

# Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

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Attitudes and Practices of School Nurses and Pediatric Primary Care Providers  
toward Collaboration around Childhood Obesity

Boston College

William F. Connell School of Nursing

ATTITUDES AND PRACTICES OF SCHOOL NURSES AND PEDIATRIC  
PRIMARY CARE PROVIDERS TOWARD COLLABORATION AROUND  
CHILDHOOD OBESITY

a dissertation

by

MARY LAURETTE HUGHES

submitted in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

May 2017

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toward Collaboration around Childhood Obesity

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2017

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Abstract

Attitudes and practices of school nurses and pediatric primary care providers  
toward collaboration around childhood obesity

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**Background:** Addressing childhood obesity requires a multidisciplinary approach. School based BMI screening and referral provided an opportunity for school nurses (SNs) and pediatric primary care physicians to collaborate. Understanding the capacity to collaborate, as well as the barriers and benefits, help to support interprofessional care.

**Purpose:** The purpose of this investigation was to determine SNs' and pediatric physicians' attitudes toward collaboration as well as the presence of successful collaboration proposed in the Four Dimension of Collaboration Model (FDCM).

**Methods & Sample:** An exploratory, cross-sectional mixed methods study of SNs' and pediatric physicians' attitudes and practices regarding collaboration was conducted using a combination of web-based and mailed survey instruments utilizing both open and closed-ended questions. One hundred and fourteen school nurses and sixty-three pediatric physicians completed the study.

**Results:** While SNs and physicians both reported high scores on the Jefferson Scale of Attitudes toward MD-RN Collaboration (JSAC) indicating a positive attitudes toward physician – nurse collaboration; SNs scores were significantly higher than physician scores ( $55.05 \pm 3.30$  v  $52.42 \pm 5.74$ ,  $p = .001$ ). A regression model identified that physician's age, community location, and having

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a moderate percentage of obese patients within their practices were associated with positive (age) and negative (community and moderate percent obese patients) effects on attitude toward collaboration. Providers' responses indicated deficits throughout the FDCM. Dimension indicator, "mutual acquaintanceship" indicated that 37% physicians did not know any SNs. Similarly, 24% SNs reported that they did not "trust" local physicians to listen to their concerns. Qualitative analysis indicated the myriad of challenges faced by both providers. Benefits and barriers were similar for SNs and physicians; however, their experiences suggested a lack of mutual knowledge.

**Conclusions:** Collaboration around childhood obesity is a unique struggle due to its multifaceted nature. School nurses and physicians showed positive attitudes toward collaboration; however, their capacity to act was limited. School nurses and pediatric physicians recognized the value of interprofessional collaboration recommending improvements to the current system.

## **ACKNOWLEDGEMENTS**

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## **CHAPTER 1 BACKGROUND**

### **Statement of the Problem**

Childhood obesity is considered a worldwide epidemic (WHO, 2012; Wang, 2001) and to combat this problem a collaborative approach to care is required (Koplan, Liverman, & Kraak, 2005). Collaborative efforts among health care providers have been supported by major health organizations as a means to enhance the efficiency and efficacy of healthcare services (Stange, et al., 2010; Waddington & Egger, 2008). Studies of inpatient health professional collaboration have demonstrated improved patient outcomes as well as increased satisfaction with care (Schmitt, 2001; Baggs, Schmitt, Mushlin, et al, 1997; Sicotte, D'Amour, & Moreault, 2002). Collaboration between health care professionals in primary care and school settings to address child/youth health concerns has been supported by leaders in both healthcare and education (Novello, DeGraw, Kleinman, 1992; Walsh, Brabeck & Howard, 1999, Pietras, Rhodes, Meyers, & Goodman, 2012; NASN, 2011). Currently, there is a paucity of research on the collaborative practices of healthcare providers in primary, community, and school settings. Since pediatric healthcare is overwhelmingly provided in these venues, it is essential that these practices be investigated in order to facilitate improved health outcomes for children who suffer with obesity and the related consequences.

## **Background**

Collaboration has been defined by a variety of terms, including partnership, inter-professional collaboration, interdisciplinary collaboration, integrated health services (D'Amour, Ferrada-Videla, Rodriguez, Beaulieu, 2005; Erikson, Splett, Mullett, Heiman, 2006a; Frankowski, Keating, Rexroad, Delaney, McEwing, et al, 2006; Lear, 2002). Inpatient collaboration between physicians and nurses has been studied extensively (Baggs & Schmitt, 1988; Hojat et al., 2001; Adams, Bond, Arber, 1995; Ushiro, 2009); however; Schmitt (2001) in a review of collaboration research conducted in the United States (US) found few rigorous studies.

