were validated by reviewing recordings with transcriptions. The co-moderator transposed field notes into electronic versions. To ensure accuracy of transposed data, the moderator and co-moderator electronically exchanged documents to review text. Documents were then entered into Atlas.ti 5.0 as primary documents for analysis.

Data Analysis

Data analysis was an iterative process referred to as content analysis. Content analysis is a standard procedure for analyzing transcript interview data (Flick, 2002). The HP 2010 Determinants of Health Model adapted for BMI Screening Programs in Public Elementary Schools categories were used to reduce textual data into themes. Themes were compared within and across primary documents so that context and meaning were accurately captured. In addition, data were analyzed according to geographic region. The PI functioned as a primary coder. The co-moderator functioned as second coder. Discrepancies in coding were discussed in terms of context to rule out ambiguity and determine emergent themes.

Several measures were taken to enhance the rigor of this research. Investigator triangulation (using more than one coder to contrast codes) enhanced credibility of findings to remain analytically and contextually accurate at the smallest unit of analysis (Flick, 2002). Credibility was also enhanced by use of multiple method triangulation by the use of observation/field notes and interviews/transcripts to gain deeper insight, meaning and understanding of answers to research questions (Polit & Beck, 2006). In addition, dependability and confirmability were established through review of an audit trail by an experienced qualitative researcher who served as a third party reviewer (Lincoln & Guba, 1985). Dependability was established by the auditor who examined methods, procedures, and analytic techniques. Confirmability was established through audit trails, specifically reviews of the inquiry process, interview tapes, field notes, transcriptions, and coding records. Suggestions for improvement were negotiated and resolved by consensus with the moderator and the co-moderator.

Results

Demographic characteristics of FG participants are presented in Table 3.1, and characteristics of their schools are provided in Table 3.2. Of the 25 SNs who volunteered to participate in the study, most were OASN members, RN licensed, SN certified, and had been employed as a full-time nurse in a public elementary school within the past year. In addition, most of the participants had OASN memberships greater than 5 years (60.7%), had at least 5 years of experience as a SN working full-time in a public elementary school (76%), and held bachelor degrees (64%). Most of the SNs (76%) were assigned to one school and cared for children in kindergarten through sixth grades (96%). Sixty-eight percent reported that 51%-100% of the children under their care in their primary assigned school were on free/reduced lunches.

Table 3.3 presents emergent themes according to The HP 2010 Determinants of Health Model adapted for BMI Screening Programs in Public Elementary Schools categories. See Tables 3.4 through 3.9 for HP2010 categories, emergent themes and SN description by quotes. Table 3.10 highlights emergent themes as related to geographic segmentation by the adapted Determinants of Health Model categories and quotes by SNs. Key facilitating factors and barriers are provided in Table 3.11.

BMI Screening Practices

BMI screening was described as a “time consuming” process of delegation, supervision, height and weight data collection, BMI calculation, conversion and plotting, risk identification, referral, and follow-up. The primary practice was multi-phasic data collection that included the obtaining of heights and weights on all children. Many SNs described that they did not screen for obesity “per se” as they did not convert data and plot BMIs. These SNs believed they merely assessed height and weight, but did not screen for obesity. There were geographic distinctions as to BMI screening practices. Emergent geographic themes included suburban discretion, rural reluctance, and urban chaos.

Suburban discretion. Suburban SNs were concerned with the “sensitivity” of identifying a child as “at-risk for obesity.” For them to follow-up based only on a weight risk was described as “just too sensitive of a problem.” One SN stated that she followed up on “at-risk children by providing a letter to parents.” She referred to her letter as “informative yet sensitive.” Most participants discussed that “fifth and sixth graders” were the “most vulnerable” of all school children.

Rural reluctance. Of the eight rural SNs who participated in the FG session, only one screened for obesity. Reluctance for the others to screen children was consistent with logistics for data collection and prioritizing daily assignments.

Urban chaos. Urban SNs voiced that logistics in grouping children for data gathering purposes is difficult. The issues were student transfers within public/charter schools and daily administrative decisions. These concerns reduced urban SNs' abilities to organize and manage effective screening programs.

Policy Factors

SN participants voiced passionate claims that obesity prevention need to be addressed at federal, state, local school system, and individual school levels. Social causes such as fast food and excessive physical inactivity were issues SNs felt needed to be addressed at all levels. SNs felt that parent apathy and overweight were contributory factors; that policy did not support SNs if an angry parent was the result of identifying a child at-risk for obesity. Lack of school system policy impeded data collection, referral, follow-up, and child safety related to lockdown situations. Fear of law suits due to lack of a practice standard and policy was a consensus. An emergent theme from the urban geographic area was Urban Chief Executive Orders.

Urban Chief Executive Orders. Urban SNs described non-mandated administrative directives as supercilious requirements aimed to satisfy community stakeholders. SNs discussed that Urban Chief Executive Orders were used to determine workload priority and as to gain administrative support for SN interventions.

School Physical Environment

With regard to school physical environment, BMI data collection was influenced by physical attributes of a school. For example, larger schools take more screening time and a lack of privacy curtains influenced quality of data. Having a sense of control over access to functional and accurate scales, stadiometers, and calculators were concerns SNs voiced. The location and size of the area where SNs screened were described as "nurse's office", "student health center", and/or "clinic." These physical areas were also described as problematic. Emergent themes varied based on the geographic area of the FGs. Suburban clinics, rural closets, and urban classes emerged as themes.

Suburban clinics. Suburban SNs discussed how clinic locations near gym classes impacted ability to gather data while maintaining confidentiality and processing student information into computer systems. The impact that noise, order, and technology had on accurate data collection and calculation was a primary concern.

Rural closets. Rural SNs expressed issues about not having "adequate" clinic space to assess children. It was accepted that supplies and equipment were scarce. Some described scales that were old or broken. Several described make-shift clinics in broom closets, conference rooms, and libraries. They also described sharing space with ancillary staff such as music teachers, speech therapy, and custodians. Privacy issues were extremely important.

Urban classes. Urban SNs justified in-classroom screening with regard to keeping children safe during lockdown situations and not taking children outside of classroom to the scale or stadiometer. They described being "responsible for four or more schools" that have reached maximum capacity with children kindergarten through 8th grade in each school.

School Social Environment

Several school social environment themes emerged that described internal and external school communities impacting BMI screening process. Internal communities included teachers, gym teachers, parents, cafeteria personnel, and principals. External communities included school board, health care providers, and society. Teacher accessibility was described as “crucial to height/weight collection.” Principal support was important for scheduling rooms and resolving any conflict that resulted from a lack of teacher or parent support for screening. Intervention aspects of BMI screening were most influenced by cafeteria personnel and diet choices. Parental involvement with screening was a problematic topic. Some SNs preferred parent involvement; others rejected the notion to include them. This ambivalence was related to SNs needing help to complete screenings and a need for confidentiality to be maintained with regard to health information. Administrative support was suspect, because without a policy guiding practice behavior, complaints from parents would probably result in a negative response by administration regardless of child health. A lack of community organization to address child overweight was an overall common theme. Emergent themes varied based on the geographic location of the FGs. Suburban privilege, rural detouring, and public paucity emerged as regional themes.

Suburban privilege. Discussion among the suburban SNs highlighted a strong socioeconomic foundation of above middle income and college educated parents. Maternal involvement was prevalent in these schools. Cooperative spirit between teachers and parents was evident. The issue of parent involvement required rumor control by SNs in the form of confidentiality training as it related to health information of children.

Rural detouring. The rural setting has a close social network among community members, especially school administration, parents, teachers, and SNs. Discussion about health priorities and screening practice were consistent with power, money, and who knew what about whom. The power that teachers have in the school over daily schedules and the SN access to children was an issue that SNs struggled with daily. SNs also discussed how principal support could “make or break” a screening program.

Public paucity. The urban SNs struggled with parent and community involvement. They underscored that parents are “absent” from the education process “most of the time” and that community outreach was limited. SNs described parent involvement usually meaning that a parent was angry with school professionals. Urban SN knew health issues included sensitive information that results in a parent-school professional conflict. Avoiding this conflict was not a strategy the SN employed, but SNs related a lack of parent participation with a lack of acceptance of overweight notification from BMI screening results. Several school-based obesity intervention programs were funded and included in-school dance classes, walking clubs, and jump rope clubs.

School Risk/protection Factors

Three primary themes emerged that SNs felt were impacted BMI screening. First, the number of children on free lunches and health insurance status of children do not influence BMI screening regardless of community socioeconomic status. Second, geography in terms of suburban, rural, and urban regions had unique issues specific to

BMI screening. Third, SNs described “American fast food” as a culture that influences school health, regardless of which geographic segment the SN identified as appropriate to the school district in which he/she worked.

Access to Quality Health Care

With regard to access to quality health care, themes emerged that influenced follow up and referral aspects of BMI screening. SNs described that no successful obesity programs were available for SN to refer. Limited availability of referral options impacted community health. Lack of SN staffing negatively impacted the screening process, because time was an issue for data capture, data management, follow-up, and referrals. The age of children impacted screening as younger children required more time and older children required more tactful approaches. Geographic segmentation, student age, race, and grade, and SN workload impacted BMI data collection and intervention.

Facilitating Factors

Teachers were the overall most important facilitating factor as expressed by all SNs, because they gave SNs access to children. Teachers also influence cooperation and provide structure (time oriented) to the screening program. Suburban SNs identified that gym teachers were especially important to BMI screening because they reinforce the message of health. Gym teachers also provide a message in self-responsibility for fitness where many gym teachers have technology that monitors fitness levels. Suburban SNs described collecting BMI data near a gym class was important, because gym teachers had software programs to calculate BMI data and because the message of health was reinforced. Rural and urban SNs presumed facilitating factors from skilled and non-skilled professionals. For example, urban SNs collectively agreed that trained personnel such as aides would be very helpful for data collection and BMI conversion. Rural SNs were also interested in collaborative work and focused on assisting one another instead of hiring assistance. Other presumed facilitating factors included student nurses and community interplay. Community interplay was defined as all members of the community working together for a common goal.

Barriers

Lack of privacy, time, and lack of policy were the primary barriers voiced by SNs. School size and the location in the school where BMI data are collected can have a negative influence. For example, for rural SNs having no clinic or area to properly collect BMI data is problematic. For suburban SNs, being distant from a gym class made data collection a slower process. Urban SNs focused their concerns primarily on school organization and logistics and its impact on the time it takes to screen children. All SNs agreed that age and grade level also affected how rapidly data were collected. Geography in terms of the number and distance of schools any one nurse is assigned effects time for data collection. Lack of nurse knowledge about position statements, resources, and the BMI as a valid measure of obesity were also stated. Cost was identified as a barrier, yet the context of how cost negatively influenced BMI screening was not explored by the moderator because of time constraints.

Discussion

BMI screening for the purpose of obesity identification is a controversial topic (Nihiser et al., 2007). Critics contend that the high probability of measurement error and potential for negative child mental health effect have relevance to school nurse practice (Gance-Cleveland & Bushmaier, 2005). The AMA (2007) clearly stated that descriptive language must be included when working children. SN perceptions substantiate that BMI screening practice is complex when working with potentially obese school age children. The study underscored that policy, school social environment, school physical environment, access to quality health care, and geography are perceived as factors that impact SN BMI screening practice. This is consistent with the findings from Hendershot et al. (2008) that policy influences the likelihood that SNs will conduct BMI screening, that suburban SN identified inadequate resources for BMI screening, and that parental responses to identifying overweight and obese children are barriers to practice.

With regard to BMI screening practice, some SNs participate in screening and others do not. Most of the suburban and urban SNs practiced BMI screening as part of an obesity identification effort. Most of the rural SNs did not practice BMI screening. Rural reluctance was consistent with findings that only 34% of surveyed SNs practicing in southeast regions of Missouri, which is mostly rural, used BMI-for age percentiles to assess for obesity (Moyer, 2005).

BMI screening as a time consuming process was a key finding. SNs shared insights into aspects of the process that impacts their ability to perform screenings implying there is an ideal, sequential process. Gance-Cleveland and Bushmaier (2005) provided SNs with a detailed protocol for accurate BMI measurement for school age children where 600 students could be measured in 6 hours with six stations staffed by two trained, adult, lay data collectors. SNs discussed a variety of data collection strategies.

These included mass collection, case finding, and multi-phasic. The example of multi-phasic strategy was logical to mandated vision and hearing screenings suggests time management and seasonal influences. That is, in Ohio hearing and vision screenings are required to be completed annually on specific grades and children by November 1st of the academic year. Many SNs described adding height and weight screening to the hearing and vision screening process. Gance-Cleveland and Bushmaier recommended annual, state mandated, mass, BMI screening in schools. Again, Hendershot et al., (2008) identified that mandates do influence BMI screening practice.

Group concern existed about whether height/weight data collection was necessary if not mandated. Discussions about scientific rationale for data collection included growth patterns across time for obesity identification or underweight indicators. Some SNs were concerned about BMI screening in terms of false positive results angering parents or labeling a child and causing long-term psychological harm, but believed the BMI was an accurate measure of risk. These findings differed from Moyer, Bugle, and Jackson’s (2005) study where SNs thought visual observation was the most accurate method of determining obesity. Although SNs agreed that the BMI is a quick and easy screening method, there was concern that identification without effective intervention and referral was futile. Valanis (2004) emphasized the need for screening programs to be accurate, rapid, non-invasive, cost-effective, and have a cure, and accessible treatment. SNs in this study who did not screen for obesity gave reason that BMI screening did not meet established screening program criteria.

The feeling that obesity was a sensitive subject for children was particularly evident among suburban SNs. Rural SNs were reluctant to refer children or to notify parents of a potential obesity risk due to fears about parental anger. Many SNs do not refer children at or above the 85th percentile, but would prompt parental acceptance by a referral for a co-morbid concern. Parental receptivity and student sensitivity concerns are consistent with Price's (1987) and Moyer's (2005) findings that most SNs do not feel competent to counsel and refer overweight/obese children. Grimmett et al. (2008) also found BMI screening and at-risk for obesity identification were distressing for some children and some parents emphasizing the importance of "managing the process sensitively" for overweight children and their families (p. e682).

Urban SNs were concerned with organizing screening programs and the data collection process. They voiced concerns about chaos and a lack of order in the schools. Intrasystem student transfers between public and charter schools, daily administrative decisions, and increased numbers of children with special needs complicated the data collection process. This finding is consistent with Schainker et al. (2005) findings that barriers to SN services in Massachusetts urban schools included coordination of care across settings, care of children dependent on medical technology, working parents, high teacher turnover, and high immigration rates.

There was trepidation about documentation expectations. SNs were uncertain about what should happen to collected data and how much documentation of SN intervention was necessary to indicate that the health status of a child was addressed adequately. An example of this apprehension was with regard to BMI calculation. SNs described an overall lack of systematic application. Some SNs described use of standard BMI wheels where a 4.5 inch diameter double sided tool is used to calculate BMI for children. One side of the wheel is used for children from 20 to 90 pounds, while the other side calculates BMI for adolescents and adults from 80 to 450 pounds. Other SNs described use of calculators and/or computer software programs to calculate BMI. All SNs indicated that all of the methods took a great deal of time to calculate and plot. Some SNs used non-trained health care workers to gather, calculate, plot, and document BMI. SNs were concerned about liability with delegation and documentation of a non-mandated screening. A lack of standards in training and responsibility of paraeducators, paraprofessionals, and volunteers in US school settings was supported throughout the literature (Brent, 2000; Ideka, Crawford, & Woodward-Lopez, 2006; Research Connections, 2003). Banerjee, Morgan, Rees, and Latiff (2003) investigated school children in Britain and concluded that routine growth screenings are ineffective without adequate resources, high standards, and licensed professionals. Northrup, Cotrell, and Wittenberg (2008) emphasized community partnerships and team approaches within school settings to screen for health risks.

SNs' concerns for a national epidemic of child obesity were passionate. Child health as a precursor to academic success and adult health were described as unimportant issues to legislators, school administrators, and society as a whole. School health initiatives to control junk food and soda access, as well as, increasing physical activity were described as not important to the school board's "bottom line" but high on SNs' agendas. These results are consistent with Moyer's (2005) findings that SN perceptions of obesity management in schools need to include banning high energy calorie dense food/drink dispensers and increasing physical education opportunities. SNs conveyed a sense of responsibility to lead school health initiatives and to role model healthy behaviors; and these perceived responsibilities are consistent with Moyer's (2005) findings. SNs felt limited on what they could do to lead school and national health priorities to reduce child obesity. Participation in the focus groups was one way they felt they could "make a difference" and be proactive in "taking steps toward improving the problem." Participation in the research process as well as policy making are ways Hootman (2002) recommended SNs can positively impact child health in the schools. According to Kubik, Story and Davey (2007) SNs are under used resources in the campaign against childhood obesity.

Discussions about policy that referred to BMI screening programs involved prioritizing State of Ohio mandated hearing, vision, and scoliosis screenings over those non-mandated screenings. Serum glucose, blood pressure, asthma peak flow, and BMI were not consistently measured in schools because they are not mandated. In this study, the lack of school system policy was described as major impedance to BMI screening. SNs believed school systems would comply with a federal mandate that offered SNs protection from legal/financial liabilities associated with BMI screening. This infers that fear of lawsuit supersedes child health. Van Buruean (1995) discussed child rights to highest attainable health within a school system as reasonable under international law framework. The Alma Ata (1978) initiative entitles children the right to health care access and health education without unjustifiable discrimination (Van Buruean, 1995).

Although the No Child Left Behind Act of 2001 respects international law for child right to education, it has been censured for diverting physical education and health services funds to academic achievement reserves (Maurer & Smith, 2005).

State level initiatives have been developed to address number of hours in fitness class as well as reducing availability of vending machines during school hours. Yet, no initiatives have been developed in Ohio with regard to aggregate or individual BMI monitoring. According to the Center for Health and Health Care in Schools (2007), eight states (Arkansas, California, Florida, Illinois, Missouri, Pennsylvania, Tennessee, and West Virginia) have mandated state level policies for assessing child BMI in schools. Further, no school district in Ohio has adopted BMI screening mandates (personal communication, January 20, 2008, Ann Connelly, Ohio Department of Health School Nurse Consultant).

An aggregate approach to BMI screening does not reduce the responsibility of the SN to intervene if a child is identified with an obesity concern. SNs in this study were very interested in having clear, consistent direction, and support from state and local professional organizations, governing bodies, and school administration. In July 2007, National Association of Pediatric Nurse Practitioners (NAPNAP) released Healthy Eating and Activity Training (HEAT) guidelines that included yearly BMI monitoring of school age children. In this study, urban SNs used urban chief executive orders as a method of best practice for BMI screening. There was speculation that governing bodies, advisory councils, professional organizations, school systems, and SNs had different views about best practices. There is no current research that assesses the implementation of nursing guidelines aimed at best practice for obesity prevention.

School physical environment highlighted clinic design, space designation, and equipment as impacting BMI screening. Even with compliance to the Health Insurance Portability and Accountability Act (1996), SNs' ability to maintain confidentiality was of concern. Guidelines for adequate space of public elementary school clinics are 200-500 square feet according to the Educational Facility Planners 1991 criteria (Butin, 2000). Clinic locations are recommended to be near administrative offices, meet federal accessibility requirements and have adequate space for educational displays. Physical layout for privacy and confidentiality must be arranged to maintain physical, social, and mental integrity. This includes acoustical seclusion for consultation, assessment, and procedures. Walls, privacy curtains, and private spaces are essential. Equipment such as stadiometers and scales must be reliable and calibrated according to manufacturer recommendations (Butin, 2000). It is unclear what constitutes effective physical layouts for BMI screening. Participants discussed having inadequate space, inadequate privacy components, unusable equipment, and not being close to either the students or the gym teachers. Computer equipment was also discussed as being necessary for BMI screening. Stoddard et al. (2008) identified that BMI screening in schools can be private and reliable if standard protocol is followed that limits the number of children waiting for screening and if data are collected in a private space.

In reference to school social environment, SNs described internal political boundaries as forces impacting health screening practice. It was believed that state mandated screening programs were a priority over nurse judgment or school health initiatives. SNs described principal support and teacher accessibility as fundamental to a team approach to screening. This finding is consistent with Idek et al. (2005) position that BMI screening in schools needs to be carefully considered by school administration before committing resources to identifying children as overweight. The underlying idea was that a school health focus must involve all levels of the school community. The Role of Schools in Addressing Child Overweight expert panel proposed 10 key strategies to provide a healthy school environment for children to learn. One strategy was having a social network established to implement a high-quality disease prevention program (Idek et al., 2005).