The current literature on collaboration spans a broad spectrum, much of it comprised of advocacy work that highlights improved patient outcomes associated with increased collaboration (Reeves, Lewin, Espin, & Zwarenstein, 2010). Despite the significant literature devoted to collaboration, the definition remains ambiguous. Frequently, the context of the research defines the term, for instance Baggs and Schmitt (1988) defined collaboration as “ICU nurses and physicians cooperatively working together, sharing responsibility for problem solving and decision making, to formulate and carry out plans for patient care” (p.146). Their conceptualization of collaboration is limited to a setting of close proximity which necessitates frequent rapid decision-making, unlike the dynamics required in a community setting.

Healthcare in the community setting often involves long-term relationships between providers and patients. Primary care providers face the

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challenge of guiding the health and wellbeing of their patients in an extremely limited time frame. For example, in an annual physical examination, a pediatric primary care provider (physician) seeks to address all the current and potential health care concerns facing the child/adolescent, as well as providing anticipatory guidance for their parents in 60 minutes or less. If there is more than one child in a family, multiple children may be included in the same visit. Research has begun to identify some of the challenges facing primary care providers (Wagner, Austin & von Korff, 1996). Accessing other healthcare providers to support and follow through with patient's health plans is one recommendation to improve care and ease the primary care provider's burden (Lear, 2007). School nurses (SN) are well positioned to collaborate with primary care providers about pediatric health concerns.

Significant research has been conducted on school children with medically complex health concerns (Golden & Nageswaran, 2012; Esperat, Moss, Roberts, Kerr, & Green, 1999; Carter, Cummings & Cooper, 2007). In addition, several studies have demonstrated the efficacy of a working connection between physicians and SNs regarding health issues such as diabetes and asthma (Erickson et al, 2006; Splett, Erickson, Belseth & Jensen., 2006; Bobo et al., 2011). A health dilemma which presents an ongoing challenge for all pediatric healthcare providers is childhood obesity. Building upon the improvements in managing medically complex children, as well as asthma and diabetes in the school setting, the combined efforts of SNs and physicians may serve to better address childhood obesity.



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Childhood obesity, similar to asthma, affects a significant segment of the population. Asthma care in the community has been supported through the use of asthma action plans. These plans have opened a system of communication between physicians, families, and SNs, keeping all interested parties actively involved in the child's care. Having an algorithm of care, moving from routine maintenance to increased episodic care to urgent/emergent treatment, allows all adults involved in a child's life to implement the same management strategy. The potential exists for improved communication and strategizing around children with weight issues.

Diagnosis of childhood overweight and obesity is underestimated in the primary care setting (Barlow & Expert Committee, 2007). Healthy People 2020 set a target of 54.7% primary care providers assessing BMI percentiles, up from the existing baseline of 49.7%, which indicates less than half of primary care providers are screening their patients for BMI percentiles. This lack of assessment then translates into under-treatment and management of obese patients. The American Academy of Pediatrics has established guidelines that include a 4 step approach to the treatment of childhood obesity: prevention plus, structured weight management, comprehensive multidisciplinary intervention, and tertiary care intervention (Barlow & Expert Committee, 2007). School nurse are positioned to reinforce the four step approach on a regular basis with the child and family by providing education, and strategizing goals, as well as accessing community resources.

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The National Association of School Nurses (NASN) has recognized the potential opportunity for school nurses (SNs) to collaborate with physicians regarding childhood obesity. In a Consensus Resolution, NASN (2011a, p.1) states that “school nurses and NASN collaborate with students, parents, school community, community at large, and the health care community to provide education and resources to address this public health issue and promote a culture of health in schools.” Despite support for coordinated assessment and planning, evidence of physician and SN collaboration regarding obesity is deficient.

A public response to childhood obesity has included legislation to address this problem. While some schools/districts independently began to screen students’ BMI measurements and refer to physicians for medical evaluation, Arkansas was the first state to legally mandate school based BMI screening in 2003. Arkansas surreptitiously included Act 1220 into the state legislature without public notice or financial appropriation to carry out the legislation (Thompson & Card-Higginson, 2009). Several provisions of the Act concerned establishment of committees and boards to examine the health, nutrition, physical activity of students, as well as profit-making in schools by food companies. Two provisions of the Act which were implemented directly following passage were 1) the annual collection and report of student BMI with potential health risks to families and 2) the restriction of vending machine use during the school day in elementary schools (Phillips et al., 2010). While provision # 2 might have gone unnoticed, provision # 1 became front page news. Arkansas has persisted with this screening and referral process; however, this piece of legislation continues to draw criticism

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in the public sector and was once again up for reversal in the legislature in 2007.

Rather than repeal, the Act was amended; students are screened for BMI every other year rather than every year, and students in 11<sup>th</sup> and 12<sup>th</sup> grades are excluded from screening as well as students whose parents submit written requests for exemption (Act 201 of 2007, CSH of AR, 2012).

In Massachusetts, school based BMI screening was mandated for all public schools as of September, 2009. This mandate was developed, supported, and open for public comment by the MA Department of Health, School Health Services Division. Inclusive in the mandate was the measurement of student's height and weight, with calculated BMI percentile (MA DPH, 2009). This measurement would occur annually with students in grades 1, 4, 7, and 10. Parents/guardians of students whose BMI percentile is greater than 85% would be mailed a referral notice from the SN. This referral notice has an individualized letter describing the student's measurements and standard information about healthy weight, nutrition and physical activity. Included in the referral notice is the recommendation to bring these results to the student's physician for further evaluation. The referral notice also has a section to be completed by the physician regarding their findings and treatment recommendations. This portion of the referral notice was intended to be returned to the SN for inclusion in the student's health record and follow through on recommendations. This format is consistent with all other screenings and referrals conducted by school nurses (hearing, vision, scoliosis, blood pressure, dental, and mental health). Despite the open forums concerning prior to passage of the MA mandate, a survey of MA primary

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care pediatricians open from October –December, 2009 found that 37.1% of responding physicians were unaware of the mandate prior to answering the survey (Pietras et al., 2011).

The public outcry concerning school based BMI screening prompted a response from the medical profession. Subsequent to a pediatric forum on the topic of school based BMI screening, a 2009 supplement of Pediatrics presented several articles related to school based BMI screening. In a study conducted by the CDC to ascertain the efficacy of school based BMI screening, Nihiser et al. (2009) propose that despite school-based BMI screening lack of adherence to *all* of the AAP criteria for a screening tool (lack of research, paucity of proven treatments for obesity, and inconsistent access to community resources for treatment), the screening programs may still have value. In a subsequent presentation concerning best practices for school based BMI screening, Nihiser (2010) focuses on AAP criteria specific to school based screenings: 1) disease detected by screening are associated with adverse consequences, 2) screening test is sensitive, specific, and reliable, 3) the screener is appropriately trained to perform the screening; 4) the population targeted for screening has either/or the highest prevalence or the will benefit the most from early detection; 5) the site of screening is appropriate and able to communicate results to those concerned; 6) effective treatment is available and early intervention helpful to prevent further complications; 7) those who screen positive will receive further medical follow-up and treatment if necessary; and 8) benefits of screening should outweigh the cost of conducting the screening. Nihiser et al. (2009) and Nihiser (2010) agree

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that while a majority of the AAP criteria are met for school based BMI screening, there is a lack of research regarding effective treatment, access to medical follow-up and/or treatment, and data on cost effectiveness. Despite these deficits, Nihiser (2010) does not dismiss school based BMI screening but continues to pursue further evidence.

Data from Arkansas and West Virginia included in several of the Pediatrics 2009 Supplement have demonstrated the absence of proposed adverse outcomes (Harris & Neal, 2009; Thompson & Card-Higginson, 2009). Fitzgibbons and Beech (2009) considered the importance of including culturally appropriate information and guidance when providing BMI screening and referrals to families but also support the measurement because of improvement in parental recognition of their child's weight status and the associated health risks of obesity. Johnson, Pilkington, Lamp, He, and Deeb (2009) interviewed parents of school children who had been measured for BMI and sent the information by mail. These authors found results similar to Fitzgibbons and Beech (2009), that parents supported the collection and information mailed home about their child's BMI status. It was noted that only 33.6% of parents chose to discuss this information with their child's doctor; this figure increasing to 44.0% if the child was outside the healthy weight designation. Ryan (2009) considered the legal implications of collecting and reporting school based BMI measurements, finding school based screening in alignment with the states' role in protecting public health. Ryan also indicated this is uncharted territory, where surveillance may conflict with the educational mandate to protect the rights of privacy of school

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children: Family Education and Right to Privacy Act (FERPA). As Dietz, Story and Leviton (2009) aptly surmised, “The Arkansas experience has shown clearly that BMI screening is a team effort with input from scientists, policy makers, educators, school administrators, health care providers, technology experts, parents, community leaders, and lawyers” (p.6).