The external school social environment was described by SNs as primarily related to school board power. There was consensus that most of the cooperative power needed to carry out BMI screening programs was held by school boards, especially in regard to parental notification of overweight status. Rural SNs shared an intense ambivalence about parental notification. This ambivalence is congruent with findings from work by Kubik, Story, and Reiland (2006) describing parent opinions about BMI screening in schools and school board power. Parents notified of overweight children were more likely to report discomfort than parents notified of their child having no weight concerns. “Blaming” was a theme Kubik et al. (2006) accentuated as an important result of reporting individual BMI findings to parents.

External community systems also impede SNs’ abilities to effectively educate and refer at-risk children. Although there was much discussion and speculation about the role of society on the obesity epidemic, scientific literature does suggest causation, especially with soda intake, fast food consumption, and inactivity due in part to video play (Andersen et al.,1998; Dietz & Gortmaker, 1985; Giammattei et al., 2004; Gortmaker et al., 1996; Frost, 2003). Findings from this study indicated community interplay, geography, organizational logistics, organizational mission, poverty, and communication may be factors in obesity screening and intervention. Lacking was information about community members who are committed to obesity intervention actively participating in school intervention programs. There is congruency in parental involvement according to social class, specifically how poverty impacts child health. Evans (2004) found that poor children experience less social support from parents, schools, neighborhoods, municipal services, and health care. Such risks when accumulated over time have significant impact on health of urban children (Evans, 2004). Comparisons to suburban and rural counterparts were less noticeable in terms of diversity and resources. Lareau (2000) identified that middle and upper social class parents in suburbs used gossip, rumors, and manipulation to help children succeed in school. Likewise, parents of children in lower social classes such as urban settings were less likely to be involved in school matters. Falk and Kirkpatrick (2000) found that rural communities will disband and prohibit work when trust has been violated or poor outcomes have been experienced. Northrup, Cottrell, and Wittenberg (2008) identified that community partnerships among nurses, educators, and families can successfully reduce cardiac health risks in Appalachian populations.

In reference to school risk/protection, concerns about fast food as paramount in American culture was evident. This is consistent with research findings linking poor school performance to children who are overweight or obese (Datar, Sturm, & Magnaosco, 2005). SNs discussed the relationship between the benefits of profitable school district contracts with soft drink and food companies and reduced daily physical education/activity due to proficiency testing preparation. Taras and Potts-Datema (2005) validated there is increased information suggesting obesity has a negative effect on academic performance.

SN workload/time, staffing, heavy case loads, and affordable and available referral sources were the topics of concern with regard to access. Urban SNs described a workload that included a 90% chronically ill population. SNs described attending to brittle diabetics on insulin drips, wheelchair dependent children with G-tube feedings and foley catheters, high incidence of peanut allergies, and asthmatic patients who are inhaler dependent. The national average ratio of student to SN is 950:1 (Ideka, 2006). This ratio exceeds NASN position of one SN to 750 school children (NASN, 2005). Horowitz (2005) identified reduced salaries and over extended budgets as contributors to SN workload concerns. In addition, delegation of BMI screening tasks as well as other skilled procedures to unlicensed persons requires SNs to oversee all supervision and management of assigned tasks (NASN, 2006). The end result is that the SN workload reduces the ability to focus on prevention.

The workload issue is not likely to resolve in the near future as in 2008, the American Association of Colleges of Nursing (AACN) estimated that the school-age population will increase more than 16% by 2016, and that there will be a deficit in the number of Registered Nurses who will be prepared to care for the children (AACN, 2008).

Nwabuzor (2007) reported that only 63% (n=33) of states have mandates in place for SNs to care for children in public schools. Of these, 5 (15%) states have established numeric student to SN ratios. Horowitz and McCoy (2005) reported that 47% of schools provide care above the nationally recommended SN to student ratio. In fact, in some states the SN to student workload can be as high as 1 SN to more than 5,000 students (Nwabuzor, 2007).

SNs in this study identified that while some factors serve as barriers, others as facilitating factors. Facilitating factors varied by region. Suburban SNs described physical education teachers as important to the BMI screening process due in part to computer software programs. This finding is consistent with Sutch and Lee's (2006) introduction of hand held physical electronic energizers to educate children about the balance between healthy eating and physical activity. Prototypes have been introduced that yield gym report cards which require accurate personal health history and vital statistic data entry by physical education teachers to record trends and scores (Sutch & Lee, 2006). Urban SNs concurred that trained aides are needed for data collection and BMI conversion. French (2002) noted urban schools have consistently used paraprofessionals to assist SN. French also described an immediate need to create safe productive school environments for children with health risks. Rehm (2002) emphasized the need for parents, nurses, and educators to be persistent in the face of systemic barriers and to take action to protect children. Rural SNs were also interested in collaboration. An overarching theme was the influence teachers have on BMI screening practice of SNs. Lightfoot and Bines (2000) identified teachers as gatekeepers to children access to health care, especially in routine health screening, surveillance and immunization programs. Lightfoot and Bines concluded that teachers have complementary roles with SNs which should be used strategically to keep school children healthy.

The insight gathered regarding SN BMI screening practice yield unanswered questions in each HP 2010 Determinants of Health Model adapted for BMI Screening in Public Elementary Schools category. Factors described as barriers such as workload, acuity and staffing ratios presented as topics needing further clarification. Future research is needed to more broadly assess SN practices and opinions. Based on findings from this study, a survey was developed using the HP 2010 Determinants of Health Model adapted for BMI Screening in Public Elementary Schools to determine SN BMI screening practices and to validate emergent themes (See Chapter 4). Administration of the final survey to a random selection of SNs is recommended so that data can be used to support policy and obesity intervention standards for care.

Limitations

This study had limitations specific to sample composition. Self reported views from a convenience sample of primarily Caucasian females who worked in similar settings, school districts and regions limit transferability of findings to all SNs. In addition, because some participants knew one another, they could have been reticent to share true opinions and practice experiences. It is possible that those who did not participate substantially differed from those who did participate. Finally, participants were limited to OASN members who worked full-time in public elementary schools within the past year. Non-OASN members, part-time, retired, and those SNs who work in other settings (e.g. private, parochial, health departments, junior or senior high schools) may have significantly different opinions and practice experiences.

Implications for SN Practice

BMI screening in public schools addressed an important child health issue. The risks and benefits of a practice based in prevention are controversial. The United States Preventive Services Taskforce (2005) cautions against routine annual screenings due in part to the potentially negative psychological impact obesity identification has on children. SN BMI screening practice that aims for privacy, baseline data for growth trends, dietary control, and physical activity is well-supported in scientific literature. Collaborative efforts aimed to address national and local obesity issues are necessary. It is imperative that SNs understand the barriers to BMI screening prior to making a practice decision.

Early identification programs require skilled professional involvement. Interdisciplinary effort through classroom, physical education teachers, dieticians, physicians, and SNs are advised. SNs described how student nurses from area universities reduce workload barriers, especially in data capture, calculation, and documentation. Service-learning methods of instruction offer university SN partnerships for student experiences. Partnerships become a win-win situation for all involved. In fact, many positive outcomes for service learning participants have been identified (Foss, Bonaiuto, Johnson, & Moreland, 2003). BMI screening programs are ideal for service-learning opportunities. Emphasis on screening criteria and use of BMI as a valid measure would be pre-assignment content for classroom lecture or web enhanced discussions. Hands-on demonstration of skills would serve to provide nursing students with mass, multi-phasic, and pediatric screening experiences while providing the SN with reduced workload, assistance with data capture, BMI calculation, and plotting. Clinical faculty would monitor students' responsibilities in the BMI screening process. Ideally, universities in all regions would participate in this effort.

For regions with scarce university resources, community partnerships with other paraprofessional service providers are recommended. For example, medical assistants, emergency medical technicians, and volunteer fire fighters could serve as facilitating factors in the BMI screening process. SN emphasis on a properly delegated and supervised collection of accurate BMI data by a community partner working to accrue required on- site clinical hours and experiences for paraprofessional certifications might be a foundation for a collaborative partnership. Regardless of what entities partner with SNs, the end result would be an early obesity identification program that reduces SN workload and gains community involvement.

Table 3.1 Demographic characteristics of focus group (FG) participants.

Participant characteristics	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
OASN membership				
<5 years	1 (12.5%)	3 (42.9%)	6 (60%)	10 (40%)
> 5 years	1 (12.5%)	3 (42.9%)	0 (0%)	4 (16.7%)
>10 years	6 (75%)	1 (14.2%)	4 (40%)	11 (44%)
Yrs. experience as FT				
<5 years	1 (12.5%)	3 (42.9%)	2 (20%)	6 (24%)
> 5 years	3 (37.5%)	3 (42.9%)	3 (30%)	9 (36%)
>10 years	4 (50%)	1 (14.2%)	5 (50%)	10 (40%)

continued

Table 3.1. Continue

Participant characteristics	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
Education				
Diploma/ADN	2 (25%)	1 (14.2%)	3 (30%)	6 (24%)
BSN	3 (37.5%)	7 (100%)	4 (40%)	14 (56%)
BS	1 (12.5%)	0 (0%)	1 (10%)	2 (8%)
MSN	1 (12.5%)	0 (0%)	6 (60%)	7 (28%)
MS	4 (50%)	0 (0%)	4 (40%)	8 (32%)
School Nurse Certification				
Yes	8 (100%)	6 (85.7%)	10 (100%)	24 (96%)
No	0 (0%)	1 (14.2%)	0 (0%)	1 (4%)

Table 3.2. Characteristics of schools described by school nurse participants.

	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
School Characteristics				
Geographic Area				
Urban	0 (0%)	0 (0%)	10 (100%)	10 (40%)
Rural	0 (0%)	7 (100%)	0 (0%)	7 (28%)
Suburban	8 (100%)	0 (0%)	0 (0%)	8 (32%)
Number of schools assigned				
<2	8 (100%)	6 (85.7%)	5 (50%)	19 (76%)
>2	0 (0%)	0 (0%)	3 (30%)	3 (12%)

continued

Table 3.2. Continue

	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
5 or more	0 (0%)	1 (14.2%)	2 (20%)	3 (12%)
Students on free lunch				
0-50%	6 (75%)	0 (0%)	0 (0%)	6 (24%)
51-100%	2 (25%)	7 (100%)	10 (100%)	17 (68%)
Race of students in primary school				
Asian				
0-50%	8 (100%)	2 (28.5%)	2 (20%)	12 (48%)
51-100%	0 (0%)	0 (0%)	0 (0%)	0 (0%)

continued

Table 3.2. Continue

	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
Hispanic				
0-50%	3 (37.5%)	3 (42.9%)	5 (50%)	11 (44%)
51-100%	0 (0%)	0 (0%)	0 (0%)	0 (0%)
African American				
0-50%	5 (62.5%)	6 (85.7%)	2 (20%)	17 (68%)
51-100%	0 (0%)	0 (0%)	5 (50%)	5 (20%)
Caucasian				
0-50%	0 (0%)	0 (0%)	4 (40%)	4 (16.7%)

continued

Table 3.2. Continue

	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
51-100%	6 (75%)	6 (85.7%)	0 (0%)	12 (48%)
Other				
0-50%	0 (0%)	3 (42.9%)	3 (30%)	6 (24%)
51-100%	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Don't Know	2 (25%)	1 (14.2%)	3 (30%)	6 (24%)
School System Status				
Emergency academic	0 (0%)	0 (0%)	6 (60%)	6 (24%)
Emergency funding	0 (0%)	0 (0%)	5 (50%)	5 (20%)

continued

Table 3.2. Continue

	FG1 n=8	FG2 n=7	FG3 n=10	Total N=25
Emergency building	0 (0%)	0 (0%)	1 (10%)	1 (4%)
Other	3 (37.5%)	3 (42.9%)	0 (0%)	6 (24%)
Don't Know	2 (25%)	4 (57.1%)	2 (20%)	8 (32%)

Table 3.3. *Emergent themes according to HP 2010 Adapted Determinants of Health Model categories*

HP 2010 Adapted Determinants of Health Model Categories	Emergent themes
BMI Screening	Complex process, multi-phasic, validity of BMI
Policy	Co-morbid referrals
School physical environment	Privacy curtains, equipment issues,
School social environment	Teacher accessibility, principal support, cafeteria workers, physical education teachers, parent involvement, administrative support, community interplay
School risk/protection	American fast food culture, geographic regions
Access to quality health care	Poor affordability/poor availability of referral sources, SN staffing, age of children

Table 3.4. *Emergent themes of BMI screening practice as described by SNs*

Themes	Quotes
Complex process	"First…heights and weights …record on student folder… then…calculate, so time consuming. …depends on which building…might have the LPN, a student or gym teacher do it. Then…plot onto student folders…parent notification… usually letters…telephone calls, conferences…which is *really* time-consuming, so to reduce effort, instead of sending results home, I tell parent if child is overweight. …takes an unbelievable amount of time and energy. Next, referrals to doctor and dietary. ..no time for follow up. .. few intervention programs.. hard to determine if the time and effort is worth it for the kid."
Multi-phasic	"…the state requires vision and hearing …I collect the weights then; it's faster that way.
Validity of BMI	"…question the BMI as a valid measure for screening…. a universal lack of knowledge about causes, treatment." "…not worthwhile…making someone aware of truth? If you are in the 85^{th} -100^{th} percentile, everyone knows. I can assume the parent knows and accepts it. My telling them that I calculated the fact isn't going to make a difference...contrast to vision screening. I screen detect, inform…parent may or may not know, but then I refer for problem resolution. Taking a child from overweight to normal is not feasible. Until society and parents take steps to resolve…I won't do it…no sense." "Why…label a kid fat without a valid reason and plan?"

Table 3.5. *Emergent themes of policy as described by SNs*

Themes	Quotes
Co-morbid referrals	"I intervene only if the child exceeded BP parameters and the 85^{th} percentile for weight." "The BMI is not a meaningful number. If I say I have a concern because a child is depressed and overweight, or if I say your child may high blood pressure or diabetes, the parents are much more receptive. The BMI percentile has meaning. I use the chart and say that the child is 97% heavier than all the other children in the nation, now, that objectifies it. The BMI percentile has helped me more than anything when explaining this (risk and problems) to parents."

Table 3.6. *Emergent themes of school physical environment as described by SNs*

Themes	Quotes
School size	"The more room there is, the more kids there are."
Privacy curtains	"There is no way to maintain confidentiality without a curtain"
	"I don't have curtains in my clinic."
	"Sound goes through cloth."
	"There isn't enough room to hang a curtain."
Equipment issues	"I ordered a portable stadiometer and I got it a year later."
	"Mine (scale) broke and I ordered another one, but they won't approve it. If it were a school board election year I'd have it; otherwise I wait."

Table 3.7. *Emergent themes of school social environment as described by SNs*

Themes	Quotes
Teacher accessibility	"Teachers are vital for any screening program in the school."
Principal support	"If I come the same day as the Easter Bunny, I am out of luck, with little ones, every day is Santa Day. Well, health is important too, but no one backs me up."
Cafeteria workers	"They just serve what's purchased…chicken patties and fries on Monday, Tuesday tacos, Wednesday pasta, Thursday bread sticks and Friday leftovers… variety is candy bars and ice cream…"
Physical education teachers	"…without them kids wouldn't have reinforcement on health." "…they give up class time for screening… some even have software to calculate and track BMI." "Mine records the BMI on the report card for parents to see."

continued

Table 3.7. *Continue*

Themes	Quotes
Parent involvement	"There is absolutely no way I'd permit a parent to help with weight. They gossip too much." "…some can be hurtful even though well intended…" " With an orientation to privacy, I have no problem with parent help, any pair of hands will do!"
Administrative support	"I will NOT do BMI screenings this year. I (was) told by the teachers that I should not approach certain students because of parents. This is my first year in the system and I do NOT know if administration will support me if they hear from an angry parent. The gym teachers and cafeteria staff are beginning to work with me on food choices for the kids, but really how will I know if the changes we employ work if I can't even approach the subject?"
Community interplay	"(It's) not just teachers and principals, but dietary, parents, doc, and **US**… we can't get junk food out…I ask teachers how do they help reduce the problem…give them a snack… I say give them a pencil or a sticker... A tooth brush would help our cause. Everyone has their own agenda."

Table 3.8. *Emergent themes of school r1isk/protection as described by SNs*

Themes	Quotes
American fast food culture	"Fast food culture is an issue that is American, not just inner city poor." "An example includes a story about delivering Christmas baskets for my church…it was really eye opening to see that every delivery we made on Saturday 11:00 a.m. to 3:00 p.m…invariably, in every home, TV watchers and fast food eaters. These are people who are certainly not affluent. The culture is fast food. It is easier to give $10 and get a happy meal, than go to the grocery store and get a pound of hamburger." "This is evident in the larger society too. The paper had (golden arch) logo on the front page this morning. It was about a story on an inside page. But, people probably didn't turn the page, they thought breakfast!!" "…microwave and the fast food ..it's all they know. We have baked potatoes occasionally (and the kids) don't know what it is!!! We had a sample taste testing and it was like kiwi, cauliflower and they didn't know what some of the fresh fruit was—much less had ever tasted it."
Geography/regions	"at state conference, I talk to SNs who gives concrete reasons how staffing is impacting school health…and routine work…like screening programs…" "…rural is different than inner city is different than suburbs …bottom line …we are doing the best we can…we all have issues….different issues but very real ones."

Table 3.9. *Emergent themes of access to quality health care as described by SNs*

Themes	Quotes
Poor affordability of referral sources/Poor availability of referral sources	“There are no affordable and successful obesity intervention programs to refer these kids to.” “Referral is affected because of poor availability and access.” “There is a cost of care burden on parents.”
SN staffing	“…we are spread too thin to get everything done.” “…non-mandated screenings? I already travel 3 buildings and have more than 7500 screenings to accomplish in a year. Five thousand that have to be done every year by November 1. There isn’t enough of me…”
Age of children	“the little ones take more time, but 5^{th} and 6^{th} graders require a more empathetic approach.”

Table 3.10. *Emergent themes from geography according to adapted DOHM categories as described by SNs*

DOHM Categories	Regional Theme	Quotes
BMI screening	Suburban discretion	"I screen every child in my school, especially the 5^{th} and 6^{th} graders. They are the most vulnerable."
	Rural reluctance	"Screening is unfeasible for one nurse covering 3 buildings, 1700 students in grades K-5… two brand new insulin dependent diabetics, everyday medication administrations, G-tubes, foley catheters, head lice, skinned knees, head injuries, bloody noses, cramps, asthmatic attacks and vomit."
		"Mostly, we don't screen (for obesity) due to the work load of the special needs students."
		"Everyone is busy when we screen. There is a huge need for crowd control... its like herding cattle—hundreds of children to move in 15 minutes blocks of time… … its tough to accomplish."

continued

Table 3.10. *Continue*

DOHM Categories	Regional Theme	Quotes
	Urban chaos	"I had 120 kids to screen. The teacher who's class I was going to screen had a concussion, so then we had a new teacher to lighten the load, the principal split the class. Then the district split the class again and sent them to another building. Now we depend on the basic organization of the school to do our job. When there is no order, it is a problem."
		"Order is lacking. You can't find kids. There is high attrition. I did one kindergarten classroom four times."
		"Some kids move four and five times in one year. The paperwork and card shuffle is a disastrous nightmare. It influences our delivery of care."
Policy	Urban CEO's	"There are so many programs coming into the schools that require my time, the CEO programs come first then my other duties fall to the way side, it's the basis for keeping my job."
Physical Environment	Suburban clinics	"I had a building where I had about 2 square feet to work in, a doorway to my clinic. Privacy was tough… NO room for a curtain. To maintain privacy, students graph their own …height and weight!"

continued

Table 3.10. *Continue*

DOHM Categories	Regional Theme	Quotes
	Rural closets	"We just learn to adapt and look beyond the hardship, even if it is to use a broom closet or a bathroom, the work has to be done." "Well we don't have clinics." "they call us over the PA." Everyone in the building knows who has vomited, had their first period and who has lice. That is why we use the closet…" "I can hide there and get the job done." "What I have is a conference room to serve as a clinic. (Try and) screen there!" "I had to write a proposal to support using the room as a private place. The old principal denied it, the second one approved it. I have a diagram of what I want when they build our new school. I hope the architect asks. I gave it to the principle and the school board, but who knows….I am ready for them though. But, all my supplies are crammed in the closet."
	Urban classes	"71 steps between the first and third floors, so I have started doing most everything in the room, it saves time." "For safety concerns in one of my buildings this year, I went into the class for heights and weights in the classroom, because it wasn't safe to bring them out (lockdown)."

continued

Table 3.10. *Continue*

DOHM Categories	Regional Theme	Quotes
Social Environment	Suburban privilege	"There are moms who try to do good for others when it's a violation in privacy."
	Rural detouring	"If they (the teachers) know you're in the building they will sniff you out like a hound dog on hunting day. They to send for us to come to them when it's convenient for them, but when I need the kid to screen, it's another story."
	Public paucity	"There are problems getting them to an IEP meeting."
School Risk/protection	None	
Access to care	Suburban Workload	"I only have 200 kids. I screen every child . It takes time to do it right. I have privacy curtains and the latest technology. I have to be very sensitive and keep a positive attitude. Children and parents need alot of teaching. I don't think there are enough hours in the day…. Then, I find out the child with the health insurance that I referred to pediatric medical intervention can't afford the treatment."

continued

Table 3.10. *Continue*

DOHM Categories	Regional Theme	Quotes
		"I have over 3400 K-5 graders to get processed. These kids are in two different schools that are located two miles apart. The clinic where the 5^{th} graders are has NO privacy curtains and is parent staffed. The clinic where there are K-3 graders is huge with four designated areas in it. The height and weight apparatus were bolted to the floor and wall next to an entrance because of the repeated burglaries in the area. I can't get a privacy curtain around the scale. I have eliminated the pop machine in the cafeteria, eliminated candy bar sales with the PTO and started an after school walking club. Then I find out the parents are feeding kids Ramen noodles because it's all they can afford."
	Rural Workload	"I am one person with 3 school buildings, 1700 students; 800 in k-5. Two brand new insulin dependent diabetics that I am working with 3 times a day; trying to deal with what the BS is and what the teacher should do."

continued

Table 3.10. *Continue*

DOHM Categories	Regional Theme	Quotes
	Urban Workload	"…when you have 2000+ kids among 3 or more schools, there aren't enough hours in a day for us to complete (our) work." " With MRDD phasing out their program, we are getting those kids. They take a great deal of time. So what used to be 80-90% of a healthy population, is now chronic. These kids take our time: Insulin drips and IDDM's, heavier care loads, higher workloads, and a higher acuity level."