While consensus was not drawn from these articles, support leaned in favor of the collection of school based BMI data, especially for surveillance purposes and more reservation for individual screening purposes. The single salient point which may be drawn from these articles is that school based BMI screening needs to be conducted with forethought of psychological, legal, and healthcare implications. In addition, research must continue on this mode of addressing a major health concern but that there is still not enough information to discount or retract this screening. Despite the controversy, school based BMI screening may provide an opportunity for collaboration between SNs and physicians in identifying and managing children with obesity.

### **Significance of the Problem**

Childhood obesity has reached epidemic proportions in the US and worldwide and current consensus is that a multidisciplinary approach is required to address this epidemic. Interprofessional collaboration has been demonstrated to be effective in providing wrap around care of patients (Sicotte et al., 2002), is currently taught in schools of medicine and nursing (Hojat et al., 2001; Suter et al., 2009), and has been acknowledged to improve patient outcomes (Reeves et

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al., 2010). The American Academy of Pediatrics Council of School Health (AAP COSH) recognizes the value of developing partnerships between pediatricians and school nurses by offering grants for working exemplars (AAP COSH, 2011).

Collaborate for a Healthy Weight, an expansive project combining the efforts of the Health Resources and Services Administration (HRSA) and the National Initiative for Children's Healthcare Quality (NICHQ) funds, supports, and educates health care professionals regarding local collaboration efforts. Recent webinars about programs that have been conducted in Ohio and Florida, demonstrate improvement in connectivity between families, physicians, and SNs through utilization of school based BMI screening to generate individualized Healthy Lifestyle Plan and Healthy Weight Plan, respectively (Smiley, 2012; Ellingstad, 2012).

Combating childhood obesity, along with its associated health and financial complications, requires a multidisciplinary approach. In order for this to occur, healthcare providers must acknowledge the value of collaboration. While hospital-based nurses have identified the value in working with physicians regarding patient care, the value perceived by physicians in working with other professionals is less evident (Baggs et al., 1997). Collaboration between professionals, who differ in their professional perspective and training has been found to be challenging (Kvarnstrom, 2008; San Martin-Rodriguez, Beaulieu, D'Amour, Ferrada-Videla, 2005). Collaboration within a hospital setting, where two professionals work in close proximity can be challenging enough; however,

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combined with physical distance and disparate organizational structures, the proposition may be perceived as insurmountable.

Researchers have developed scales to ascertain the factors involved in collaboration. The majority of this research has involved hospital based professionals and the results have demonstrated more positive attitudes toward collaboration by nurses than physicians (Hojat et al., 2003; Pevida, 2009). One study has moved beyond the hospital to a primary care office into the community. Hansson and colleagues (2010) reported that district nurses demonstrated higher total scores on collaboration than general practitioners, though the difference did not reach statistical significance. There were no age or gender differences among GPs for total positive attitude toward collaboration. The authors also found nurses had higher degree of correlation between positive job satisfaction and collaboration.

The professional's attitude toward collaboration needs to be addressed in other primary care settings. While the discussion about collaboration within hospitals continues, collaboration between nurses and primary care providers in the community setting is only beginning to emerge. Unlike any other form of collaboration which has been investigated, physicians and SNs are unique because they are professionally attached to different organizations. Community health centers may be overseen by large hospitals, for instance the Martha Elliot Health Center is managed by Children's Hospital, Boston; while the Edison School in Brighton is overseen by not only the Boston Public School District but also the MA Department of Health with very different policies, procedures, and foci. In



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MA the school based screening and referral mandate placed a connection between school nurses and primary care providers. It is unclear, however if this connection has become a bridge or a wedge. An apparent question resulting from this mandate: has school based BMI screening resulted in physicians and SNs collaborating and working together to address students' obesity concerns?

There is little research concerning collaboration in the community health setting, specifically between SNs and physicians. Studies such as Frankowski, et al. (2006) looked at an educational intervention with physicians and SNs to increase rates of children bringing Asthma Action Plans to school. The Asthma Initiative (Erickson et al., 2006b) also addressed improving rates of Asthma Action Plans as a mode of communication between SNs and physicians as part of a larger study to support the health of asthmatic school children. Bobo et al., 2012 conducted a multisite study to improve the communication between SNs and physicians regarding school children with diabetes. While these have incorporated collaboration into the premise of their studies, no studies have actually investigated the processes recognized to support collaboration: individual healthcare providers' perceptions, professional practices, and organizational structures in a US community healthcare arena.

Positive recognition of the capacity to address and assist families in managing childhood obesity is required from professionals involved in the healthcare of the school age children/adolescents. The findings of this study will serve as a model to assess the collaboration practices of physicians and SNs. Assessing the capacity to collaborate, as well as the benefits and barriers to

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collaboration, may highlight the need for strategies and mechanisms to enhance collaboration between physicians and SNs in general, and specifically related to the issue of childhood obesity.

### **Purpose of the Study**

The purpose of this study was to examine the attitude and practices of pediatric primary care providers and school nurses to collaboration in general, and specifically regarding childhood obesity. This study proposes to utilize the Four Dimensional Model of Collaboration (FDMC), a model of interprofessional collaboration developed to assess collaboration among professionals from separate agencies. Researchers have developed models for hospital based collaboration however many of the same parameters and practices are not applicable to the primary or community health settings. This model incorporates the components necessary for collective action between individual professionals as well as across organizations (D'Amour, Goulet, Labadie, San Martin-Rodriguez, Pineault, 2008) The FDMC separates the dimensions of collaboration into two major types: relational and organizational. This separation allows for the examination of collaboration on the individual level as well as the structural level. This study intends to examine the four dimensions of collaboration as perceived by SNs and physicians through the providers' attitudes and practices used in managing school children, specifically, those experiencing obesity.

## **Definition of Terms**

The terms used throughout the study include the following:

**Attitude toward Collaboration** The degree to which an individual health care professional believes that collaboration between themselves and another health care professional is within their work role as well as appropriate and desired. In this study, the Jefferson Scale of Attitudes toward Physician-Nurse Collaboration (Hojat et al., 2003) will be used to measure SNs' and physicians' attitudes toward collaboration.

**Barriers** For the purposes of this study, these are concerns posed by providers which may diminish the ability to or their attitude to collaborate. These may include, but are not limited to: lack of knowledge of other professional and their role, no established modes of collaboration, deficit of time available to collaborate, and lack of financial resources.

**Benefits** For the purposes of this study, these are positive effects which may be attributed to collaboration by providers. These may include but are not limited to: improvement in care coordination, reciprocal exchange of information, improved wellbeing of students/patients.

**BMI percentile** In the pediatric population, BMI percentile is used to screen for obesity as opposed to a specific numerical BMI value. Children's actual BMIs are plotted along the standard US growth chart from age 2 to 20 years. Four designations are drawn on the growth chart by percentile ranking. BMI in the: 0-

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5% underweight; 5-84% healthy weight; 85-94% overweight; greater than 95% obese (CDC, 2012a).

**Childhood Obesity** In the United States, childhood obesity is designated as a BMI above the 95th percentile for age and gender for children 2 – 20 years of age (Krebs et al., 2007, CDC, 2008). While excessive body fat is the diagnostic criteria for obesity, body fat content is not currently standardized for children under 12 years old in the United States. The calculation of BMI based on weight and height for age has repeatedly correlated well with body fat content in children as young as 2 years old, especially at the highest ranges of BMI (Krebs et al., 2007).

**Collaboration** The definition of collaboration continues to be disputed by many authors. In a review of the topic, D'Amour, Ferrada-Videla, Rodriguez, and Beaulieu (2005) identified five common themes which included sharing, partnership, interdependency, power and process. The first two terms depict a synergy between individuals; the following two evoke less positive meaning. As interpreted by the authors, interdependency is envisioned as a mutual need by the two professionals for the knowledge each possesses and that the knowledge is valuable to the care of the patient. Power refers to the absence of a power structure or one professional not having power over any other professional. Lastly, process is inherent in any activity and is defined as the capacity to move forward (D'Amour et al., 2005).

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While the concept of collaboration continues to be debated, for the purposes of this study the conceptualization by D'Amour et al. (2005) will be used. Collaboration is proposed by D'Amour et al. (2005) to be an interactional process between two or more professionals and or organizations, involving attributes such as shared decision making, mutual respect, understanding of the knowledge and expertise of the other professional, and reciprocity.

The operational definition for collaboration for this study is: reciprocal interaction and/or communication which takes place between two or more healthcare professionals (SNs and physicians) who have the same mutual goal, and may include shared decision making and mutual respect.

**Essential School Health Services (ESHS)** is a program of school health services unique to Massachusetts. It provides an infrastructure between school nurses, the MA Department of Health, school administration, and community providers. School districts must apply for ESHS status and fulfill criteria to maintain this status. While this status originally belonged to public schools, the newest phase of the program has incorporated private schools, whose nurses are being mentored by experienced school nurse leaders from other districts (MA DPH, 2008).

ESHS status also confers a distinct role for school nursing, supports a nurse to student ratio of one fulltime licensed school nurse to 250-500 students, and recommends that school nurses take a lead in disease management of students with chronic illnesses, such as diabetes and asthma.