Note. DOHM = Determinants of Health Model

Table 3.11. *Key facilitating factors and barriers to BMI screening according to geography*

Geography	Facilitating factor	Barrier
Suburban	Gym Teachers	Clinic location
Rural	Peer collaboration	Availability of Clinic
		School size
		Clinic Location
Urban	Trained Aides	School organization
Overall	Teachers	Lack of privacy
		Lack of time
		Lack of policy
		Workload of SN

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CHAPTER 4

ESTABLISHING BASELINE VALIDITY AND RELIABILITY OF A BODY MASS INDEX SCREENING SURVEY

Introduction

The World Health Organization (WHO), the National Heart, Lung, and Blood Institute (NHLBI), the Centers for Disease Control and Prevention (CDC), and the American Academy of Pediatrics (AAP) recommend routine Body Mass Index (BMI) screening of all children ages 2-20 (Colditz et al., 2002). Public health literature asserts that routine surveillance and monitoring should take place in public elementary school settings (Harvard Cancer Report, 2003; Institute of Medicine [IOM], 2005). The National Association of School Nurses (NASN) Child Overweight Position Statement supports BMI screening of children by school nurses (SNs) (NASN, 2002). The United States Preventive Services Task Force (USPSTF) (Whitlock et al., 2005) does not recommend routine screening for obesity, suggesting that it may promote negative self image if a child is identified as at-risk for overweight or obesity. The American Medical Association (AMA) (2007) supports the use of the unambiguous terms “overweight” or “obesity risk” when working with children and adolescents. Given such ambivalent direction, BMI screening for early identification of unhealthy childhood weight is not a consistent practice among pediatric health care professionals and SNs (Kubik & Story, 2006; Stoddard, Story, & Skay, 2008; Hendershot, Telliohann, Price, Dake, & Mosca, 2008). Primary care providers (pediatricians, family physicians, physician assistants, and nurse practitioners) name a lack of agreement with BMI screening recommendations and skepticism about effective treatments as reasons for inconsistent practice (Flower, Perrin, Viadro, & Ammerman, 2007). Until recently, research that describes SN practice with regard to BMI screening in public elementary school settings has been sparse, especially in terms of policy, environment, access to quality health care, facilitating factors, and barriers (See Chapter 3). Most currently, Hendershot et al., (2008) assessed barriers to BMI screening practice using a newly developed survey. Survey development and psychometric methods by Hendershot et al., were lacking in that no focus groups were used to elicit survey items, face validity was established through a review of literature, and content validity was established by experts who were not representative of the sample. The purpose of this research was to psychometrically assess a developed survey aimed at identifying SN BMI screening practice, facilitating factors, and barriers in public elementary schools.

Theoretical framework

An adaptation of the Healthy People (HP 2010) Determinants of Health Model was used to guide this research. The HP 2010 Determinants of Health Model was originally established to guide U.S. health care professionals providing high quality care to citizens and communities (United States Department of Health and Human Services [USDHHS], 2000). Although the HP 2010 Determinants of Health Model has been minimally applied to research, it is implicit in all research focused on HP 2010 objectives (Exworthy, Bindman, Davies, & Washington, 2006) (See Chapter 3, Figure 3.1). The HP 2010 Determinants of

Health Model asserts an explanatory relationship between health policy and access to quality health care. The relationship between policy and access is a process that moves through the individuals and the environment. HP 2010 infers a positive predictive relationship to policy and individual or aggregate health status (USDHHS, 2000).

By organizing the factors affecting health status into measurable components, interventions can be monitored for success based on the national leading health indicators or quantified health status or risk/protection. Because reducing obesity is a HP 2010 objective, it was logical to use an adapted version of the model and apply it children in school settings (See Chapter 3, Figure 3.2).

In the original Determinants of Health Model (USDHHS, 2000), health status is indicated by risk/protection and population data established from behavior and biology of individuals. The model reflects that wellness or threats to health is influenced by environment, policies/interventions, and access to quality health care (USDHHS, 2000). In the adapted model, risk/protection factors include age or grade level, demographics, and culture of the children, and geographic location of the school (Ogden, Flegal, Carroll, & Johnson, 2002; Mazure, Marquis, & Jensen, 2003; Devlin, Roeder, & Bacanu, 2001; Wang, Monteiro, & Popkin, 2002). Health status is school population data that reflects early identification of obesity for at-risk children (Ogden, 2002).

In the original model, policies and interventions are described through health promotion campaigns, mandates, and disease prevention services. Interventions could be implemented through community and health agencies, places of worship, professionals, civic groups, or businesses. Interventions have independent influences on health. If planned, mutually established with client, and of scientific basis, interventions have positive outcomes. For example, nursing interventions use scientific findings to overcome barriers in an attempt to maintain or restore health. Policy and intervention affect health status of individuals and aggregates or more broadly, the community (USDHHS, 2000).

In the adapted model, policy and intervention are distinct concepts. Policy is defined by international, national, state, and local governing agencies and advisory boards (Koga, Kawaguchi, Aizawa, & Wald, 2006). The intervention is a BMI screening program. This model assumes that the BMI is an accurate measure of health status for school age children (Cole, Bellizzi, Flegal, & Dietz, 2000; Ogden, 2002). A relationship is posited between existing policy/intervention and increased access to quality health care (USDHHS, 2000). Access to quality health care for school age children is defined by SN staffing and by accessibility to available and appropriate referral sources (Moyer, Bugles, & Jackson, 2005).

In the original model, environment mediates access and is comprised of physical and social contexts. These contexts, made up of people and place, have profound positive or negative effects on health. Psychological, social, or physical conditions that impede healthy behavior and threaten health status are barriers. Conversely, facilitating factors enhance intervention and positively impact heath status. Facilitating factors include mental, physical, or social conditions that promote health and/or reduce risk (USDHHS, 2000).

The adapted version of the model views environment as the public elementary school setting. School social environment is defined by parent involvement, teacher accessibility, principal support, school board and administrative support, and after-school programming (Konu, Lintonen, & Rimpela, 2002). School physical environment is defined by school size, clinic size and location, and ability to maintain confidentiality (Baker, Han,

& Keil, 1996). Barriers are defined as conditions within a health care system that prevent children from accessing needed services or prevent providers from delivering needed services to children (USDHHS, 2000). Facilitating factors are defined as any variables that enhance interventions, positively influence health status, reduce risk, or enhance protection (USDHHS, 2000).

Specific Aims

The specific aims of this study were to establish: 1) face validity, 2) content validity, and 3) reliability of a newly developed survey designed to identify SN BMI screening practice, facilitating factors, and barriers. Face validity was established using a focus group (FG) with actively practicing SNs. Content validity was established using SN experts and actively practicing SNs. Reliability was also established using actively practicing SNs.

Methods

Total survey design methods were used to develop and assess the survey (Weisenburg et al., 1996). Total design methods include questionnaire design, establishing face and content validities, and establishing reliability using test retest (Weisberg et al., 2005). SNs and School Nurse Experts (SN Experts) were recruited from public websites and from the Wright State University (WSU) School Nurse Program. Characteristics of SNs and SN Experts are presented in Table 4.1. Approvals for this study were obtained from the WSU Institutional Review Board (IRB) and the Ohio State University IRB.

Development of Body Mass Index-Screening Survey (BMI-SS)

The development of the BMI-SS began with a thorough review of the literature as it related to the HP 2010 (USDHHS, 2000) national objectives established to guide health care professionals in addressing the leading health indicators such as childhood overweight and obesity. Next, 3 FGs with SNs (N=25) were convened, over a 2-year time period (2004-2006) (See Chapter 3). The HP 2010 Determinants of Health Model Adapted for BMI Screening in Public Elementary Schools was used to construct a semi-structured list of open ended questions. The FGs were used to determine SN perceptions of factors relevant to BMI screening. Most SN participants were members of a professional organization, RN licensed, SN certified, and had been employed as a full-time nurse in a public elementary school within the past year. In addition, most held a bachelor's degree (64%) were assigned to one school (76%), and cared for children grades kindergarten through 6th grades (96%).

Several themes emerged that were consistent with the HP 2010 Determinants of Health model adapted for BMI Screening in Public Elementary School categories. This groundwork confirmed that factors related to the six key thematic categories of the HP 2010 adapted Determinants of Health Model were components of BMI screening that influence and impact practice. FG results indicated that SN BMI screening practice was conditional to policy, school social and physical environments, risk/protection, and access to quality health care. Themes related to geographic area emerged. All SNs perceived that teachers were the most important facilitating factor.

Primary barriers voiced by SNs included lack of privacy, time, and policy. School size and amount of space the SNs had to assess a child were barriers, but for rural SNs this assumed there was a specific area designated as a clinic. For suburban SNs, having space to obtain BMIs located near a gym class was important. Urban SNs focused their concerns primarily on school organization and the logistic of obtaining data. Age and grade level had an effect on how rapidly data were collected. Geography in terms of the number and distance of schools that any one nurse is assigned affects the time a nurse can collect data. In addition, a psychometrically sound instrument was needed to more broadly and objectively assess SN practices and perceptions regarding BMI screening in public elementary schools.

Body Mass Index Screening Survey (BMI-SS)

The focus of this methodological study was the BMI-SS (Appendix B). The BMI-SS is comprised of two parts. Part I is designed to assess the BMI screening practice of SNs who work with school age children in public elementary school settings. The first question of Part I asks if the participant uses BMI screening as part of his/her practice (yes/no). If no, the participant is directed to Part II of the BMI-SS, the Demographic Questionnaire. If yes, the participant is directed to complete Part I which contains questions 2a through 7h. Questions 2a through 7h address HP 2010 categories related to BMI screening in public elementary school settings. For example, questions 2a through 2u refer to intervention. Questions 3a through 3h refer to policy. Questions 4a through 4g refer to school physical environment. Questions 5a through 5h refer to school social environment. Questions 6a through 6f refer to school risk/protection factors. Questions 7a through 7h refer to access to quality care.

Questions 2a-7h contain three separate sets of responses. The first response set asks if a specific subcategory influences BMI screening practice (yes/no). If no, the participant is directed to the next subcategory. If yes, the participant is directed to the second and third response sets. The second response set asks if the specific subcategory positively or negatively impacts BMI screening practice. The third response set asks the participant to describe the strength of that impact on practice. Strength of impact is ranked in terms of strength or weakness. Choices are 1= very strong, 2 = strong, 3= weak, and 4= very weak. Upon completion of the last question (7h), participants answering are directed to Part II.

Part II of the BMI-SS is a demographic questionnaire. Demographic questions address SN characteristics and school information. SN data address nursing education, full-time employment status and history, years of nursing experience, years of school nursing experience, and SN workload. SN workload is defined as number of students assigned per SN. School information consists of geographic location, composition of student population by race and grade, and school emergency status as related to academics, funding, and school building categories.

Four versions of the BMI-SS were created over the course of the study. The First Version of the BMI-SS had 66 questions and an average completion time of 25-35 minutes (Appendix C). Readability of the BMI-SS was assessed at 12th grade level using the Kincaid-Fleishman grading scale (Calderon, Morales, Liu, & Hays, 2006). The survey was developed in English.

Phases and Procedures for Instrument Development

The validity and reliability of the BMI-SS was established in four phases over 4 months. Face validity was established in Phase 1 with actively practicing SNs. Content validity was established in Phase 2 with SNEs and in Phase 3 with actively practicing SNs (Cohort #1) using a Content Validity Index (CVI) Evaluation Tool (ET). Reliability was established in Phase 4 with actively practicing SNs (Cohort #2) using test retest strategy. The sequence of procedures and participants is presented in Figure 4.1.

Phase 1: Face validity of the First Version of the BMI-SS by SNs . Face validity was established by subjective determination (Nieswiadomy, 2008). During a moderator-led FG, each item on the First Mark-Up Version of the BMI-SS was evaluated for face validity by 3 actively practicing SNs. Recruitment of the SNs was via email using contact information obtained from a public school system website. Three SNs were invited to participate (100% response rate). The moderator was the Principal Investigator (PI) who was trained in moderating FGs. Participants were employed full-time in public elementary schools. The exclusion criterion was working solely in middle, high, or private schools. Participants received 2.0 contact hours of Ohio Nurses Association (ONA) approved continuing education (CE) contact hours for the time required to view a slide presentation on the topic of face validity and to review the survey.

Phase 1: Face Validity by SNs

Actively practicing, Ohio licensed, registered nurse, full-time public elementary SNs (N=3).
Exclusion criterion working solely in middle, high or private schools
Assessed each item on First Mark-Up Version of BMI-SS

↓

Phase 2: Content Validity by SN Experts

Directorship of SN Certification Program or State Department of Health SN Consultant (N= 3)
Assessed each item on Second Mark-Up Version of BMI-SS using CVI ET

↓

Phase 3: Content Validity by SNs (Cohort #1)

SNs enrolled in a SN Certification Practicum and working full-time in a public elementary school (N=10)
Assessed each item on Third Mark-Up Version of BMI-SS using CVI ET

↓

Phase 4: Reliability via Test Retest Methods by SN Cohort #2

Actively practicing SNs in a graduate program claiming SN as a concentration or major and working full-time in a public elementary school (N=10)
Completed Final Version of BMI-SS via test retest strategy (14 days apart)

Figure. 4.1. Sequence of Procedures and Participants used for Instrument Development

The 2-hour audio-taped FG session took place in a school clinic during the summer when school was not in session. The First Mark-Up Version of the BMI-SS had space for the SNs to write comments after each item and at the end of the survey (See Appendix C). Participants were instructed to make comments on the survey about typographical errors, word choices, and confusing terms or directions during the discussion. Each item was discussed in terms of 3 key questions. The first key question related to wording, logic, and appropriateness of the item in the context of flow to the next item on the survey. The second key question solicited suggestions for improvement. The third key question requested practice related recommendations. The moderator took hand written notes to record key points in the FG discussion.

Audio recordings were transcribed verbatim by the PI into an electronic document within 24 hours of the FG. The electronic transcript was verified by comparison to the audio recording. The PI also transposed hand-written field notes into the transcript. The transcripts were then compared to the notations on each of the First Mark-Up Versions of the BMI-SS. Key points were incorporated into transcript. The PI reviewed the transcript and notes with an independent third party to ensure accuracy. After the independent reviewer confirmed accuracy of the transcripts, final versions of the transcript and field notes were then entered into Atlas.ti Version 5.0. Audiotapes were destroyed via breakage. Unique identifiers were used in the transcript to maintain confidentiality of participants. Marked up surveys and field notes were stored in a locked file cabinet.

Data analysis was iterative and comparative, focusing on item wording, context, and ambiguities/discrepancies that were considered for possible changes to the survey. Coding labels included "suggestions for items to change" and "acceptable items."

Few comments regarding item wording, context, and ambiguities/discrepancies were made, and therefore minimal grammar edits and punctuation changes were completed. One FG participant indicated the survey included "all the nuts and bolts to screening kids in schools." A Second Mark-Up Version of the BMI-SS was prepared; the only substantive change from the First Mark-Up Version was a focus group participant suggestion to include a question about funding of nursing services in schools (See Appendix C).

Phase 2: Content validity of the Second Version of the BMI-SS by SN Expert. Content validity was established by a panel of SN Experts who independently evaluated the Second Mark-Up Version of the BMI-SS using a Content Validity Index (CVI) Evaluation Tool (ET). Sample selection was purposive. Inclusion criterion was directorship of a SN Certification Program or serving as state level Department of Health School Nurse Consultant (SNC). Recruitment was via email using contact information obtained from public websites.

Eleven SN Experts were invited to participate. An incentive for participation was 2.0 contact hours of CE for the time required to view slide presentations on topics of content validity, HP 2010, and the BMI-SS with CVI ET as well as to complete the CVI ET. Five (45%) SN Experts responded positively. Of these, two withdrew from participation; one SN Expert had a family emergency, and one SN Expert indicated a heavy workload interfered with her ability to complete the review. Two follow-up emails were sent to the remaining participants reminding them to return the survey and CE evaluation tool. Three SN Experts (27%) completed the review of the Second Mark-Up Version of the BMI-SS and the CVI ET. The average review time was 16 days.

The Second Mark-Up Version of the BMI-SS included directions on how to complete the CVI ET. Space was provided for written comments. SN Experts reviewed each item and indicated relevancy on a four point scale (1= not relevant, 2= some relevance, 3= relevant, and 4= very relevant). Rater acceptability of the 67 items was coded as a binomial variable: items scored as a 1 or 2 indicated no relevance or some relevance and were coded as 0, and items scored as a 3 or 4 indicated relevance or very relevant and were coded as 1. Response options were reduced to binomial variables due to the small number of participants and the lack of adequate data to produce variance between relevancy options (Nieswiadomy, 2008). With a potential per item rater acceptability range of 0-1, agreement across raters was examined by calculating the percentage of congruency among the 3 raters (See Table 4.2). An item analysis benchmark of 0.66 was established, which would represent a congruence of 2 out of 3 raters (Polit & Beck, 2006; Sirey et al., 2005). Eleven (16.4%) of the survey items did not meet the established item analysis benchmark and were removed from the Second Mark-Up Version of the BMI-SS.

The CVI was represented as the ratio of relevant items (55) to the total number of items (67). (The first question on the BMI-SS asks about participation in screening programs; this item was not included in the review for relevancy. Therefore the CVI was calculated based on 55 relevant divided by 66 total items). An established tool analysis benchmark was established at 0.80 (Strickland & Lenz, 1991). The obtained CVI was 0.833. Based on the acceptability of the 55 retained items, a Third Mark-Up Version of the BMI-SS was prepared for validity assessment by actively practicing SNs (Appendix E).

Phase 3: Content validity of the Third Version of the BMI-SS by SN Cohort #1. Content validity of the Third Mark-Up Version of the BMI-SS was established by actively practicing SNs (SN Cohort #1). Sample selection was purposive. Inclusion criteria were current enrollment in a SN certification program and working full-time in a public elementary school. Exclusion criterion was previous participation in FGs for the development of the survey. Eleven SNs were invited to participate. An incentive for participation was 2.0 contact hours of CE for the time required to view slide presentations on topics of content validity, HP 2010, and the BMI-SS with CVI ET as well as to complete the CVI ET. Of the 11 SNs invited to participate, 10 SNs (90.9%) responded positively; one SN opted not to participate in this phase of the study due to workload issues.

The 10 SNs making up Cohort #1 met in a classroom setting at a midwest university. The PI used a slide presentation to explain content validity. The Third Mark-Up Version of the BMI-SS with a CVI ET was distributed to each SN. The same procedures used in Phase 2 to obtain and analyze data were used in Phase 3. The exception was the item analysis benchmark which was established at a 0.70 level to reflect a congruence of 7 out of 10 raters (Polit & Beck, 2006; Sirey et al., 2005). (The item analysis benchmark in Phase 2 was set at 0.66). All 55 items met the established item benchmark. The CVI was represented as the ratio of relevant items (55) to the total number of items (55). (The first question on the BMI-SS asks about participation in screening programs and was not included in the review for relevancy). A tool analysis benchmark was established at 0.80 (Strickland & Lenz, 1991). The obtained CVI was 1.0. The Third Mark-Up Version of the

BMI-SS was retained as the Fourth Version of the BMI-SS, in order to establish reliability by SN Cohort #2 in Phase 4 of the study.