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Seven components are required of school districts for ESHS status and funding. These components include:

1. **School health service program infra-structure**, includes a designated role of School Nurse Leader who is included as a school administrator, and is similar to the role of hospital nursing administrator. Additionally, this infrastructure includes a School Health Advisory Council comprised of School Nurse Leader and /or school nurse, teachers, students, parents and other interested parties. Procedures and agreements outlined by this council are determined by student health needs assessments and follow recommendations set forth by the Massachusetts Comprehensive School Health Manual.
2. **Collaboration with the comprehensive, coordinated health education program, tobacco control program, and other preventive educational efforts.**
3. **Plan for linkage of students with primary care providers, dental providers, behavioral/mental health programs (as needed), community prevention programs, and health care insurance.**
4. **Development of a management information system** to ensure that mandated data required by MA Department of Health is submitted on schedule; to allow for aggregate student health data to be available to administration as well as local boards of health and other organizations connected to child health and wellbeing.
5. **Implementation of performance improvement (continuous quality improvement) and evaluation programs.** This component allows for evaluation and improvement of the school health services program as well as determining family satisfaction with care.
6. **Services to private schools located in the applicant's community** will be identified and offered to local private schools which may have only minimal school health services.
7. **Promote collaboration/consultation/networking among school nurses** that are not a part of the ESHS system at this time to enable non-ESHS school health programs to expand and explore the development of the range of capabilities of ESHS school health program.

While the third component states explicitly the intent to collaborate with primary care providers, many of the other components for ESHS are also necessary for interprofessional collaboration as indicated in the Four Dimensional Model of

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Collaboration. As such it is important to know if school nurses who participate in the ESHS system view collaboration any differently or have experienced successful collaboration with their local physicians.

**Medical Home** The concept of a medical home emerged in the 1960s in the field of Pediatrics; however, it has only recently become a part of provider lexicon. In 2007, the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), and the American Osteopathic Association (AOA) developed a joint agreement on the seven principles of a medical home which include that each patient has a personal physician, a physician will direct the medical practice, the orientation of care is focused on the whole person, care is coordinated and/or integrated, quality and safety are paramount, access to care is improved for all, but especially for those with limited capacity, and lastly the provider will be reimbursed financially for the time and energy to make this medical home effective and – ensure that principles 1-6 are maintained (Bachrach, Isakson, Seith, Brellocks, 2011).

Medical homes have some unique attributes which have contributed to the coordination of patient care, especially chronically ill patients. A team approach to care, coordinated by the primary care physician, and involving other healthcare providers, such as nutritionists, physical therapist, and others contribute to the health of the patient. This model has been recognized as effective and efficient especially with complex care (Palfrey et al., 2004). The primary care medical home model has been accepted as a validated method of quality patient care by the approval for treatment reimbursement by insurance companies (Bachrach,

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Isakson, Seith, Brellocks, 2011). For the purposes of this study medical homes will be those that are recognized and reimbursed by insurance providers under medical home rates.

**Pediatric Patients** Pediatric patients will be designated as patients from birth to age 21. The primary age group of concern are school age children, ages 3 to 18, however there are some children who attend high school or vocational schools until age 21.

**Pediatric Primary Care Provider (physician)** A healthcare professional who works in a primary care capacity and setting, and provides care for a pediatric population. These providers' practices must be located in Massachusetts (MA). The provider must have practiced in the state of MA for at least one year in order to possibly have received a BMI screening and referral form from a SN, as this screening process has only been implemented statewide since 2009. For the purposes of this study a primary care provider will be limited to a physician (either pediatrician or family medicine) who manages the care of pediatric patients. Furthermore, the patient care load of the pediatric primary care provider must be comprised of equal to or more than 50% pediatric patients.

**School-based BMI percentile screening and referral** This procedure has been a MA state legislature mandated requirement for all MA school nurses since September, 2009. The procedure involves the collection of height and weight data on school age children and adolescents in grade 1,4,7, and 10; calculation of body mass index percentiles using obtained heights and weights, and referral for



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primary care evaluation through written notification to parents/guardians of screened children and adolescents.

**School Nurse (SN)** A licensed nurse who has participated for at least one full year in the BMI screening and referral process while serving the student population in MA schools. School nurses may have a variety of educational backgrounds. The MA Department of Elementary and Secondary Education regulates that licensed school nurses hold not only a current license as a registered nurse but they also have either a bachelor's or master's degree in nursing. Economics and availability has resulted in SNs with Registered Nurses with Associate's and Bachelor's degrees, as well as SNs with Advanced Practice Degrees (Master of Science in Nursing; Nurse Practitioners) and RNs with Master's Degrees in other fields (Praeger & Zimmerman, 2009; Tetuan & Akagi, 2004; Maughan, 2009). All nurses employed in school setting as school nurses will be included in this study.

### **Study Aim**

The aim of this study is to conduct a descriptive, correlational study of pediatric primary care providers' and school nurses' attitudes toward collaboration and provider/practice characteristics. The Jefferson Scale of Attitude toward Physician-Nurse Collaboration will be used to measure attitude toward collaboration. This study will reflect the 2009 Massachusetts statewide school mandate to screen and refer school age children and adolescents for elevated BMI percentiles to primary care providers. The providers' (pediatricians

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and family medicine physicians) and school nurses' perceptions of collaboration in general, and regarding childhood obesity will be ascertained. Pediatric primary care providers (physicians) and school nurse (SNs) provider and practice characteristics will be examined for any association with their attitude toward collaboration scores.

The Four Dimensional Model of Collaboration (D'Amour et al., 2005) will constitute the framework of the survey. The Jefferson Scale will be used to address the individual's perception of collaboration. Situation specific questions, developed by the investigator, will address the components of the Four Dimensional Model, including leadership and organizational infrastructure to support collaboration. Benefits and barriers specific to school-based BMI screening and referral will be identified by the physicians and SNs. Lastly, all healthcare providers will have the opportunity to express in their own words their perception of physician – SN collaboration as it relates to childhood obesity.

### **Research Questions**

1. How do Pediatric Primary Care Providers (physicians) and School Nurses (SNs) compare in their attitudes toward, and indicators of, collaboration.
2. What associations exist between provider characteristics (age, licensure, gender, educational level, and years in practice), practice demographics (rural or urban setting; ESHS or medical home designation; economic status of community) and Attitudes toward Collaboration scores?

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3. What are the barriers and benefits to school-based BMI screening and referral  
as a mechanism to address childhood obesity identified by MA physicians and  
SNs?

## **CHAPTER 2 LITERATURE REVIEW**

### **Theoretical Basis**

Collaboration will be viewed through the lens of the Four Dimensional Model of Collaboration developed by D'Amour, Ferrada-Videla, San Martin-Rodriguez & Beaulieu (2008).

### **Four Dimensions of Collaboration Model**

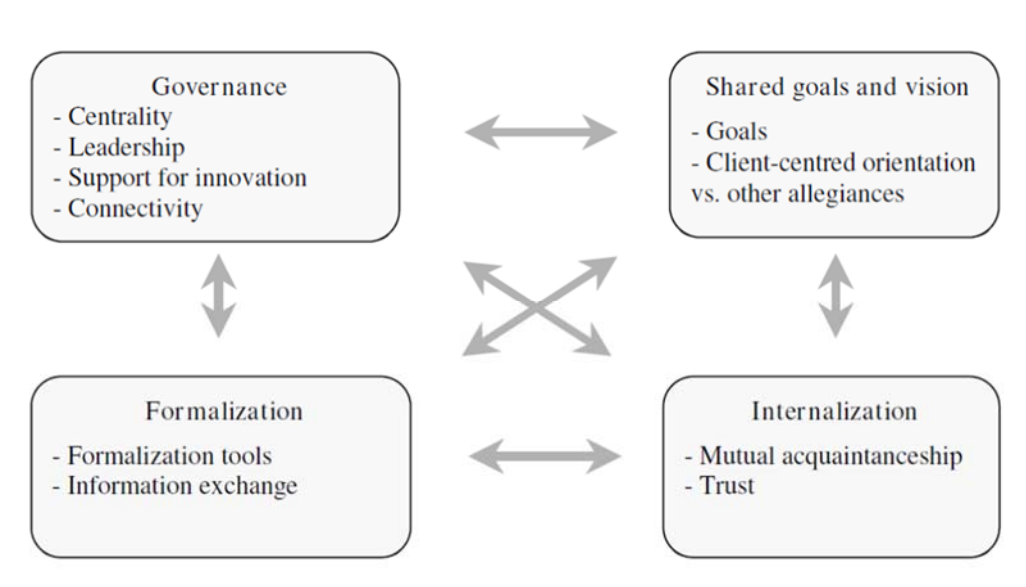
D'Amour, et al, (2008) proposed the Four Dimensional of Collaboration Model which had been conceptualized, and supported by empirical evidence obtained through interprofessional collaboration research involving primary care health care in Canada as well as Spain (Sicotte et al., 2002; D'Amour et al., 2008; San Martin-Rodriguez et al., 2005; Nuno-Solonis, Zabalegui, Arce, Martin-Rodrogez, and Polanco, 2013).