Phase 4: Reliability of the Fourth Version of BMI-SS by SNs Cohort #2. Reliability was established by actively practicing SNs using test retest strategy. Sample selection was purposive. Inclusion criteria were SNs currently enrolled in a graduate SN program and working full-time in a public elementary school. Exclusion criteria were (a) previous participation in FGs for the development of the survey or, (b) participation in Phase 3, SN Cohort #1. Twelve SNs were invited to participate. An incentive for participation was 3.0 contact hours of CE for the time required to view slide presentations on topics of reliability and SN participation in research as well as to complete the Fourth Version of the BMI-SS two times. Of the 12 SNs invited to participate, 10 SNs (83.3%) responded positively and two (16.7%) SNs opted not to participate in this phase of the study due to not needing any CE.

The 10 SNs making up Cohort #2 met in a classroom setting at a midwest university. The PI used a slide presentation to explain reliability. After the presentation, the Fourth Version of the BMI-SS was distributed to each SN (See Appendix E).

Upon completion of the survey, each SN received 1.5 contact hours of CE for the time required to view the slide presentation on the topic of reliability and to complete the Time One (T1) Final Version of the BMI-SS. The PI met with the 10 SNs 14 days later for the purpose of retesting (Time Two [T2]). In the second meeting, that was also conducted in a classroom setting, the 10 SNs viewed a slide presentation on the topic of participation in research, completed the survey for the second time, and received 1.5 contact hours of CE for the time required to view slide presentation and to complete the T2 Final Version of the BMI-SS.

Survey data were entered into SPSS Version 15.0 and coded. Data gathered from impact questions were dichotomized as strong (1) or weak (0) in order to reduce retest error and improve stability between very strong and strong or between weak or very weak (Nunnally & Bernstein, 1994). A total of 348 variables were entered for analysis.

Because the aim of Phase IV was to establish reliability of the BMI-SS using test retest strategy, stability of the 56 survey items from test to retest was assessed. (The first question, which was not included in Phase 2 or Phase 3, was included in Phase 4 for reliability stability). No inter-rater or internal consistency measure was studied, because each question is independent of each another; no additivity exists among categories. Therefore, data were analyzed using descriptive statistics for frequency distribution and percentage agreement. A Cronbach's alpha or Kuder-Richardson 20 was not appropriate because additivity among categories does not exist (Nunnally & Bernstein, 1994).

A benchmark of 90% was established for the all responses (Chris Halloway, The Ohio State University College of Nursing, Statistical Consultant, personal communication, November 30, 2007). If an item fell below 90% it was considered unstable and was eliminated. Of the 348 items assessed for stability, 338 (97.1%) were stable with 100% agreement. Ten items (2.9%) fell below the established 90% benchmark. These items are presented in Table 4.3 according to item, subcategory, and response set percent agreement. Four (2.3%) of the 168 items representing the category of fundamental tasks related to BMI screening fell below the benchmark. These included items 2d (collecting heights and weights for children grades K-4), 2e (collecting heights and weights for children grades 5 and 6), 2l (plotting height and weight data to BMI-for- age charts), and 2s (child education specific to BMI screening). One (1.5%) of the 64 items representing the category of policies guiding BMI screening practice fell below the benchmark. This single item was 3c (the NASN Position Statement on Overweight Children and Adolescents, 2002). Two (4.1%) of the 48 items representing the category of school physical environment factors that influence BMI screening practice fell below the benchmark. These items included 4c (presence of privacy curtains) and 4f (available, reliable, accurate equipment such as balanced scales, portable stadiometers, etc.). One hundred percent (100%) of 64 items representing the category of school social environment factors that influence BMI screening practice were above the established benchmark for stability. Two (4.1%) of the 48 items representing the category of school risk/protection factors that influence BMI screening practice fell below the benchmark. These items included 6d (the chronic medical needs of children in the school) and 6e (the demographic composition of students). One (1.7%) of the 56 items representing the category of access to quality health care that influence BMI screening practice fell below the benchmark. This item, 7d, was a question about reimbursement for school nursing care placed into the school's general fund. A Final Version of the BMI-SS was developed from the results of phase IV (See Appendix E).

Overall, mean percentage agreement for each category was above the established benchmark or 90% (See Table 4.4). The highest mean percentage agreement was the category of school social environment (99.11%) and the least mean percent agreement was the category of fundamental tasks related to BMI screening (93.01%).

Discussion

Psychometric testing to establish validity and reliability for newly designed research instruments is the hallmark of rigor in survey research (Nieswiadomy, 2008). This study was conducted subsequent to preliminary work involving focus groups to develop a survey for SNs regarding BMI screening of school age children. The specific aims of this research were to systematically establish face validity, content validity and reliability in incremental phases. A major strength of this study is that actively practicing SNs participated in every phase of the survey development. The data obtained from these phases were used to modify the original BMI-SS. The systematic and sequential approach resulted in reducing a large number of variables into a theoretically and clinically relevant survey.

Specific Aim #1. Subsequent to the preliminary effort of 3 focus groups with SNs that was conducted to identify barriers related to BMI screening practice, a survey was drafted that contained items representing facilitating factors and barriers that were described by SNs. Next, a FG was used to establish face validity of the newly developed survey. The SN participant overall impression of the 66-item tool was to include one additional question about whether funds from reimbursement for school nursing care that were placed into a general fund impacted student access to quality healthcare such as BMI screening of children.

Specific Aim #2. In the next step of the study, a panel of SN Experts established content validity by evaluating the 66 items on the Second Version of the BMI-SS using a CVI ET. (Question #1 which was a respondent screening question, was not evaluated). Eleven items were ranked as irrelevant and were removed from the instrument. A Third

Version of the BMI-SS was developed and evaluated by a group of actively practicing SNs, Cohort #1. Participants confirmed that all 55-items were valid.

Specific Aim #3. The Final Version of the BMI-SS was created. The survey was administered to Cohort #2, a group of actively practicing school nurses who had never seen or contributed to the survey development. Test retest strategy was used to establish reliability for the 56-item survey that contained 348 variables and included Question #1. Each item was analyzed for stability. Ten items were eliminated due to instability between the test (T1) and the re-test (T2); the remaining items met reliability criteria and were adopted for the final version of the survey- the BMI-SS.

The BMI-SS will be used to describe or identify facilitating factors and/or barriers as they apply to a BMI screening program. Development of the six categories of the survey highlights the effort made to adhere to a theory driven approach in adding to a scientific body of knowledge. The rigorous process of validating items within six theoretically-based categories provided a foundation for stability.

Limitations

The overall limitation of this study was selection bias. Because the focus of this study was SN perceptions about BMI screening practice in public elementary schools and because none of the SN samples used in this study was randomly selected from a public elementary school frame, participants did not necessarily represent all public elementary schools. Multi-stage sampling strategy of public elementary schools would have provided less threat to external validity and thus improved generalizability (Polit & Beck, 2006). For example, the sample used to establish face validity included 3 SNs from the same suburban, public school system. In addition, these SNs were also members of a professional organization and were nationally certified.

The samples of SN Experts (n=3) and Cohort #1 (n=10) used to establish content validity were more diverse than the SNs who participated in the FG used to establish face validity. For example, The SN Experts held more degrees than the SNs in the FG and SNs form Cohort #1 were a younger less experienced group of SNs than the FG. Even with these differences all study participants were female, most had greater than 6 year histories as members in professional organizations, all held masters degrees or higher, and were from the same geographic regions in Ohio. The sample of 10 actively practicing SNs (Cohort #2) used to establish reliability was similar in gender, age, professional membership history, geographic region, education, and certification to the SNs used to establish content validity.

All the SNs from Cohorts 1 and 2 were seeking advanced education and preparing for or had recently attained SN certification while working full-time as a SN. Some SNs in Cohort #1 and Cohort #2 were from the same school districts. These similarities are not representative of all SNs or of all public elementary schools. Further, the sample sizes of each of the four phases were small and not representative of all public elementary schools. The samples did, however, include only those SNs who used BMI screening in their full-time practices and did serve to provide an overview of BMI screening practice and barriers.

With further regard to limitations related to reliability, the instability of the eliminated items may signify situational bias. In other words, the BMI-SS may have a time-space contextual limitation in that some barriers may only be temporarily an issue and overcome with SN creativity, flexibility, or collaboration. An example is that not having privacy curtains in a clinic may be of issue until the SN decides to use a broom closet to ensure privacy. Although this item was eliminated due to instability, other examples of items impacted by time-space contextual limitations might include use of volunteers, accessing teachers, or establishing a referral site.

Another limitation is related to test sensitivity. Although a 14-day test-retest interval was used to control for test sensitivity, the SNs may have reflected about BMI screening practice after taking the survey the first time and upon retest changed their opinion about how much of an impact the factor has on BMI screening practice. For example, school policy may guide daily decision making, yet after the NASN Position statement on Overweight Children and Adolescents was presented, awareness may have affected a clinical practice decision to employ BMI screening.

Implications

BMI screening is an intervention and a complex process that requires a theoretical basis for implementation and follow-up. Like other nursing interventions, success is heavily dependent on knowledge and skill of the nurse. In school settings, physical and social environments play dominant roles in success (IOM, 2002). In community health settings, policy and access to quality health care complicate effective programming to a greater degree than in acute care and in-patient settings (IOM, 2002). Overcoming barriers in an attempt to create successful intervention programs is essential to positive health outcomes (IOM, 2002). In this study, an instrument designed to identify barriers for BMI screening programs in school settings has been judged by a panel of SN Experts and by clinicians as valid and reliable.

Recommendations

The BMI-SS provides a basis for identifying facilitating factors and barriers to BMI screening in school settings. It measures the impact barriers have on SN practice. Descriptive studies using robust samples is recommended to generate more accurate knowledge about SN BMI screening practice of school age children in public elementary school settings. To reduce sampling bias in follow up studies, multi-stage sampling strategies are needed using the public elementary school as the unit of analysis. In addition, inclusion criteria for part-time and non-certified SNs should be considered.

Conclusion

This methodological study was undertaken to fill a need for a valid and reliable tool for identifying barriers to BMI screening practice by SNs working in public elementary school settings. The survey was found to have congruent theoretical and clinical design. Overall, limitations for this study are related to sampling bias, situational bias, and test sensitivity. After four revisions of the BMI-SS, the final version is considered valid and reliable. This rigorous design was used to advance the science of nursing so that those working to establish a quality standard of care for the prevention of obesity among school age populations have a valid and reliable instrument to determine barriers to practice, to assist in policy development, and/or facilitating change that allows for obesity prevention intervention in school settings.

Table 4.1 *Demographic characteristics of participants*

Participant characteristics	FG (n=3) (11.5%)	SNE (n=3) (11.5%)	SN Cohort #1 (n=10) (38.5%)	SN Cohort #2 (n=10) (38.5%)	Total (N=26) (100%)
Female	3 (11.5%)	3 (11.5%)	10 (38.5%)	10 (38.5%)	26 (100%)
Age mean years (SD)	52 (19.5)	44.3 (5.9)	33.4 (5.4)	35.2 (4.7)	37.5 (9.5)
Race					
Caucasian	3 (11.5%)	2 (7.5%)	7 (28%)	7 (28%)	19 (73%)
African American	0 (0%)	1 (3.9 %)	3 (11.5%)	1 (3.9%)	5 (19.2%)
Asian	0 (0%)	0 (0%)	0 (0%)	1 (3.9 %)	1 (3.9%)
More than 1 race	0 (0%)	0 (0%)	0 (0%)	1 (3.9%)	1 (3.9%)

continued

Table 4.1 Continue

Participant characteristics	FG (n=3) (11.5%)	SNE (n=3) (11.5%)	SN Cohort #1 (n=10) (38.5%)	SN Cohort #2 (n=10) (38.5%)	Total (N=26) (100%)
Professional membership					
No history	1 (3.9 %)	0 (0%)	0 (0%)	2 (7.5%)	3 (11.5%)
<5 years	0 (0%)	0 (%)	3 (11.5%)	3 (11.5%)	6 (23%)
6- 10 years	1 (3.9%)	1 (3.9%)	5 (19.2%)	5 (19.2%)	12 (46.1%)
>10 years	1 (3.9%)	1 (3.9%)	0 (0%)	0 (0%)	2 (7.5%)
Inactive	0 (0%)	0 (0%)	2 (7.5%)	0 (0%)	2 (7.5%)
Years full-time experience					
<5 years	0 (0%)	0 (0%)	5 (19.2%)	6 (23%)	11 (42.3%)

continued

Table 4.1 Continue

Participant characteristics	FG (n=3) (11.5%)	SNE (n=3) (11.5%)	SN Cohort #1 (n=10) (38.5%)	SN Cohort #2 (n=10) (38.5%)	Total (N=26) (100%)
> 6-10 years	2 (7.5%)	1 (3.9%)	5 (19.2%)	4 (15.3%)	12 (46.1%)
>10 years	1 (3.9%)	2 (7.5%)	0 (0%)	0 (0%)	3 (11.5%)
Education					
Diploma/ADN	1 (3.9%)	2 (7.5%)	0 (0%)	0 (0%)	3 (11.5%)
BSN	2 (7.5%)	3 (11.5%)	6 (23%)	10 (39%)	21 (80.7%)
BS	1 (3.9%)	0 (0%)	4 (15.3%)	0 (0%)	5 (15.3%)
MS	1(3.9%)	0 (0%)	5 (19.2%)	0 (0%)	6 (23%)
MSN	2 (7.5%)	3 (11.5%)	5 (19.2%)	10 (39%)	20 (76.9%)
PhD in Other	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

continued

Table 4.1 Continue

Participant characteristics	FG (n=3) (11.5%)	SNE (n=3) (11.5%)	SN Cohort #1 (n=10) (38.5%)	SN Cohort #2 (n=10) (38.5%)	Total (N=26) (100%)
PhD in Nursing	0 (0%)	1 (3.9%)	0 (0%)	0 (0%)	1 (3.9%)
National SN Certification					
Yes	3 (11.5%)	2 (7.5%)	5 (19.2%)	6 (23%)	16 (61.53%)
No	0 (0%)	1 (3.9%)	5 (19.2%)	4 (15.3%)	10 (39%)
Geographic Area					
Urban	0 (0%)	0 (0%)	2 (7.5%)	2 (7.5%)	4 (15.3%)
Rural	0 (0%)	0 (0%)	3 (11.5%)	4 (15.3%)	7 (28%)
Suburban	3 (11.5%)	0 (0%)	5 (19.2%)	4 (15.3%)	12 (46.1%)

continued

Table 4.1 Continue

Participant characteristics	FG (n=3) (11.5%)	SNE (n=3) (11.5%)	SN Cohort #1 (n=10) (38.5%)	SN Cohort #2 (n=10) (38.5%)	Total (N=26) (100%)
Number schools assigned					
0	0 (0%)	3 (11.5%)	0 (0%)	0 (0%)	3 (11.5%)
1-2	0 (0%)	0 (0%)	2 (7.5%)	3 (11.5%)	5 (19.2%)
3- 5	2 (7.5%)	0 (0%)	6 (23%)	3 (11.5%)	11 (42.3%)
5 or more	1 (3.9%)	0 (0%)	2 (7.5%)	4 (15.3%)	7 (28%)

Notes. FG=Focus Group, SNE= School Nurse Expert, SN= School Nurse

Table 4.2. *Item acceptance decision according to item number and category, subcategory, relevancy ranking, acceptability and benchmark by SNE (n=3)*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE 3 RA	Bench-mark	Acceptance decision
1	Implement a BMI Screening Program?	NE	NA	NE	NA	NE	N/A	NE	Retained
Tasks 2a	Collecting heights	3	1	4	1	4	1	100	Retained
2b	Collecting weights	3	1	4	1	4	1	100	Retained
2c	Collecting Mass screening day	3	1	4	1	4	1	100	Retained
2d	Collecting Grades k-4	3	1	4	1	4	1	100	Retained
2e	Collecting Grades 5 & 6	3	1	4	1	4	1	100	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
2f	Collecting per request	3	1	4	1	3	1	100	Retained
2g	Collecting per suspicion	3	1	4	1	3	1	100	Retained
2h*	Collecting with Co-morbidities	1	0	4	1	2	0	.33	Not Retained
2i	Calculation per wheel	3	1	4	1	4	1	100	Retained
2j	Calculation paper/pencil	3	1	4	1	2	0	100	Retained
2k	Calculation software	3	1	4	1	4	1	100	Retained
2l	Calculation with math students	3	1	4	1	1	0	.66	Retained
2m	Plotting height and weight data to BMI-for-age charts	3	1	4	1	4	1	100	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
2n	Plotting height and weight data to BMI-for-age charts to monitor individual growth pattern	3	1	4	1	4	1	100	Retained
2o	Plotting height and weight data to BMI-for-age charts to determine need for referral/intervention	3	1	4	1	4	1	100	Retained
2p	Plotting order to obtain aggregate data about school health	3		4	1	4	1	100	Retained
2q	BMI data recording on health folders for within school system information sharing	3	1	4	1	2	0	.66	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
2r	BMI data recording for information sharing with parents	3	1	4	1	4	1	100	Retained
2s	Parent counseling	3	1	4	1	4	1	100	Retained
2t	Child education	4	1	4	1	4	1	100	Retained
2u	Re-screen	3	1	4	1	4	1	100	Retained
2v	Follow-up with intervention program	3	1	4	1	4	1	100	Retained
Policies 3a*	World Health Organization Child Growth Standards	3	1	2	0	2	0	..33	Not retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
3b	Center for Disease Control and Prevention (CDC)/National Heart Lung and Blood Institute (NHLBI) clinical guidelines for practice	3	1	2	0	4	1	.66	Retained
3c	American Academy of Pediatrics (AAP) Obesity Prevention Guidelines	3	1	2	0	4	1	.66	Retained
3d	Institute of Medicine Report on Child Obesity	3	1	2	0	4	1	.66	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
3e	United States Preventive Task Force (2005) Position on Management of Obesity, Overweight, and Undernutrition in Children	3	1	2	0	4	1	.66	Retained
3f	National Association of School Nurse Position Statement on Overweight Children and Adolescents	3	1	2	0	4	1	.66	Retained
3g	State Department of Health Guidelines for BMI screening	3	1	1	0	4	1	.66	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
3h	Local school system/district policy	3	1	4	1	4	1	100	Retained
3i	Priority health concerns identified in School Wellness Plan	3	1	4	1	4	1	100	Retained
Physical Environment 4a*	Large school size in square footage with long hallways	2	0	2	0	2	0	0	Not retained
4b*	Large school size in square footage with stairs to climb	2	0	2	0	3	1	0	Not retained
4c*	Location of clinic	2	0	3	1	1	0	0	Not retained
4d*	Small size of clinic	2	0	3	1	1	0	0	Not retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
4e	Existence of a clinic	2	0	3	1	3	1	.66	Retained
4f	Space to screen	3	1	4	1	3	1	100	Retained
4g	Presence of privacy curtains	3	1	4	1	4	1	100	Retained
4h	Ability to maintain confidentiality while gathering height/weight data	3	1	4	1	4	1		Retained
4i	Ability to maintain confidentiality of BMI data	3	1	4	1	4	1	100	Retained
									continue
4j	Available, reliable, accurate equipment such as balanced scales, portable stadiometer, etc	3	1	4	1	4	1	100	Retained
Social Environment 5a	Teacher support	3	1	4	1	4	1	100	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
5b*	Teacher accessibility	2	0	4	1	2	0	.33	Not retained
5c	Principal support	3	1	4	1	4	1	100	Retained
5d*	Physical education teachers participation in BMI monitoring	2	0	3	1	2	0	.33	Not retained
5e	Parent assistance with screening	2	0	3	1	3	1	.66	Retained
5f*	Parent presence in clinic	2	0	2	0	2	0	0	Not retained
5g	Parent notification/permission of screening day	3	1	4	1	4	1	100	Retained
5h	Cafeteria workers influence in lunch portion sized	1	0	3	1	4	1	.66	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
5i	Food Service Director influence in selection of healthy meals	1	0	4	1	4	1	.66	Retained
5j	Positive attitude about promoting healthy student weights among school personnel	3	1	4	1	3	1	100	Retained
5k	School board/administrative support for nurse actions with regard to BMI screening	3	1	4	1	3	1	100	Retained
School Risk/protection 6a	American fast food culture	1	0	4	1	4	1	.66	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
6b	Geographic region where school resides e.g. mountainous, rural, urban, suburban, river, dessert, river, etc.	1	0	4	1	3	1	.66	Retained
6c	Age/grade level of students	3	1	4	1	4	1	100	Retained
6d	Chronic medical needs of children in the school	3	1	4	1	4	1	100	Retained
6e	Demographic composition of students	2	0	4	1	4	1	.66	Retained
6f	Urgent situation with academic status e.g., poor proficiency scores, low state report card	2	0	4	1	4	1	.66	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
6g*	Urgent situation with building status e.g., older buildings with poor ventilation, heating or cooling systems; new construction occurring or needed	1	0	2	0	3	1	.33	Not retained
6h*	Urgent situation funding status e.g., state absorbed, system in need of levy passage for viability of programs	2	0	2	0	3	1	.33	Not retained
7a	School nurse workload	3	1	4	1	3	1	100	Retained
7b	Nurse to student ratio above 1:750 - 1199	3	1	4	1	4	1	100	Retained

continued

Table 4.2. *Continue*

Item and Category	Item Subcategory	SNE1 RR	SNE1 RA	SNE2 RR	SNE2 RA	SNE3 RR	SNE3 RA	Bench-mark	Acceptance decision
7c	Nurse to student ratio above 1:1200	3	1	4	1	4	1	100	Retained
7d	Reimbursement for school nursing care placed into school's general fund	1	0	3	1	3	1	.66	Retained
7e	Available referral sources for overweight/obese children	3	1	4	1	4	1	100	Retained
7f	Affordable referral sources for overweight/obese children	3	1	4	1	4	1	100	Retained
7g	Accessible referral sources for overweight/obese children	3	1	4	1	4	1	100	Retained

Notes. *= Not retained, SNE= School Nurse Experts, RR= Relevancy Ranking, RA= Rater Acceptability, NE= Not evaluated, NA= Not applicable.

Table 4.3. *Percent Agreement below benchmark (90%) for Test Retest of Final Version of BMI-SS*

Item	Subcategory	Response set	Percent agreement
2d	collecting heights and weights for children grades k-4	Impact of task on BMI screening	70%
		Strength of impact on task of BMI screening	80%
2e	collecting heights and weights for children grades 5 & 6	Impact of task on BMI screening	80%
2l	Plotting height and weight data to BMI-for-age charts	Strength of impact on task of BMI screening	70%
2s	Child education specific to BMI screening	Strength of impact on task of BMI screening	80%
3e	NASA Position statement on Overweight Children and Adolescents	Strength of impact on policy guiding BMI screening practice	80%
4c	Presence of privacy curtains	Strength of impact on school physical environment influencing BMI screening practice	80%

continued

Table 4.3. *Continued*

Item	Subcategory	Response set	Percent agreement
4f	Available, reliable, accurate equipment ie: balanced scales, portable stadiometer, etc.	Strength of impact on school physical environment influencing BMI screening practice	80%
6d	Chronic medical needs of children in the school	Strength of impact that school risk/protection factors have on BMI screening practice	80%
6e	Demographic composition of students	Strength of impact that school risk/protection factors have on BMI screening practice	80%
7d	Reimbursement for school nursing care placed into general fund	Impact of factor on access to quality health care related to BMI screening	80%
		Strength of impact on access to quality health care related to BMI screening	70%

Note. BMI-SS= Body Mass Index Screening Survey

Table 4.4. *Percent Agreement for each category of the Final Version of the BMI-SS*

Category	Mean % Agreement
Tasks	93.01
Policy	96.21
School Physical Environment	97.22
School Social Environment	99.11
School Risk/protection Factors	95.10
Access to Quality Healthcare	95.24

Note. BMI-SS= Body Mass Index Screening Survey

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CHAPTER 5

SUMMARY

This dissertation examined a school-based nursing intervention to prevent childhood obesity, specifically barriers to school nurse (SN) Body Mass Index (BMI) screening among school age children in public elementary schools. Chapter Two included findings from an integrative review of literature aimed at evaluating the school-based obesity prevention programs against established clinical benchmarks and National Association of Pediatric Nurse Practitioners (NAPNAP) Healthy Eating and Activity Together (HEAT) Clinical Practice Guidelines. A defense for BMI screening of school age children in public elementary schools was established.

Findings from focus groups (FGs) where urban, suburban, and rural SNs identified facilitating factors and barriers to BMI screening in the context of school policy, social and physical environments, and access to quality health care were presented in Chapter Three. Data obtained from this qualitative research study were used to develop a survey aimed at identifying barriers to SN BMI screening practice. Chapter Four contained the results of establishing the reliability and validity of that survey. Overall, this research provided important information on the current state of the science of child obesity prevention intervention.

Findings

In Chapter Two, a critical review of 14 studies that included six systematic reviews/meta-analyses, seven randomized control trials (RCTs), and one integrative research review (IR) reinforced that the problem of childhood overweight and obesity are epidemic. Child obesity affects over 20% of the school age population; thus it is a national public health priority (Koplan, Liverman, & Kraak, 2005). Because school age children spend most of their waking hours in school settings, the school environment is an important setting to implement national prevention agendas (Zenzen & Kridli, 2008). The review of literature provided insight on school-based prevention intervention programs designed to promote healthful eating and physical activity behaviors. Thirty-four programs were compared to clinical benchmarks and to NAPNAP HEAT Clinical Practice Guidelines. A key finding was that only one school-based program—Bienestar-- (Trevino et al., 1998) which executed early identification measurement related to BMI above 95^{th} percentile successfully met clinical benchmarks. Thus, routine BMI screening is crucial to obesity prevention intervention in elementary school settings. Identifying barriers to BMI screening practice by practicing SNs became the focus of Chapter Three.

In Chapter 3, The Healthy People 2010 Determinants of Health Model was adapted to provide a theoretical framework for exploring barriers to BMI screening programs in public elementary schools. Twenty-five SNs who participated in three focus groups across the state of Ohio and who self-identified the school districts they work in as urban, rural, or suburban geographic areas identified barriers to BMI screening.

Several themes emerged that were consistent with geographic area, policy, access to care, school physical environment, school social environment, school risk/protection, and access to care. Key geographic themes included suburban discretion, suburban clinics, suburban privilege, rural reluctance, rural closets, rural detouring, urban chaos, urban classes, and public paucity

Suburban discretion was described by suburban SNs concerned with the "sensitivity" of identifying a child as "at-risk for obesity." For them, following up or referring on a BMI above 85th percentile was "just too sensitive." Suburban SNs discussed that "5th and 6th graders" were the "most vulnerable" of all school age children. Suburban SNs also described locations "near gym class" impacted the ability to gather data while maintaining confidentiality and processing student information into computer systems. The *suburban clinic* was a theme that emerged to describe the impact noise, school order, and technology had on accurate data collection and calculation. The suburban SNs highlighted a strong socioeconomic foundation of above middle income and college educated parents where maternal involvement was prevalent. *Suburban privilege* was the issue of controlling rumors as they related to maintaining the health information of children.

Rural reluctance was described by rural SNs as important consistent with logistics for data collection and prioritizing daily assignments. Issues about having inadequate "clinic space" to assess children was coined *rural closets*. Rural SNs accepted that supplies and equipment were scarce. Scales that were "old or broken" and make shift clinics in broom closets was considered a norm that allowed for maintaining privacy and confidentiality. The notion of r*ural detouring* the close social network among community members consistent with power, money, and who knew what about whom. The power teachers had over daily schedules such as access to children for a screening program was described as "a daily struggle." Rural nurses described that "playing on principal support" could "make or break" a screening program.

Urban SNs voiced that the logistics in grouping children for data gathering purposes reduced the ability to organize and manage screening programs due in part to student transfers within public/charter schools and daily administrative decisions. *Urban classes,* a theme that referred to in-classroom screening, kept children safe during lockdown situations. Urban nurses underscored that parents are "absent" from the education process "most of the time" and that community outreach was limited. *Public paucity* referred to a lack of parent participation and a lack of acceptance of overweight notification from BMI screening results.

Ultimately, the greatest barriers for SNs were that they work under the auspices of professional practice guidelines and school policy. No policy statements existed to guide identification or intervention for children at-risk for obesity. Referral for follow up, effective treatment, and accurate measure, requisites for screening practice, were deficient. Consensus lacked in terms of who should screen as well as when, where, and how often BMI screening of children should take place. SN workload, patient acuity, and nurse to student ratios presented as topics that needed further clarification. Further research was needed to more broadly assess SN practices and opinions. Therefore, a survey was developed to identify BMI screening practices, facilitating factors, and barriers among SNs working with school age children. A study describing the psychometrics of establishing reliability and validity of the tool is presented in Chapter Four.

Chapter Four presented the methods used to establish reliability and validity of the BMI Screening Survey (SS). Four phases were introduced to describe the process used to psychometrically test the BMI-SS. In Phase I, a small focus group was employed to determine the overall impression of the 66-item tool. One question about whether funds from reimbursement for school nursing care that were placed into a general fund impacted student access to quality healthcare such as

BMI screening of children. Face validity was established after the item was removed. .

In Phase 2, a panel of SN experts was employed to evaluate the BMI-SS Second Version. The items were evaluated with a Content Validity Index Evaluation Tool. Eleven items were ranked as irrelevant and were removed from the instrument. This resulted in a Third Version of the BMI-SS.

In Phase 3, the BMI-SS Third Version was evaluated by a group of actively practicing SNs. These participants also used the Content Validity Index Evaluation Tool and confirmed that all 55-items were valid.

In Phase 4, the Final Version of the survey was administered to another a group of actively practicing SNs who had never seen or contributed to the survey development. Test retest strategy was used to establish reliability of the survey that contained 348 variables. Each item was analyzed for stability and 10 items were eliminated due to instability between test and retest.

Recommendations for Practice

BMI screening in public elementary schools address an important child health issue where the risks and benefits of a practice are controversial. The United States Preventive Task Force (2005) cautions routine BMI screening in schools due in part to the potentially negative psychological impact obesity identification has on children. While the NAPNAP HEAT Clinical Practice

Guidelines include a mental health assessment, there is some indication that the guidelines are lacking important safety and assessment details.

Collaborative efforts between SN and pediatric nurse practitioners to implement HEAT Clinical Practice Guidelines address national and local obesity issues, especially in terms of advocacy. It is imperative that SNs understand the barriers to BMI screening prior to making a practice decision. Because no critical pathway has been developed to assist SNs in BMI screening practice, it is recommended that collaborative efforts include an expert panel to yield a child growth decision tree for SNs who work in public schools. The proposal would be to gather aggregate data and determine individual treatment plans with referral and follow up for all outlier students while incorporating school health initiatives based on school system healthy environment policies. Although similar to a wellness plan, these health initiatives have policy and procedure components that allow SNs to function within the context of employee and professional, registered nurse.

Because geographic diversity is recognized as a barrier to BMI screening practice, regions with scarce university resources need community partnerships with other paraprofessional service providers. Medical assistants, emergency medical technicians, and volunteer fire fighters serve as possible partnerships. The SNs emphasis on a properly delegated and supervised collection of accurate data by a community partner working to accrue required hours and experiences would be the foundation of a collaborative BMI screening practice in the school setting. Regardless of what entities partner with SNs, the end result would be an early obesity identification program that reduces SN workload and gains community involvement.

In Chapter Four, an instrument was developed to assess barriers to BMI screening practice. The advantage of this tool, that it was developed in association with Healthy People 2010 objectives from SN perceptions, judged by a panel of SN experts, and deemed by SN clinicians as valid and reliable, is that when recognized, barriers can be overcome and replaced with successful evidenced-based intervention programs that yield positive health outcomes (IOM, 2005). BMI screening success, like other evidenced-based nursing interventions, depends on the knowledge and skill of the nurse. In school settings, physical and social environments play dominant roles in success (IOM, 2005). In community health settings, policy, and access to quality health care complicate effective programming to a greater degree than in acute care and in-patient settings (IOM, 2005). Recognition of the barriers to effective BMI screening programs can provide valuable information for overcoming them.

Recommendations for Research

The recommendations for continued research related to BMI screening of children ages 5-12 years among SNs in public elementary schools involves continuing psychometric evaluation of the BMI-SS. According to Polit and Beck (2006) the next step in survey development is to determine construct validity using factor analysis. Factor analysis will be used to determine the coherence of the items within each category of the BMI-SS. In other words, further research will be done to determine if the questions measuring the concepts of policy, intervention, school/risk, physical and social environments, and access to quality health care are independent of one another and cluster together within each category when statistically analyzed.

Conclusion

In conclusion, this dissertation explored the state of the science of obesity prevention intervention for school age children and worked to identify the barriers of SN BMI screening practice. An adapted HP 2010 Determinants of Health Model for BMI Screening in Public Elementary Schools guided focus group research and Total Survey Design Methods to develop an instrument that captures SN perceptions about BMI Screening. The BMI-SS has established face validity, content validity, and test-retest reliability. Follow-up study will involve construct validity through factor analysis.

Finally, because obesity is an immediate public concern, the current state of the science indicates early identification is necessary and can be successful. It is crucial that SNs establish and employ clear guidelines for practice in order to assess, educate, and advocate for school-based obesity prevention intervention programs that promote policy, practice, and research. Overcoming barriers to SN BMI screening practice is essential to the ultimate goal of reducing prevalence of obesity in school age populations. The BMI-SS is prepared to provide an assessment of those barriers.

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APPENDIX A

NATIONAL ASSOCIATION OF PEDIATRIC NURSE PRACTITIONER

HEALTHY EATING AND ACTIVITY TRAINING

CLINICAL PRACTICE GUIDELINES FOR SCHOOL AGE CHILDREN

SCHOOL AGE (5–10 years)

HEAT Clinical Practice Guideline
Recommendations and Supporting Evidence

Section 1. Early Identification

BLUE BOXED AREA = Culturally Appropriate Recommendations

CLINICAL PRACTICE	RATIONALE AND REFERENCE
HISTORY 1. Document and annually update a three-generation family health history, including: overweight, hypertension, diabetes mellitus, gestational diabetes, coronary heart disease (CHD) before 55 years in men and 65 years in women, smoking and passive smoke exposure, gestational age and birth weight of the child, and parent self-report of height, weight, and educational level.	**HISTORY** 1. It is important to identify early risk factors and potential co morbidities **(26, 30).** Obesity in one or both parent(s) is a risk factor for overweight in children, as is low income status **(12, 58).**
a. *Pay particular attention to a history of maternal diabetes, including gestational diabetes, because this condition places all exposed children, especially those of* **Native American** *mothers, at significant risk of overweight.*	a. *Exposure to intrauterine diabetes was a risk factor for the development of obesity and diabetes in* **Pima Indian** *children* **(Culture Ref: 16).**
MEASUREMENTS 2. Perform accurate height and weight annually; consider more frequent measurement if at risk of or overweight. 3. Perform assessment for risk of overweight: a. Calculate and document BMI on the 2000 CDC growth chart for children. b. Document on the problem list BMI of ≥ 85th%.	**MEASUREMENTS** 2., 3. An accurate height and weight is necessary in order to calculate an accurate BMI. Routine measurement of height and weight in primary care settings has been noted to vary greatly in accuracy **(31).** It is important to track BMI to ensure early recognition of an increase in weight to linear growth. This monitoring can be facilitated by routine calculation and plotting of BMI **(26, 29, 30).**
4. Perform BP measurement with appropriate size cuff at every well child visit. a. Document BP percentile for age, sex, and height using 2005 NHLBI charts to identify children with BP readings > 90th% (pre-hypertensive) and ≥ 95th% (hypertensive). b. Document on problem list all BP ≥ 90th% (pre-hypertensive) and ≥ 95th% (hypertensive). c. Perform follow-up for elevated BP measurement.	4. Children who have a BMI ≥ 85th% are at risk of having an elevated BP for age and gender. Early detection of elevated BP is important to maintain cardiovascular health **(17, 26, 37, 40, 46).**
5. Perform a fasting glucose level, total cholesterol, and/or lipid panel to assess for diabetes mellitus, hyperlipidemia, and metabolic syndrome if the child's BMI is ≥ 95%.	5. Providers must recognize other health-related risks and/or consequences of overweight **(26, 30).** The prevalence of metabolic syndrome is high among overweight children and escalates with increasing degree of overweight. Biomarkers of increased risk of adverse cardiovascular outcomes are already present in these children **(57).**
PHYSICAL EXAM 6. Perform Sexual Maturity Rating (Tanner Stage) annually.	**PHYSICAL EXAM** 6. Early appearance of secondary sexual characteristics is associated with overweight in females before age 8 **(1).**
EDUCATION 7. Educate parents about the child's growth pattern, clearly identifying risk status for overweight when BMI > 85th% occurs.	**EDUCATION** 7. Increased knowledge by parents about their child's growth status can be a strong motivator. In a recent study, parent awareness of their child's overweight status was significantly related to readiness to change **(29, 42).**

SCHOOL AGE

CLINICAL PRACTICE	RATIONALE AND REFERENCE
ASSESSMENT 1. Monitor parent/child affect, using the two-question depression screen with both parent and child at every well child visit. During the past month have you been bothered by a. Feeling down, blue, depressed, or hopeless? b. Feelings of little interest or pleasure in doing things?	**ASSESSMENT** 1. The USPSTF recommends screening for depression among adults, finding the two question screen as effective as longer screening questionnaires. The prevalence of depression is increasing among school age children. Both overeating and anorexia occur more often among depressed children than among unaffected peers. Providers need to make this assessment so that they can intervene appropriately **(4, 21, 38, 49, 59).**
2. Document areas of strength and concern.	2. Health care providers can help families communicate better by identifying specific focal points for intervention. Working with families using strength-based approaches increases the likelihood that parents will follow practitioner recommendations and engage in healthful changes **(23, 26, 30).**
3. Monitor child's social and emotional development by inquiring about school related behavior, peer interactions, bullying, activity in and out of school, and academics.	3. Children with increased BMI are more likely than normal-weight children to report being victimized or bullied by others and bullying others **(25).**
4. Document parent's attitudes, values and beliefs, and spiritual and cultural influences about nutrition, physical activity, and body size and shape; maternal education level; race/ethnicity; religion; preferred language; and preferred type of educational materials.	*4. Families are important role models and influence the nutritional and physical activity habits of children* ***(29, 30).*** *Children and parents may have different views of healthy eating and activity* ***(36).***
EDUCATION 5. Educate parents about: a. Expected growth and physical, developmental, and emotional changes. b. Changes in growth velocity and implications for appetite and food intake.	**EDUCATION** 5. Awareness of such issues can aid communication between health care providers, parents, and patients.
6. Educate parents about strategies for effective communication with the developing child: a. Truly listen to the child's verbal and non-verbal communication. b. Respect the child's feelings. c. Respect the child's individuality.	6. Data from Melnyk et al. show that parents are likely to be unaware of the worries and needs of their children. Health care providers can help families communicate better by identifying strengths and barriers to good communication **(26, 30, 34).**
7. Counsel extended family members as well as parents about issues related to the child's health.	*7. Family is of great importance to all children, and is of special relevance in both the* **Hispanic** *and* **African American** *cultures. Compadres (godparents) play a significant role in the life of the Hispanic child. African American grandparents are greatly involved with the upbringing of their grandchildren. Many* **Native American** *households include extended family members (grandparents, aunts, uncles). Promoting healthful eating as well as increasing physical activity was found to be successful if the family of Native Americans was involved. Practitioners are more likely to be successful with their message if the extended family is included in the discussion (**Culture Ref: 2, 3, 6, 7, 12, 13**).*
8. Refer family as needed to appropriate community nutrition and physical activity resources, including RDs.	8. Practitioners are a vital link between families and local community agencies. They can assist families with needs and concerns and can identify and provide referrals to resources for encouraging positive nutrition and physical activity. RDs are a good resource for parents and children who have complex educational and nutritional

Section 2. Developmental and Communication Considerations

CLINICAL PRACTICE	RATIONALE AND REFERENCE
	management needs. Qualified RDs can be located using the American Dietetic Association (ADA) website http://webdietitians.org **(51)**.
9. *Educate families and children using culturally appropriate curricula (e.g., the Pathways curriculum developed for* **Native American** *families and children).*	9. *Pathways was a multi-site school-based study that included 1,704* **American Indian** *children in third to fifth grade and was aimed at promoting healthful eating and increasing physical activity. The curriculum includes content that is culturally appropriate for Native Americans. This curriculum can be accessed at http://hsc.unm.edu/pathways* ***(Culture Ref: 9).***
10. Counsel using MI when parents and children are willing to make positive changes. a. Reinforce all positive health behaviors. b. Identify discrepancies between goals and behaviors. c. Develop a plan of action in partnership with the family.	10. MI creates a partnership between the parent, child, and professional to address health issues that parents and children can choose to focus on if they wish. The structured MI approach helps the partners address important health issues in a timely way. Some evidence indicates that MI improves the likelihood of positive patient behavior change **(7, 35, 50)**.

Section 3. Nutrition Essentials, Optimal Feeding, and Eating Behaviors

CLINICAL PRACTICE	RATIONALE AND REFERENCE
ASSESSMENT 1. Monitor nutritional intake for consistency with expert recommendations for age, sex, and activity level at each well child visit or at least annually, including: a. Types, amounts, and frequency of foods and beverages. b. Portion sizes. c. Variety of foods eaten in each macronutrient group. d. Types of dietary supplements.	**ASSESSMENT** 1. Expert recommendations are provided by the HHS/USDA 2005 *Dietary Guidelines for Americans*. Providers need to make this assessment in order to make appropriate suggestions for change to promote healthier eating patterns if needed **(29, 56)**.
2. Monitor and document barriers to healthy eating, such as lack of healthy foods, financial barriers, and lack of knowledge about healthful food choices.	2. To best assist parents, health care providers must be aware of barriers that families face in making appropriate food choices **(52)**.
EDUCATION 3. Educate parents about recommended nutritional intake for age and about appropriate types, amounts, and portion sizes of healthful foods (see Tables 1 and 2). a. Select whole grain products for at least half of grains eaten. b. Eat 5 or more servings of fruits and vegetables daily (serving = $\frac{1}{2}$ cup). Regularly select vegetables from all subgroups, including dark green, orange, legumes, and starchy vegetables (about $\frac{1}{3}$ of intake should come from each color grouping). c. Choose appropriate types, amounts, and portion sizes of healthful foods (see Table 2). d. Avoid calorie-dense, nutrient-poor foods. e. Limit fast food to no more than twice per week and educate about healthier choices and portion control when eating out	**EDUCATION** 3. Excessive calorie intake can be mitigated by focusing on healthy foods, limiting portion size, and limiting foods that are high in calories and low in nutrients **(29, 30, 56)**. c. Because food portions have increased in most foods for children ages 2–18, it is important to limit or teach appropriate portion size, and to help children recognize satiety. Sensations of satiety occur 20 minutes into eating. Therefore it is important to eat slowly enough to allow feelings of fullness to guide intake **(3, 29, 30, 39)**. d. Servings of fruits and vegetables can be substituted for high-fat foods in order to reduce calories and increase nutrient intake **(15, 20)**. e. Consistently eating fast food is associated with an increase in BMI over time **(54)**.

SCHOOL AGE

CLINICAL PRACTICE	RATIONALE AND REFERENCE
f. Ensure adequate daily calcium intake for age: • 800 mg per day between 4 and 8 years of age • 1,200–1,500 mg per day between 9 and 19 years of age	f. Lower consumption of calcium and dairy products has been associated with overweight (14, 56).
g. Limit fat intake to 25%–35% after 4 years of age. h. Make healthier choices for types of fat: • avoid foods high in trans fats, e.g., cookies, baked goods, doughnuts, french fries • use soft margarine rather than butter or stick margarine • use low-fat or fat-free dairy products • choose polyunsaturated or monounsaturated fats, such as those found in fish, nuts, and vegetable oils	g.–i. It is important to limit foods high in refined sugar and saturated fats, as these can lead to increased adiposity. Between 1970 and 2003, Americans increased their daily intake of calories by 23%, fat by 50.5%, intake of refined sugar by 18.9%, and refined grains by 44.3% (26, 56). www.ers.usda.gov/data/foodconsumption/FoodGuideIndex.htm
i. Provide healthful snacks in appropriate portion sizes and limit prepared snack foods, such as chips, cake, and candy.	
j. Limit 100% fruit juice to 4–6 oz per day and avoid consumption of fruit drinks and sodas.	j. Sweetened drinks and unusual weight gain in children are positively associated (22, 24, 32, 56).
k. Encourage consumption of water and low or fat-free milk rather than sweetened beverages.	k. Low- and fat-free dairy products are a nutritious snack option (30, 56).
4. Educate parents about how to carry out promising feeding practices, including:	
a. Recognize changes in growth velocity and associated changes in appetite and need to balance energy intake from food with energy output in physical activity (see Table 1).	a. Educate parents about changes/increases in appetite associated with onset of puberty (51).
b. Be a positive role model for healthful eating behaviors.	b. Recent studies demonstrate that changes in child dietary behavior is strongly supported by positive role modeling by the parent (6, 41, 61).
c. Recognize the value of family meals and have them as often as possible to increase quality of nutrition and enhance family connectedness.	c. When children eat regularly with families, they increase their intake of fruits, vegetables, fiber, and micronutrients from food, consume fewer fried foods, less soda, and less saturated and trans fat, and have a lower glycemic load. Parent role modeling of good nutrition and eating behaviors is associated with both parent and child weight loss (3, 18, 61).
d. Recognize that parents are responsible for providing healthful food choices at appropriate intervals and settings (what, where, when) and the child is responsible for deciding whether to eat and how much to eat.	d. It is recommended that parents implement this division of responsibility in feeding because it avoids needless and potentially harmful struggles for control. This division of responsibility is supported by the AAP in their on-line and print nutritional resources for parents (14, 29).
e. Purchase and prepare only healthful foods and drinks, including snacks.	e. Research shows that many parents do not believe they have control over their child's nutritional choices and buy into the myth of healthy eating as restrictive, expensive, and beyond their reach. Practitioners need to correct these perceptions and support parents in assuming their important role in providing and modeling good nutritional habits (6, 23, 41).
f. Encourage the child to eat a healthful breakfast daily.	f. Eating breakfast helps to ensure a steady metabolic rate throughout the day, increasing the likelihood of avoiding overweight. Eating breakfast also is associated with better school performance and behavior (56).
g. Prepare children to select and prepare healthful foods and drinks.	g. Involving children in selecting and preparing foods facilitates their self-care skills and provides useful learning opportunities about good choices at a time when their buying power, decision-making opportunities, and peer influences are increasing (41, 44).
5. Educate parents about avoiding less optimal feeding practices. a. Avoid use of a "clean plate" policy. b. Avoid use of food for comfort; recognize emotional triggers for eating and substitute other coping strategies. c. Avoid restrictive and fad diets.	5. Eating a variety of foods is more likely to provide all essential and other biologically beneficial nutrients. It is essential for a healthy lifestyle and is associated with fewer health deficits (15, 20, 28). Research studies show that when parents withhold favorite foods, children crave those foods more and tend to overeat when they do have access to them. The best strategy is to offer only healthful foods and snacks and relatively small portions (16).

Section 3. Nutrition Essentials, Optimal Feeding, and Eating Behaviors

CLINICAL PRACTICE	RATIONALE AND REFERENCE
6. *Counsel with emphasis on the positive health consequences of good nutrition rather than focusing on the child's weight.*	6. **Hispanics:** *In the Hispanic culture, thinness is often associated with poor health, and there is often the perception that a little extra weight is necessary for children in order to help them recover from illness* **(Culture Ref: 5, 13).** **African Americans:** *African Americans are more tolerant of larger body size and caregivers seldom perceive their children as obese* **(Culture Ref: 1, 15).** *Practitioners may be more successful at establishing rapport with Hispanic and African American families if the discussion is initially focused on health, not necessarily weight.*
7. *Counsel parents to offer traditional foods and not to offer children alternative foods when they refuse traditional foods.* **Hispanics and Native Americans:** *beans, corn, tortillas, and vegetables.* **African Americans:** *fruits and vegetables.*	7. *Frequent exposure to food is important in developing food preferences and traditional foods tend to be highly nutritious* **(Culture Ref: 11, 14, 16, 17).** **Hispanics:** *School aged children are receptive to family-based activities, and meal preparation helps to reinforce good dietary practices* **(Culture Ref: 12).**

Section 4. Physical Activity and Sedentary Behavior

CLINICAL PRACTICE	RATIONALE AND REFERENCE
ASSESSMENT 1. Monitor at least annually: a. Daily physical activity level, type, and amount. b. Daily types and amounts of sedentary behavior. c. Barriers to performing activity, e.g. safety, access, cost.	**ASSESSMENT** 1a. Daily, regular physical activity in the school aged child promotes healthful behavior and decreases the risk of co-morbidities associated with overweight **(9, 10, 11, 19, 20, 26, 27, 29, 30, 33, 48).** b. Sedentary activities are associated with increased incidence of overweight and may limit other opportunities for appropriate social development **(3, 5, 20, 25, 26, 30, 31, 45, 46).** c. Research has shown multiple barriers associated with engaging in physical activity for children and their families. Awareness of barriers provides an opportunity for practitioner, parent, and child to engage in problem-solving to overcome barriers **(23, 43, 55).**
EDUCATION 2. *Counsel with emphasis on the positive health consequences of increased physical activity rather than focusing on the child's weight.*	**EDUCATION** 2. **Hispanics:** *Average physical activity is lower among Hispanic children than among white children* **(Culture Ref: 5, 8, 12).** **African Americans:** *Statistically, heads of household in this population are less likely to do well with weight loss programs, which decreases their attempts to change their children's weight status* **(Culture Ref: 15).** **Native Americans:** *Native American children are not physically active on a regular basis. A collaborative relationship that involves the Native American community is essential for a program to be successful. Encourage any games that may be traditional for a specific tribe* **(Culture Ref: 9, 16).**
3. *Educate parents and children about age-appropriate physical activity and how to incorporate it into daily family routines.*	3. *Practitioners may be more successful in increasing the child's activity level for* **Hispanics, African Americans, and Native Americans** *if they educate families to participate in the activities together.*
a. At least 60 minutes daily of intermittent, moderate to vigorous physical activity.	a. Daily, regular physical activity in the school aged child promotes healthful behaviors and decreases risk of co-morbidity **(9, 10, 11, 19, 20, 26, 27, 29, 30, 33, 48, 53).**
4. Educate parents about the value of family activities and parent modeling of positive physical activity behaviors.	4. Increased recreational screen time is associated with greater adiposity in children **(2, 8, 11, 30, 45, 55, 60).**

SCHOOL AGE

Section 4. Physical Activity and Sedentary Behavior

CLINICAL PRACTICE	RATIONALE AND REFERENCE
5. Educate parents about media influence on health-related behaviors and how to carry out promising screen time practices: a. Turn off TV during meals b. Limit screen time to no more than 2 hours per day c. Monitor the child's time to ensure a balance between screen time and physical activity. d. Do not allow a TV in the child's bedroom.	5. Increased recreational screen time is associated with greater adiposity in children **(2, 8, 11, 30, 43, 45, 47, 53, 60).** Awareness of media influences on food and physical activity choices may improve eating habits. a. Food types and quantities eaten may be influenced by TV watching **(2, 45).** b. AAP recommendation **(30, 45).** c., d. Increased TV viewing—especially in the bedroom—leads to increased inactivity and increased weight gain **(13).**

Section 5. Advocacy

CLINICAL PRACTICE	RATIONALE AND REFERENCE
SCHOOL AGE CHILDREN 1. Advocate that all foods and beverages sold or served to students in school be healthful and meet accepted nutritional content standards.	**SCHOOL AGE CHILDREN** 1. Schools should provide a consistent environment that is conducive to healthful eating behaviors and regular physical activity **(Advocacy Ref: 14, 17).**
2. Advocate for retention of physical education time in schools.	2. Higher student fitness levels are associated with higher performance on standardized achievement tests **(Advocacy Ref: 21).** A 2000 survey found that only 8.0% of elementary schools, 6.4% of middle/junior high schools and 5.8% of senior high schools provided daily physical education (PE) for the entire school year for all of the students in each grade **(Advocacy Ref: 2, 14).**
3. Advocate for classroom involvement in school nutrition and physical education activities: • Prepare classroom activities to teach origin of foods used in local diet. • Prepare a user friendly resource corner on nutrition for parents and children. • Advocate for volunteers to promote supervised physical activity during school recess. • Organize fellow students to develop media messages about healthy eating and physical activity for local radio stations and school assemblies.	3. The Snack Wise Nutrition Rating System helps consumers select smarter snack choices through an easy to recognize color code of green (best choice), yellow (choose occasionally), or red (choose rarely) **(Advocacy Ref: 5).** Coordinated changes in the classroom curriculum, the in-school advertising environment, school health services, and after-school programs all offer the potential to advance overweight prevention efforts **(Advocacy Ref: 14, 26).**
PARENTS AND TEACHERS 4. Perform the School Health Index, a self-assessment and planning tool, on your local school to improve school policies and programs. To order, email HealthyYouth@cdc.gov or visit http://apps.nccd.cdc.gov/shi/.	**PARENTS AND TEACHERS** 4. The assessment and planning tool will provide direction for needed changes **(Advocacy Ref: 7).**
5. Advocate for daily physical education.	5. Higher student fitness levels are associated with higher performance on standardized achievement tests **(Advocacy Ref: 8, 21).**
6. Advocate for improved school lunches that: a. Provide a variety of healthy foods from which to select. b. Emphasize appropriate portion sizes. c. Minimize foods high in fat and calories but low in nutrient content.	6. Schools should engage students and parents, through taste tests of new entrees and surveys, in selecting foods sold through the school meal programs in order to identify new, healthful, and appealing food choices. In addition, schools should share information about the nutritional content of meals with parents and students **(Advocacy Ref: 26).**

SCHOOL AGE

CLINICAL PRACTICE	RATIONALE AND REFERENCE
7. Advocate for restricted vending machine sales and conversion to healthy foods and beverage selections, such as: a. Low fat snacks. b. Fresh or canned fruits. c. Water and low- or fat-free milk.	7. By law, in some states, the only beverages that may be sold in school vending machines are water, milk, and 100% fruit juices or fruit-based drinks that are at least 50% fruit juice with no added sweeteners. All "other foods" sold in schools (including those sold in vending machines, at fundraisers during the school day, and at school functions) must reflect the Dietary Guidelines or meet the USDA standard for a lunch component **(Advocacy Ref: 12).**
8. Advocate for parent and teacher involvement on community and school boards that make decisions on school nutrition and physical education.	8. Many schools around the nation have reduced their commitment to provide students with regular and adequate physical activity. Low levels of physical activity are consistently linked to overweight in children **(Advocacy Ref: 1, 14, 18).**
PROVIDERS 9. Advocate in schools to raise awareness of the importance of physical activity programs and policies. a. Speak out at local schools. b. Take a leadership role in promoting physical education in schools.	**PROVIDERS** 9. Many schools around the nation have reduced their commitment to provide students with regular and adequate physical activity. Low levels of physical activity are consistently linked to overweight in children **(Advocacy Ref: 1, 14, 18).**
10. Educate parents, students, and school staff regarding diversity of children and tolerance and acceptance of all body types and physical abilities.	10. Overweight children often suffer from low self-esteem, depression, and/or fear of being bullied or teased (especially in physical education class). This may lead to avoidance of physical activity or outside activities, which may exacerbate the problem. Stigmatization of obesity is very real. All children want to feel included and competent **(Advocacy Ref: 4, 24).**
11. Advocate for the formation of School Health Advisory Committees. a. Practitioners can encourage parents, teachers, other professionals, and youth leaders to join together and assess needs, develop plans, and implement policies related to physical activity and healthy eating in their communities. b. These committees should develop clear, positive physical activity and nutrition messages.	11. Each school should establish and maintain a School Health Advisory Committee (composed of at least one staff member, one school health council member, and possibly a local hospital representative, dietitian or other health professional, recreation program representative, union representative, or employee benefits specialist) that reports to the school health council **(Advocacy Ref: 26).**

SCHOOL AGE

APPENDIX B

FINAL VERSION OF THE BODY MASS INDEX SCREENING SURVEY

Body Mass Index Screening Survey (BMI-SS)

Final Version*

Directions: The BMI-SS is a two part survey. Part One is aimed at measuring barriers and facilitating factors of Body Mass Index screening practice among school nurses working with school age children in public elementary schools. It takes about 20-25 minutes to complete Part One of the survey. Part Two is a short demographic questionnaire. It takes about 5 minutes to complete. Please follow the directions.

Part One

Q-01. Body Mass Index Screening is defined as a Preventive intervention aimed at the early identification of overweight. For the purposes of this study, it is assumed an evidence-based, accurate measure of health status for school age children. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, thank you for taking the time to complete this survey. Please proceed to Part Two of the survey.

Note. * Also used as T1 and T2 Versions for SN Cohort #2

BMI Screening Practice	**Response**	**Thank you**
1a. Do you implement a BMI Screening practice as a Preventive intervention program in the primary assigned school where children grades K-6 are under your care?	☐ No → ☐ Yes (Go to Q-02) ↓	PROCEDE TO PART TWO

Comments for Q 01:

Q-02. You have indicated that you use BMI screening as a Preventive intervention. The following topics are fundamental tasks that other school nurses have reported as important to BMI screening. Please indicate by answering YES or NO if these tasks have a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
2a. Collecting heights	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 2b) ↓		☐ 3 weak
			☐ 4 very weak
2b. Collecting weights	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 2c) ↓		☐ 3 weak
			☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
2c. Data collection on a mass screening day	☐ Yes → ☐ No (Go to 2d)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2d. Data collection of heights and weights on children grades K-4	☐ Yes → ☐ No (Go to 2e)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2e. Collecting of heights and weights on children grades 5 &/or 6.	☐ Yes → ☐ No (Go to 2f)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
2f. Collecting heights, weight or BMI per parent or child request	☐ Yes → ☐ No (Go to 2g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2g. Data collecting to validate suspicion of risk for or overweight	☐ Yes → ☐ No (Go to 2h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2h. Height and weight data calculation/conversion using wheel	☐ Yes → ☐ No (Go to 2i)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
2i. Height and weight data calculation/conversion using paper-pencil method	☐ Yes → ☐ No (Go to 2j)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2j. Height and weight data calculation/conversion using software computer programs	☐ Yes → ☐ No (Go to 2k)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2k. Height and weight data calculation/conversion using upper grade math students	☐ Yes → ☐ No (Go to 2l)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
2l. Plotting height and weight data to BMI-for-age charts	☐ Yes → ☐ No (Go to 2m)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2m. Plotting height and weight data to BMI-for-age charts to monitor individual growth pattern	☐ Yes → ☐ No (Go to 2n)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2n. Plotting height and weight data to BMI-for-age charts to determine need for referral/intervention	☐ Yes → ☐ No (Go to 2o)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
2o. Plotting height and weight data on BMI-for-age charts in order to obtain aggregate data about school health	☐ Yes → ☐ No (Go to 2p)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2p. BMI data recording on health folders for within school system information sharing.	☐ Yes → ☐ No (Go to 2q)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2q. BMI data recording for information sharing with parents	☐ Yes → ☐ No (Go to 2r)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
2r. Parent counseling specific to BMI screening	☐ Yes ☐ No (Go to 2s)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2s. Child education specific to BMI screening	☐ Yes ☐ No (Go to 2t)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2t. Follow up with child (re-screen) specific to BMI screening	☐ Yes ☐ No (Go to 2u)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
2u. Follow up with intervention program specific to BMI screening	☐ Yes → ☐ No (Go to Q03) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments concerning Fundamental Tasks to BMI Screening

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Q-03. Policy is defined by international, national, state and local governing agencies and advisory boards. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
3a. Center for Disease Control and Prevention (CDC)/National Heart Lung and Blood Institute (NHIBI) clinical guidelines for practice	☐ Yes → ☐ No (Go to 3b)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
3b. American Academy of Pediatrics (AAP) Obesity Prevention Guidelines	☐ Yes → ☐ No (Go to 3c)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
3c. Institute of Medicine Report (IOM) on Child Obesity (2005)	☐ Yes → ☐ No (Go to 3d)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
3d. United States Preventive Taskforce 2005 Position on Management of Obesity, Overweight, and Undernutrition in Children	☐ Yes → ☐ No (Go to 3e)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
3e. National Association of School Nurse Position Statement on Overweight Children and Adolescents	☐ Yes → ☐ No (Go to 3f)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
3f. Ohio Department of Health Guidelines for BMI screening	☐ Yes ☐ No (Go to 3g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
3g. Local school system/district policy	☐ Yes ☐ No (Go to 3h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
3h. Priority health concerns identified in School Wellness Plan	☐ Yes ☐ No (Go to Q04)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments Concerning Policy :

Q-04. School physical environment is defined by clean and safe places for people to work, exercise, play and learn. It is comprised of tangible elements that are usually recognized by individuals through the senses. Some elements are not recognizable by the senses. When unrecognizable elements are toxic, irritating, dangerous or infectious, the physical environment can harm individual and community health. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
4a. Existence of a clinic	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 4b) ↓		☐ 3 weak
			☐ 4 very weak

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
4b. Space in the school to screen	☐ Yes ☐ No (Go to 4c)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4c. Presence of privacy curtains	☐ Yes ☐ No (Go to 4d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4d. Ability to maintain confidentiality while gathering height/weight data	☐ Yes ☐ No (Go to 4e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
4e. Ability to maintain confidentiality of BMI data.	☐ Yes ☐ No (Go to 4f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4g. Available, reliable, accurate equipment such as balanced scales, portable stadiometer, etc.	☐ Yes ☐ No (Go to Q05)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments Concerning School Physical Environment:

Q-05. School social environment is defined by the people in the school. It includes interactions with family, friends, coworkers, and others in the community. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Social Environment	**Influence your BMI screening practice?**	**If yes, does the school social environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
5a. Teacher support	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 5b) ↓		☐ 3 weak
			☐ 4 very weak

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
5b. Principal support	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 5c) ↓		☐ 3 weak
			☐ 4 very weak
5c. Parent assistance with screening	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 5d) ↓		☐ 3 weak
			☐ 4 very weak
5d. Parent notification/per-mission of screening day	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 5e) ↓		☐ 3 weak
			☐ 4 very weak

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
5e. Cafeteria workers influence in lunch portion sized	☐ Yes → ☐ No (Go to 5f)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
5f. Food Service Director influence in selection of healthy meals	☐ Yes → ☐ No (Go to 5g)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
5g. Positive attitude about promoting healthy student weights among school personnel	☐ Yes → ☐ No (Go to 5h)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
5h. School board/administrative support for nurse actions with regard to BMI screening	☐ Yes ☐ No (Go to Q06)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments Concerning School Social Environment:

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Q-06. School risk factors are defined by aggregate data that suggest the school, community or system bears a burden to maintain or restore health due to overcrowding, violence, economy, crisis, demography, geography, race, culture and/or language. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Risk Factors	**Influence your BMI screening practice?**	**If yes, do the school risk factors have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
6a. American fast food culture	☐ Yes → ☐ No (Go to 6b) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
6b. Geographic region where school resides e.g. mountainous, rural, urban, suburban, river, dessert, river, etc.	☐ Yes → ☐ No (Go to 6c) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Risk Factors	Influence your BMI screening practice?	If yes, do the school risk factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
6c. Age/grade level of students	☐ Yes ☐ No (Go to Q07)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
6d. Chronic medical needs of children in the school	☐ Yes ☐ No (Go to 6e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
6e. Demographic composition of students	☐ Yes ☐ No (Go to 6f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Risk Factors	Influence your BMI screening practice?	If yes, do the school risk factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
6f. Urgent situation with academic status e.g., poor proficiency scores, low state report card.	☐ Yes ☐ No (Go to Q07)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments Concerning School Risk Factors:

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Q-07. Access to quality health care services is defined as services received from professional providers, health information, and/or services received through other community venues. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
7a. School nurse workload	☐ Yes → ☐ No (Go to 7b) ↓	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7b. Nurse to student ratio above 1:750 - 1199	☐ Yes → ☐ No (Go to 7c) ↓	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Access to Quality Healthcare	Influence your BMI screening practice?	If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
7c. Nurse to student ratio above 1:1200>	☐ Yes ☐ No (Go to 7d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7d. Reimbursement for school nursing care placed into school's general fund	☐ Yes ☐ No (Go to 7e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7e. Available referral sources for overweight/obese children	☐ Yes ☐ No (Go to 7f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
7f Affordable referral sources for overweight/obese children	☐ Yes → ☐ No (Go to 7g) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7g. Accessible referral sources for overweight/obese children	☐ Yes → ☐ No (PROCEED TO PART TWO) ↓	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments Concerning Access to Quality Healthcare:

Part Two

Participant Information *ID#:* _____

Thank you for continuing with this survey. In order to learn about participants, please complete the following form.

(1) Today's Date: ____________________

(2) Demographics

a.) Gender

1). ____ Male 2). ____ Female

b). Age in years

1).	____	20-29	2).	____	30-39	3).	____	40-49
4).	____	50-59	5).	____	60-69	6).	____	70>

c.) Race

1). ____ American Indian or Alaskan Native
2). ____ Asian
3). ____ Black or African American
4). ____ Hispanic or Latino
5). ____ Native Hawaiian or Pacific Islander
6). ____ Caucasian
7.) ____ More than one race

(3) Ohio School Nurse Association Membership history:

a). Active

1). ___ Less than 12 months
2). ___ 1-5 years
3). ___ 6- 10 years
4). ___ more than 10 years

b). ___ Inactive

c). ___ No membership history

(4) Years experience as a school nurse working full-time in an elementary school:

a). ___ Less than 12 months

b). ___ 1-5 years

c). ___ 6-10 years

d). ___ more than 10 years

(5) A. Education

1). ___ Diploma Program

2). ___ Associate Degree Nursing

3). ___ Associate Degree Other

4). ___ Bachelors in Nursing

5). ___ Bachelors Other

6). ___ Masters in Nursing

7). ___ Masters Other

8) ___ PhD in Nursing

9) ___ PhD Other

10) ___ DNP

(5) B. Certification

1) ___ School Nurse Certification

2) ___ Other: (Specify) ______________________________

School System Information

(6) Type of school system you work in:

a). ____ Urban b). ___ Rural c). ___ Suburban

(7) Number of elementary schools you were assigned last year

a). ___ 1 b). ___ 2-3 c). ___ 4-5 d). ___ more than 5

Thank you for taking the time to complete this part of the survey. Your input is appreciated. Please return the survey

APPENDIX C

FIRST VERSION OF THE BODY MASS INDEX SCREENING SURVEY

Appendix C

Body Mass Index Screening Survey (BMI-SS)
First Mark-up Version for Face Validity by School Nurse Focus Group

Directions: The BMI-SS is a two part survey. Part One is aimed at measuring barriers and facilitating factors of Body Mass Index screening practice among school nurses working with school age children in public elementary schools. Part One is a 7 section questionnaire with 66 items. It takes approximately 35 minutes to complete Part One of the survey. Part Two is a short demographic questionnaire. It takes about 5 minutes to complete. Please follow the directions.

Part One

Q-01. Body Mass Index Screening is defined as a Preventive intervention aimed at the early identification of overweight. For the purposes of this study, it is assumed an evidence-based, accurate measure of health status for school age children. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, thank you for taking the time to complete this survey. Please proceed to Part Two of the survey.

BMI Screening Practice	**Response**	**Thank you**
1. Do you implement a BMI Screening practice as a Preventive intervention program in the primary assigned school where children grades K-6 are under your care?	☐ No → ☐ Yes (Go to Q-02) ↓	PROCEDE TO PART TWO

Comments:

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Q-02. You have indicated that you use BMI screening as a Preventive intervention. The following topics are fundamental tasks that other school nurses have reported as important to BMI screening. Please indicate by answering YES or NO if these tasks have a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
1. Collecting heights	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 2) ↓		☐ 3 weak
			☐ 4 very weak
2. Collecting weights	☐ Yes →	☐ Positive impact →	☐ 1 very strong
		☐ Negative impact	☐ 2 strong
	☐ No (Go to 3) ↓		☐ 3 weak
			☐ 4 very weak

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
3. Collecting of other state mandated screenings such as hearing, vision	☐ Yes → ☐ No (Go to 4)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4. Data collecting on a mass screening day dedicated to obesity prevention and identification	☐ Yes → ☐ No (Go to 5)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
5. Data collecting of heights and weights on children grades K-4	☐ Yes → ☐ No (Go to 6)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
6. Data collecting of heights and weights on children grades 5 &/or 6.	☐ Yes ☐ No (Go to 7)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7. Data collecting per parent or child request	☐ Yes ☐ No (Go to8)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
8. Data collecting to validate suspicion of risk/protection for or overweight	☐ Yes ☐ No (Go to 9)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
9. Multi-phasic data collecting to compare hypertension, high serum glucose, or depression.	☐ Yes → ☐ No (Go to 10) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
10. Height and weight data calculation/conversion using wheel	☐ Yes → ☐ No (Go to 11) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
11. Height and weight data calculation/conversion using paper-pencil method	☐ Yes → ☐ No (Go to 12) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
12 Height and weight data calculation/conversion using software computer programs	☐ Yes → ☐ No (Go to 13) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
13. Height and weight data calculation/conversion using upper grade math students	☐ Yes → ☐ No (Go to 14) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
14. Plotting of height and weight data to BMI-for-age charts	☐ Yes → ☐ No (Go to 15) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
15. Plotting of height and weight data to BMI-for-age charts in order to monitor individual growth pattern	☐ Yes → ☐ No (Go to 16) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
16. Plotting of height and weight data to BMI-for-age charts to determine need for referral/intervention	☐ Yes → ☐ No (Go to 17) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
17. Plotting of height and weight data on BMI-for-age charts in order to obtain aggregate data about school health	☐ Yes → ☐ No (Go to 18) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
18. BMI data recording on health folders for within school system information sharing.	☐ Yes ☐ No (Go to 19)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
19. BMI data recording for information sharing with parents	☐ Yes ☐ No (Go to 20)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
20. Parent counseling specific to BMI screening	☐ Yes ☐ No (Go to 21)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
21. Child education specific to BMI screening	☐ Yes → ☐ No (Go to 22) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
22. Follow up with child (re-screen) specific to BMI screening	☐ Yes → ☐ No (Go to 23) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
23. Follow up with intervention program specific to BMI screening	☐ Yes → ☐ No (Go to Q03) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments:

Q-03. Policy is defined by international, national, state and local governing agencies and advisory boards. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Policy	**Influence your BMI screening practice?**	**If yes, does the policy have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
1. World Health Organization Child Growth Standards	☐ Yes → ☐ No (Go to 2) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2. Center for Disease Control and Prevention (CDC)/National Heart Lung and Blood Institute (NHIBI) clinical guidelines for practice	☐ Yes → ☐ No (Go to 3) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Policy	**Influence your BMI screening practice?**	**If yes, does the policy have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
3. American Academy of Pediatrics (AAP) Obesity Prevention Guidelines	☐ Yes → ☐ No (Go to 4)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4. Institute of Medicine Report (IOM) on Child Obesity (2005)	☐ Yes → ☐ No (Go to 5)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
5. United States Preventive Taskforce 2005 Position on Management of Obesity, Overweight, and Undernutrition in Children	☐ Yes → ☐ No (Go to 6)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
6. National Association of School Nurse Position Statement on Overweight Children and Adolescents	☐ Yes ☐ No (Go to 7)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7. Ohio Department of Health Guidelines for BMI screening	☐ Yes ☐ No (Go to8)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
8. Local school system policy	☐ Yes ☐ No (Go to 9)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
9. Priority health concerns identified in School Wellness Plan	☐ Yes ☐ No (Go to Q04)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments:

Q-04. School physical environment is defined by clean and safe places for people to work, exercise, play and learn. It is comprised of tangible elements that are usually recognized by individuals through the senses. Some elements are not recognizable by the senses. When unrecognizable elements are toxic, irritating, dangerous or infectious, the physical environment can harm individual and community health. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Physical Environment	**Influence your BMI screening practice?**	**If yes, does the school physical environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
1. Large school size in square footage with long hallways.	☐ Yes → ☐ No (Go to 2)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
2. Large school size in square footage with stairs to climb.	☐ Yes → ☐ No (Go to 3) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
3. Location of clinic	☐ Yes → ☐ No (Go to 4) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4. Small size of clinic	☐ Yes → ☐ No (Go to 5) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
5. Existence of a clinic	☐ Yes → ☐ No (Go to 6) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
6. Space in the school to screen	☐ Yes → ☐ No (Go to 7) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7. Presence of privacy curtains	☐ Yes → ☐ No (Go to 8) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
8. Ability to maintain confidentiality while gathering height/weight data	☐ Yes ☐ No (Go to 9)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
9. Ability to maintain confidentiality of BMI data.	☐ Yes ☐ No (Go to 10)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
10. Available, reliable, accurate equipment such as balanced scales, portable stadiometer, etc.	☐ Yes ☐ No (Go to Q05)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments:

Q-05. School social environment is defined by the people in the school. It includes interactions with family, friends, coworkers, and others in the community. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Social Environment	**Influence your BMI screening practice?**	**If yes, does the school social environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
1. Teacher support	☐ Yes → ☐ No (Go to 2) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2. Teacher accessibility	☐ Yes → ☐ No (Go to 3) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
3. Principal support	☐ Yes → ☐ No (Go to 4) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4. Physical education teachers participation in BMI monitoring	☐ Yes → ☐ No (Go to 5) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
5. Parent involvement in clinic support	☐ Yes → ☐ No (Go to 6) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
6. Cafeteria workers influence in health lunch selections	☐ Yes → ☐ No (Go to 7)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7. Positive attitude about promoting healthy student weights among school personnel	☐ Yes → ☐ No (Go to 8)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
8. School board support for nurse actions with regard to BMI screening	☐ Yes → ☐ No (Go to Q06)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments:

Q-06. School risk/protection factors are defined by aggregate data that suggest the school, community or system bears a burden to maintain or restore health due to overcrowding, violence, economy, crisis, demography, geography, race, culture and/or language. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Risk/protection Factors	**Influence your BMI screening practice?**	**If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
1. American fast food culture	☐ Yes → ☐ No (Go to 2) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2. Geographic region where school resides e.g., mountainous, rural, urban, suburban, river, dessert, river, etc.	☐ Yes → ☐ No (Go to 3) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
3. Age/grade level of students	☐ Yes →	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
	☐ No (Go to 4) ↓		
4. Chronic medical needs of student body	☐ Yes →	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
	☐ No (Go to 5) ↓		
5. Demographic of community represented by African American poorest of poor	☐ Yes →	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
	☐ No (Go to 6) ↓		

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
6. Demographic of community represented by wealthy educated Caucasians	☐ Yes → ☐ No (Go to 7) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
7. Demographic of community represented by farm focused rural families	☐ Yes → ☐ No (Go to 8) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
8. Demographic of community represented by immigrant population with English as second language	☐ Yes → ☐ No (Go to 9) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?
9. Urgent situation with academic status e.g., poor proficiency scores; low state report card.	☐ Yes → ☐ No (Go to 10)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
10.. Urgent situation with building status e.g., older buildings with poor ventilation, heating or cooling systems; new construction occurring or needed.	☐ Yes → ☐ No (Go to 11)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
11. Urgent situation funding status. E.g., state absorbed or system in need of levy passage for viability of programs	☐ Yes → ☐ No (Go to Q07)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments:

Q-07. Access to quality health care services is defined as services received from professional providers, health information, and/or services received through other community venues. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
1. School nurse workload	☐ Yes → ☐ No (Go to 2)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
2. Nurse to student ratio above 1:750 -1199	☐ Yes → ☐ No (Go to 3)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
3. Nurse to student ratio above 1:1200>	☐ Yes ☐ No (Go to 4)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
4. Available referral sources for overweight/obese children	☐ Yes ☐ No (Go to 5)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak
5. Affordable referral sources for overweight/obese children	☐ Yes ☐ No (Go to 6)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**
6. Accessible referral sources for overweight/obese children	☐ Yes → ☐ No (PROCEED TO PART TWO)	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak

Comments:

____

____

____

____

PROCEDE TO PART TWO

Part Two

Participant Information

ID#: ____________________________

Thank you for continuing with this survey. In order to learn about participants, please complete the following form.

(1) Today's Date: ______________________

(2) Demographics

a.) Gender

1).	____	Male	2).	____	Female

b). Age in years

1).	____	20-29	2).	____	30-39	3).	____	40-49
4).	____	50-59	5).	____	60-69	6).	____	70>

c.) Race

1).	____	American Indian or Alaskan Native	2).	____	Asian
3).	____	Black or African American	4).	____	Hispanic or Latino
5).	____	Native Hawaiian or Pacific Islander	6).	____	More than one race

(3) Ohio School Nurse Association Membership history

a). Active

1). ___ Less than 12 months
2). ___ 1-5 years
3). ___ 6- 10 years
4). ___ more than 10 years

b). ___ Inactive

c). ___ No member ship history

(3) Years experience as a school nurse working full-time in an elementary school:

a). ___ Less than 12 months

b). ___ 1-5 years

c). ___ 6-10 years

d). ___ more than 10 years

(4) Your Qualifications:

a). Education

1). ___ Diploma Program 2). ___ Associate Degree Nursing 3). ___ Associate Degree Other

4). ___ Bachelors in Nursing 5). ___ Bachelors Other 6). ___ Masters in Nursing

7). ___ Masters Other 8) ___ PhD in Nursing 9) ___ PhD Other

10) ___ DNP

b) Certification

1) ___ School Nurse Certification

2) ___ Other: (Specify) ____________________

School System Information

(5) Type of school system you work in:

a). ____ Urban b). ___ Rural c). ___ Suburban

(6) Number of elementary schools you were assigned last year

a). ___ 1 b). ___ 2-3 c). ___ 4-5 d). __ more than 5

Thank you for taking the time to complete this part of the survey. Your input is appreciated. Please return the survey and collect your CEs.

APPENDIX D

SECOND VERSION OF THE BODY MASS INDEX SCREENING SURVEY

Body Mass Index Screening Survey (BMI-SS) with Content Validity Index (CVI) Evaluation Tool (ET)
Second Mark-up Version for Content Validity by School Nurse Experts

This version of the BMI-SS has a Content Validity Index Evaluation Tool integrated into the survey. Please review this survey for content. You are not to answer the questions as if you are a school nurse who does or does not participate in a screening program, but as an expert who is reviewing the items for theoretical relevancy. The last column on each table entitled “Relevance of Topic” represents the theoretical content portion of the evaluation. Please complete only the last column. Indicate 1=no relevance, 2 = some relevance, 3 = relevant, or 4 = very relevant.

Directions: The BMI-SS is a two part survey. Part One is aimed at measuring barriers and facilitating factors of Body Mass Index screening practice among school nurses working with school age children in public elementary schools. Part One is a 7 section questionnaire with 67 items. It takes approximately 35 minutes to complete Part One of the survey. Part Two is a short demographic questionnaire. It takes about 5 minutes to complete. Please follow the directions.

Part One

Q-01. Body Mass Index Screening is defined as a Preventive intervention aimed at the early identification of overweight. For the purposes of this study, it is assumed an evidence-based, accurate measure of health status for school age children. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, thank you for taking the time to complete this survey. Please proceed to Part Two of the survey.

BMI Screening Practice	Response	Thank you
1a. Do you implement a BMI Screening practice as a Preventive intervention program in the primary assigned school where children grades K-6 are under your care?	☐ No → ☐ Yes (Go to Q-02) ↓	PROCEDE TO PART TWO

Comments for Q 01:

Q-02. You have indicated that you use BMI screening as a Preventive intervention. The following topics are fundamental tasks that other school nurses have reported as important to BMI screening. Please indicate by answering YES or NO if these tasks have a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
2a. Collecting heights	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 2b) ↓		☐ 3 weak →	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
2b. Collecting weights	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong →	☐ 2 some relevance
	☐ No (Go to 2c) ↓		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2c. Data collection on a mass screening day	☐ Yes ☐ No (Go to 2d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2d. Data collection of heights and weights on children grades K-4	☐ Yes ☐ No (Go to 2e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2e. Collecting of heights and weights on children grades 5 &/or 6.	☐ Yes ☐ No (Go to 2f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2f. Collecting heights, weight or BMI per parent or child request	☐ Yes → ☐ No (Go to 2g) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2g. Data collecting to validate suspicion of risk/protection for or overweight	☐ Yes → ☐ No (Go to 2h) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2h. Multiple screenings for other health risk/protections such as hypertension, high serum glucose, or depression.	☐ Yes → ☐ No (Go to 2i) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2i. Height and weight data calculation/conversion using wheel	☐ Yes ☐ No (Go to 2j)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2j. Height and weight data calculation/conversion using paper-pencil method	☐ Yes ☐ No (Go to 2k)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2k. Height and weight data calculation/conversion using software computer programs	☐ Yes ☐ No (Go to 2l)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2l. Height and weight data calculation/conversion using upper grade math students	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 2m)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
2m. Plotting height and weight data to BMI-for-age charts	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 2n)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
2n. Plotting height and weight data to BMI-for-age charts to monitor individual growth pattern	☐ Yes	☐ Positive impact	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 2o)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2o. Plotting height and weight data to BMI-for-age charts to determine need for referral/intervention	☐ Yes ☐ No (Go to 2p)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2p. Plotting height and weight data on BMI-for-age charts in order to obtain aggregate data about school health	☐ Yes ☐ No (Go to 2q)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2q. BMI data recording on health folders for within school system information sharing.	☐ Yes ☐ No (Go to 2r)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2r. BMI data recording for information sharing with parents	☐ Yes → ☐ No (Go to 2s) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2s. Parent counseling specific to BMI screening	☐ Yes → ☐ No (Go to 2t) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2t. Child education specific to BMI screening	☐ Yes → ☐ No (Go to 2u) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2u. Follow up with child (re-screen) specific to BMI screening	☐ Yes ☐ No (Go to 2v)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2v. Follow up with intervention program specific to BMI screening	☐ Yes ☐ No (Go to Q03)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments concerning Fundamental Tasks to BMI Screening

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Q-03. Policy is defined by international, national, state and local governing agencies and advisory boards. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Policy	**Influence your BMI screening practice?**	**If yes, does the policy have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
3a. World Health Organization Child Growth Standards	☐ Yes → ☐ No (Go to 3b) ↓	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3b. Center for Disease Control and Prevention (CDC)/National Heart Lung and Blood Institute (NHIBI) clinical guidelines for practice	☐ Yes → ☐ No (Go to 3c) ↓	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak → ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
3c. American Academy of Pediatrics (AAP) Obesity Prevention Guidelines	☐ Yes ☐ No (Go to 3d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3d. Institute of Medicine Report (IOM) on Child Obesity (2005)	☐ Yes ☐ No (Go to 3e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3e. United States Preventive Taskforce 2005 Position on Management of Obesity, Overweight, and Undernutrition	☐ Yes ☐ No (Go to 3f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
in Children				
3f. National Association of School Nurse Position Statement on Overweight Children and Adolescents	☐ Yes ☐ No (Go to 3g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3g. Ohio Department of Health Guidelines for BMI screening	☐ Yes ☐ No (Go to 3h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
3h. Local school system/district policy	☐ Yes ☐ No (Go to 3i)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3i. Priority health concerns identified in School Wellness Plan	☐ Yes ☐ No (Go to Q04)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning Policy :

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Q-04. School physical environment is defined by clean and safe places for people to work, exercise, play and learn. It is comprised of tangible elements that are usually recognized by individuals through the senses. Some elements are not recognizable by the senses. When unrecognizable elements are toxic, irritating, dangerous or infectious, the physical environment can harm individual and community health. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Physical Environment	**Influence your BMI screening practice?**	**If yes, does the school physical environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
4a. Large school size in square footage with long hallways.	☐ Yes → ☐ No (Go to 4b)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
4b. Large school size in square footage with stairs to climb.	☐ Yes → ☐ No (Go to 4c)	☐ Positive impact → ☐ Negative impact	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Physical Environment	**Influence your BMI screening practice?**	**If yes, does the school physical environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
4c. Location of clinic	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 4d)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
4d. Small size of clinic	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 4e)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
4e. Existence of a clinic	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 4f)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
4f. Space in the school to screen	☐ Yes ☐ No (Go to 4g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
4g. Presence of privacy curtains	☐ Yes ☐ No (Go to 4h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
4h. Ability to maintain confidentiality while gathering height/weight data	☐ Yes ☐ No (Go to 4i)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
4i. Ability to maintain confidentiality of BMI data.	☐ Yes ☐ No (Go to 4j)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
4j. Available, reliable, accurate equipment such as balanced scales, portable stadiometer, etc.	☐ Yes ☐ No (Go to Q05)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning School Physical Environment:

Q-05. School social environment is defined by the people in the school. It includes interactions with family, friends, coworkers, and others in the community. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Social Environment	**Influence your BMI screening practice?**	**If yes, does the school social environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
5a. Teacher support	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 5b)		☐ 3 weak →	☐ 3 relevant
	↓		☐ 4 very weak	☐ 4 very relevant
5b. Teacher accessibility	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 5c)		☐ 3 weak →	☐ 3 relevant
	↓		☐ 4 very weak	☐ 4 very relevant

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
5c. Principal support	☐ Yes ☐ No (Go to 5d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5d. Physical education teachers participation in BMI monitoring	☐ Yes ☐ No (Go to 5e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5e. Parent assistance with screening	☐ Yes ☐ No (Go to 5f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
5f. Parent presence in clinic	☐ Yes ☐ No (Go to 5g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5g. Parent notification/permission of screening day	☐ Yes ☐ No (Go to 5h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5h. Cafeteria workers influence in lunch portion sized	☐ Yes ☐ No (Go to 5i)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
5i. Food Service Director influence in selection of healthy meals	☐ Yes ☐ No (Go to 5j)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5j. Positive attitude about promoting healthy student weights among school personnel	☐ Yes ☐ No (Go to 5k)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5k. School board/administrative support for nurse actions with regard to BMI screening	☐ Yes ☐ No (Go to Q06)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning School Social Environment:

Q-06. School risk/protection factors are defined by aggregate data that suggest the school, community or system bears a burden to maintain or restore health due to overcrowding, violence, economy, crisis, demography, geography, race, culture and/or language. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Risk/protection Factors	**Influence your BMI screening practice?**	**If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
6a. American fast food culture	☐ Yes ☐ No (Go to 6b)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6b. Geographic region where school resides e.g. mountainous, rural, urban, suburban, river, dessert, river, etc.	☐ Yes ☐ No (Go to 6c)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
6c. Age/grade level of students	☐ Yes → ☐ No (Go to 6d) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6d. Chronic medical needs of children in the school	☐ Yes → ☐ No (Go to 6e) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6e. Demographic composition of students	☐ Yes → ☐ No (Go to 6f) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
6f. Urgent situation with academic status e.g., poor proficiency scores, low state report card.	☐ Yes ☐ No (Go to 6g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6g. Urgent situation with building status e.g., older buildings with poor ventilation, heating or cooling systems; new construction occurring or needed.	☐ Yes ☐ No (Go to 6h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
6h. Urgent situation funding status e.g., state absorbed, system in need of levy passage for viability of programs	☐ Yes ☐ No (Go to Q07)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning School Risk/protection Factors:

Q-07. Access to quality health care services is defined as services received from professional providers, health information, and/or services received through other community venues. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
7a. School nurse workload	☐ Yes →	☐ Positive impact	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 7b)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
7b. Nurse to student ratio above 1:750 -1199	☐ Yes →	☐ Positive impact	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 7c)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

Access to Quality Healthcare	Influence your BMI screening practice?	If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
7c. Nurse to student ratio above 1:1200>	☐ Yes	☐ Positive impact	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 7d)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
7d. Reimbursement for school nursing care placed into school's general fund	☐ Yes	☐ Positive impact	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 7e)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
7e. Available referral sources for overweight/obese children	☐ Yes	☐ Positive impact	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 7f)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

Access to Quality Healthcare	Influence your BMI screening practice?	If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
7f Affordable referral sources for overweight/obese children	☐ Yes ☐ No (Go to 7g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
7g. Accessible referral sources for overweight/obese children	☐ Yes ☐ No (PROCEED TO PART TWO)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning Access to Quality Healthcare:

PROCEDE TO PART TWO

Part Two

Participant Information *ID#:* _____

Thank you for continuing with this survey. In order to learn about participants, please complete the following form.

(1) Today's Date: ______________________

(2) Demographics

a.) Gender

1). _____ Male 2). _____ Female

b). Age in years

1).	_____	20-29	2).	_____	30-39	3).	_____	40-49
4).	_____	50-59	5).	_____	60-69	6).	_____	70>

c.) Race

1).	_____	American Indian or Alaskan Native	2).	_____	Asian
3).	_____	Black or African American	4).	_____	Hispanic or Latino
5).	_____	Native Hawaiian or Pacific Islander	6).	_____	Caucasian
7.)	_____	More than one race			

(3) Ohio School Nurse Association Membership history

a). Active

1). ___ Less than 12 months

2). ___ 1-5 years

3). ___ 6- 10 years

4). ___ more than 10 years

b). ___ Inactive

c). ___ No membership history

(3) Years experience as a school nurse working full-time in an elementary school:

a). ___ Less than 12 months

b). ___ 1-5 years

c). ___ 6-10 years

d). ___ more than 10 years

(4) A. Education

1). ___ Diploma Program 2). ___ Associate Degree Nursing 3). ___ Associate Degree Other

4). ___ Bachelors in Nursing 5). ___ Bachelors Other 6). ___ Masters in Nursing

7). ___ Masters Other 8) ___ PhD in Nursing 9) ___ PhD Other

10) ___ DNP

(4) B. Certification

1) ___ School Nurse Certification

2) ___ Other: (Specify) ______________________________

School System Information

(5) Type of school system you work in:

a). ____ Urban b). ___ Rural c). ___ Suburban

(6) Number of elementary schools you were assigned last year

a). ___ 1 b). ___ 2-3 c). ___ 4-5 d). ___ more than 5

Thank you for taking the time to complete this part of the survey. Your input is appreciated. Please return the survey and collect your CEs.

APPENDIX E

THIRD VERSION OF THE BODY MASS INDEX SCREENING SURVEY

Body Mass Index Screening Survey (BMI-SS) with Content Validity Index (CVI) Evaluation Tool (ET)
Third Mark-up Version for Content Validity by School Nurse Certification Students
Cohort #1

This version of the BMI-SS has a Content Validity Index Evaluation Tool integrated into the survey. Please review each item on this survey. You only need to answer the last columns entitled "Relevance of Topic." Indicate with an "X" by selecting 1=no relevance, 2 = some relevance, 3 = relevant, or 4 = very relevant.

Directions: The BMI-SS is a two part survey. Part One is aimed at measuring barriers and facilitating factors of Body Mass Index screening practice among school nurses working with school age children in public elementary schools. Part One is a 7 section questionnaire with 56 items. It takes approximately 25 minutes to complete Part One of the survey. Part Two is a short demographic questionnaire. It takes about 5 minutes to complete. Please follow the directions.

Part One

Q-01. Body Mass Index Screening is defined as a Preventive intervention aimed at the early identification of overweight. For the purposes of this study, it is assumed an evidence-based, accurate measure of health status for school age children. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, thank you for taking the time to complete this survey. Please proceed to Part Two of the survey.

BMI Screening Practice	Response	Thank you
1a. Do you implement a BMI Screening practice as a Preventive intervention program in the primary assigned school where children grades K-6 are under your care?	☐ No →	PROCEDE TO PART TWO
	☐ Yes (Go to Q-02) ↓	

Comments for Q 01:

Q-02. You have indicated that you use BMI screening as a Preventive intervention. The following topics are fundamental tasks that other school nurses have reported as important to BMI screening. Please indicate by answering YES or NO if these tasks have a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
2a. Collecting heights	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 2b)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
2b. Collecting weights	☐ Yes	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 2c)		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2c. Data collection on a mass screening day	☐ Yes ☐ No (Go to 2d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2d. Data collection of heights and weights on children grades K-4	☐ Yes ☐ No (Go to 2e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2e. Collecting of heights and weights on children grades 5 &/or 6.	☐ Yes ☐ No (Go to 2f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2f. Collecting heights, weight or BMI per parent or child request	☐ Yes ☐ No (Go to 2g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2g. Data collecting to validate suspicion of risk/protection for or overweight	☐ Yes ☐ No (Go to 2h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2h. Height and weight data calculation/conversion using wheel	☐ Yes ☐ No (Go to 2i)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2i. Height and weight data calculation/conversion using paper-pencil method	☐ Yes ☐ No (Go to 2j)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2j. Height and weight data calculation/conversion using software computer programs	☐ Yes ☐ No (Go to 2k)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2k. Height and weight data calculation/conversion using upper grade math students	☐ Yes ☐ No (Go to 2l)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2l. Plotting height and weight data to BMI-for-age charts	☐ Yes → ☐ No (Go to 2m) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak → ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2m. Plotting height and weight data to BMI-for-age charts to monitor individual growth pattern	☐ Yes → ☐ No (Go to 2n) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak → ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2n. Plotting height and weight data to BMI-for-age charts to determine need for referral/intervention	☐ Yes → ☐ No (Go to 2o) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak → ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2o. Plotting height and weight data on BMI-for-age charts in order to obtain aggregate data about school health	☐ Yes → ☐ No (Go to 2p) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2p. BMI data recording on health folders for within school system information sharing.	☐ Yes → ☐ No (Go to 2q) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2q. BMI data recording for information sharing with parents	☐ Yes → ☐ No (Go to 2r) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak →	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	Influence your BMI screening practice?	If yes, does the practice task have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
2r. Parent counseling specific to BMI screening	☐ Yes → ☐ No (Go to 2s) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2s. Child education specific to BMI screening	☐ Yes → ☐ No (Go to 2t) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
2t. Follow up with child (re-screen) specific to BMI screening	☐ Yes → ☐ No (Go to 2u) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Fundamental Tasks to BMI Screening	**Influence your BMI screening practice?**	**If yes, does the practice task have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
2u. Follow up with intervention program specific to BMI screening	☐ Yes → ☐ No (Go to Q03) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments concerning Fundamental Tasks to BMI Screening

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Q-03. Policy is defined by international, national, state and local governing agencies and advisory boards. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Policy	**Influence your BMI screening practice?**	**If yes, does the policy have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
3a. Center for Disease Control and Prevention (CDC)/National Heart Lung and Blood Institute (NHIBI) clinical guidelines for practice	☐ Yes → ☐ No (Go to 3b)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

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Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
3b. American Academy of Pediatrics (AAP) Obesity Prevention Guidelines	☐ Yes ☐ No (Go to 3c)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3c. Institute of Medicine Report (IOM) on Child Obesity (2005)	☐ Yes ☐ No (Go to 3d)	☐ Positive impact ☐ Neg act	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3d. United States Preventive Taskforce 2005 Position on Management of Obesity, Overweight, and Undernutrition in Children	☐ Yes ☐ No (Go to 3e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
3e. National Association of School Nurse Position Statement on Overweight Children and Adolescents	☐ Yes ☐ No (Go to 3f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3f. Ohio Department of Health Guidelines for BMI screening	☐ Yes ☐ No (Go to 3g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
3g. Local school system/district policy	☐ Yes ☐ No (Go to 3h)	☐ Posi[illegible] ☐ Nega[illegible]t	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Policy	Influence your BMI screening practice?	If yes, does the policy have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
3h. Priority health concerns identified in School Wellness Plan	☐ Yes ☐ No (Go to Q04)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning Policy :

Q-04. School physical environment is defined by clean and safe places for people to work, exercise, play and learn. It is comprised of tangible elements that are usually recognized by individuals through the senses. Some elements are not recognizable by the senses. When unrecognizable elements are toxic, irritating, dangerous or infectious, the physical environment can harm individual and community health. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Physical Environment	**Influence your BMI screening practice?**	**If yes, does the school physical environment have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
4a. Existence of a clinic	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong →	☐ 2 some relevance
	☐ No (Go to 4b) ↓		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
4b. Space in the school to screen	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong →	☐ 2 some relevance
	☐ No (Go to 4c) ↓		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
4c. Presence of privacy curtains	☐ Yes ☐ No (Go to 4d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
4d. Ability to maintain confidentiality while gathering height/weight data	☐ Yes ☐ No (Go to 4e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
4e. Ability to maintain confidentiality of BMI data.	☐ Yes ☐ No (Go to 4f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Physical Environment	Influence your BMI screening practice?	If yes, does the school physical environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
4g. Available, reliable, accurate equipment such as balanced scales, portable stadiometer, etc.	☐ Yes ☐ No (Go to Q05)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning School Physical Environment:

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Q-05. School social environment is defined by the people in the school. It includes interactions with family, friends, coworkers, and others in the community. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
5a. Teacher support	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐1 no relevance
		☐ Negative impact	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 5b)		☐ 3 weak →	☐ 3 relevant
	↓		☐ 4 very weak	☐ 4 very relevant
5b. Principal support	☐ Yes →	☐ Positive impact	☐ 1 very strong	☐1 no relevance
		☐ Negative impact →	☐ 2 strong	☐ 2 some relevance
	☐ No (Go to 5c)		☐ 3 weak →	☐ 3 relevant
	↓		☐ 4 very weak	☐ 4 very relevant

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
5c. Parent assistance with screening	☐ Yes → ☐ No (Go to 5d) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5d. Parent notification/per-mission of screening day	☐ Yes → ☐ No (Go to 5e) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5e. Cafeteria workers influence in lunch portion sized	☐ Yes → ☐ No (Go to 5f) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Social Environment	Influence your BMI screening practice?	If yes, does the school social environment have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
5f. Food Service Director influence in selection of healthy meals	☐ Yes ☐ No (Go to 5g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5g. Positive attitude about promoting healthy student weights among school personnel	☐ Yes ☐ No (Go to 5h)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
5h. School board/administrative support for nurse actions with regard to BMI screening	☐ Yes ☐ No (Go to Q06)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning School Social Environment:

Q-06. School risk/protection factors are defined by aggregate data that suggest the school, community or system bears a burden to maintain or restore health due to overcrowding, violence, economy, crisis, demography, geography, race, culture and/or language. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

School Risk/protection Factors	**Influence your BMI screening practice?**	**If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
6a. American fast food culture	☐ Yes ☐ No (Go to 6b)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6b. Geographic region where school resides e.g. mountainous, rural, urban, suburban, river, dessert, river, etc.	☐ Yes ☐ No (Go to 6c)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6c. Age/grade level of students	☐ Yes ☐ No (Go to Q07)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

School Risk/protection Factors	Influence your BMI screening practice?	If yes, do the school risk/protection factors have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
6d. Chronic medical needs of children in the school	☐ Yes → ☐ No (Go to 6e) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6e. Demographic composition of students	☐ Yes → ☐ No (Go to 6f) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
6f. Urgent situation with academic status e.g., poor proficiency scores, low state report card.	☐ Yes → ☐ No (Go to Q07) ↓	☐ Positive impact ☐ Negative impact →	☐ 1 very strong ☐ 2 strong → ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning School Risk/protection Factors:

Q-07. Access to quality health care services is defined as services received from professional providers, health information, and/or services received through other community venues. Please indicate if any of the following influence your practice by answering YES or NO. If you answered NO, proceed to the next topic. If you answered YES, indicate if the policy has a positive or negative impact on your screening practice. Then, determine the strength of that impact upon your practice (1= Very Strong, 2= Strong, 3= Weak, and 4= Very Weak). Place checkmarks in the appropriate boxes. Last, if you have any comments please write in the space provided.

Access to Quality Healthcare	**Influence your BMI screening practice?**	**If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?**	**What is the strength of that impact on BMI screening practice?**	**Relevance of Topic**
7a. School nurse workload	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong →	☐ 2 some relevance
	☐ No (Go to 7b) ↓		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant
7b. Nurse to student ratio above 1:750 -1199	☐ Yes →	☐ Positive impact →	☐ 1 very strong	☐ 1 no relevance
		☐ Negative impact	☐ 2 strong →	☐ 2 some relevance
	☐ No (Go to 7c) ↓		☐ 3 weak	☐ 3 relevant
			☐ 4 very weak	☐ 4 very relevant

Access to Quality Healthcare	Influence your BMI screening practice?	If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
7c. Nurse to student ratio above 1:1200>	☐ Yes ☐ No (Go to 7d)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
7d. Reimbursement for school nursing care placed into school's general fund	☐ Yes ☐ No (Go to 7e)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
7e. Available referral sources for overweight/obese children	☐ Yes ☐ No (Go to 7f)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Access to Quality Healthcare	Influence your BMI screening practice?	If yes, does access to quality health care services have a positive or negative impact on BMI screening practice?	What is the strength of that impact on BMI screening practice?	Relevance of Topic
7f Affordable referral sources for overweight/obese children	☐ Yes ☐ No (Go to 7g)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant
7g. Accessible referral sources for overweight/obese children	☐ Yes ☐ No (PROCEED TO PART TWO)	☐ Positive impact ☐ Negative impact	☐ 1 very strong ☐ 2 strong ☐ 3 weak ☐ 4 very weak	☐ 1 no relevance ☐ 2 some relevance ☐ 3 relevant ☐ 4 very relevant

Comments Concerning Access to Quality Healthcare:

PROCEDE TO PART TWO

Part Two

Participant Information *ID#:* _____

Thank you for continuing with this survey. In order to learn about participants, please complete the following form.

(1) Today's Date: ____________________

(2) Demographics

a.) Gender

1). ____ Male 2). ____ Female

b). Age in years

1). ____ 20-29 2). ____ 30-39 3). ____ 40-49
4). ____ 50-59 5). ____ 60-69 6). ____ 70>

c.) Race
1). ____ American Indian or Alaskan Native 2). ____ Asian
3). ____ Black or African American 4). ____ Hispanic or Latino
5). ____ Native Hawaiian or Pacific Islander 6). ____ Caucasian
7.) ____ More than one race

(3) Ohio School Nurse Association Membership history

a). Active

1). ___ Less than 12 months 2). ___ 1-5 years
3). ___ 6- 10 years 4). ___ more than 10 years

b). ___ Inactive

c). ___ No membership history

(3) Years experience as a school nurse working full-time mentary school:

a). ___ Less than 12 months
b). ___ 1-5 years
c). ___ 6-10 years
d). ___ more than 10 years

(4) A. Education

1). ___ Diploma Program 2). ___ Associate Degree Nursing 3). ___ Associate Degree Other

4). ___ Bachelors in Nursing 5). ___ Bachelors Other 6). ___ Masters in Nursing

7). ___ Masters Other 8) ___ PhD in Nursing 9) ___ PhD Other

10) ___ DNP

(4) B. Certification

1) ___ School Nurse Certification
2) ___ Other: (Specify) ______________________________

School System Information

(5) Type of school system you work in:

a). ____ Urban b). ___ Rural c). ___ Suburban

(6) Number of elementary schools you were assigned last year

a). ___ 1 b). ___ 2-3 c). ___ 4-5 d). ___ more than 5

Thank you for taking the time to complete this part of the survey. Your input is appreciated. Please return the survey and collect your CEs.