The Four Dimensional Model of Collaboration is based on the Structuration Model of Collaboration envisioned by D'Amour derived from the organizational model of collective action proposed by Crozier and Friedberg (D'Amour et al., 2008). The premise of collective action is that individuals' actions and behaviors combine to create a concerted effort. The most challenging aspect of collective action is collaboration – or the actual process of working together.

D'Amour and associates (2008) propose that there are four specific dimensions requisite to producing successful collaboration: 1) Shared goals and visions; 2) Governance; 3) Formalization; and 4) Internalization. Within these

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dimensions are ten indicators: Shared goals and visions includes: a) goals and b) client-centered orientation versus other allegiances; Governance includes: a) centrality; b) leadership; c) support for innovation; and d) connectivity; Formalization includes: a) formalization tools, and b) information exchange; lastly, Internalization includes: a) mutual acquaintanceship, and b) trust (D'Amour et al., 2008). The dimensions suggest that collaboration occurs not only on an individual level but also on an organizational level, and may additionally include a social and political level. The four dimensions provide a system of feedback and exchange. The right hand of the model included the individually and relationally oriented indicators while the left hand of the model is comprised of infrastructure indicators considered integral to successful collaboration.



**Four Dimensional Model of Collaboration (D'Amour et al., 2008)**

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The four major indicators of collaboration can be described further by their unique attributes. Simply stated, goals refer to a basic common agreement among stakeholders. When the stakeholders are healthcare providers, improving patient outcomes is typically the goal. In this study the stakeholders are school nurses and primary care providers currently involved in the mandated BMI screening and referral implementation. A goal for these two stakeholders should be active communication between these two providers regarding management of a child/youth diagnosed as obese. This active communication at a minimum is a response by physician to SN referral notice. A preferred goal would be an individualized treatment plan of action instituted by the physician and forwarded to SN with follow-up information back to physician regarding plan. For the purposes of this study however observation of the matching goals for overweight and/or obese patients as well as the commonality in use of guidelines was viewed as shared goals between the two provider types.

Client-centered orientation refers to willingness among stakeholders to focus on patient care rather than their own self-interests: professional, organizational, or individual. This is reportedly one of the most challenging aspects of collaboration as stakeholders may not always be aware of their self-interests (D'Amour et al., 2008). Actions indicate the stakeholder's orientation; this may be witnessed as inability to come to a point of agreement on goals or a lack of adherence to professional clinical guidelines.

Mutual acquaintanceship indicates that for professionals to collaborate effectively the professionals must know each other professionally and/or

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personally. Educational activities, trainings, and meetings create opportunities for each professional to understand the role of the other professionals' scope and practice.

This indicator leads directly into the next indicator: trust. One professional needs assurance that the other discipline will follow through on plans or communicate effectively in a timely manner. Trust may be built over time; with each effective instance of collaboration, more trust is built to sustain further collaboration (San Martin-Rodriguez et al., 2005).

Governance moves out of the individual level into the organizational, managerial, or administrative realm. The presence of administrative support and leaders who implement procedures to optimize collaboration, have positively influenced individuals' capacity to collaborate (San Martin-Rodriguez et al., 2005). Governance is broken down into centrality, leadership, support for innovation, and connectivity.

Centrality points to a directive or an organizational stance, indicating that collaboration is important for patient care. The directive may be disseminated by a professional organization, worksite administration, or even legislative body. The central stance must not only support the concept of collaboration but also introduce strategies to advance collaboration.

Leadership flows directly from centrality; leaders are either appointed by organizations or self-appointed proponents. These individuals assume the responsibility for moving collaboration into the field, encouraging strategizing

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and goal-setting (D'Amour et al., 2008). One proposed leadership role is that of the school physician which may be thought to represent a link between SNs and pediatric physicians.

Support for innovation is a necessary component because of the complexity of collaboration. Stakeholders must discover new ways of managing patients, learning the skills required for collaboration, and developing effective methods of communication while still maintaining existing workloads. Innovation regarding healthcare communication is still evolving, especially in the primary care and school settings, where electronic health records (EHRs) are new and not interfaced with other EHRs.

Connectivity is the opposite of working in silos. Health care providers must invest time in promoting connectivity. This may include meeting times, either by phone, in person, or group meetings. The intent of connectivity is to respond efficiently to changes in coordinated activities (D'Amour et al., 2008).

Lastly, under the dimension of Formalization, Tools reflect the policies and procedures of collaboration. Determination of each stakeholders' responsibilities in the agreed upon collective action is the basis for the formalization tools, however, this concept expands to following through on mutually agreed roles. Fulfilling expectations for all collaborative members is necessary to maintain trust. Effective information exchange allows collaborative partners to have timely flow of information by which to adjust and manage patient



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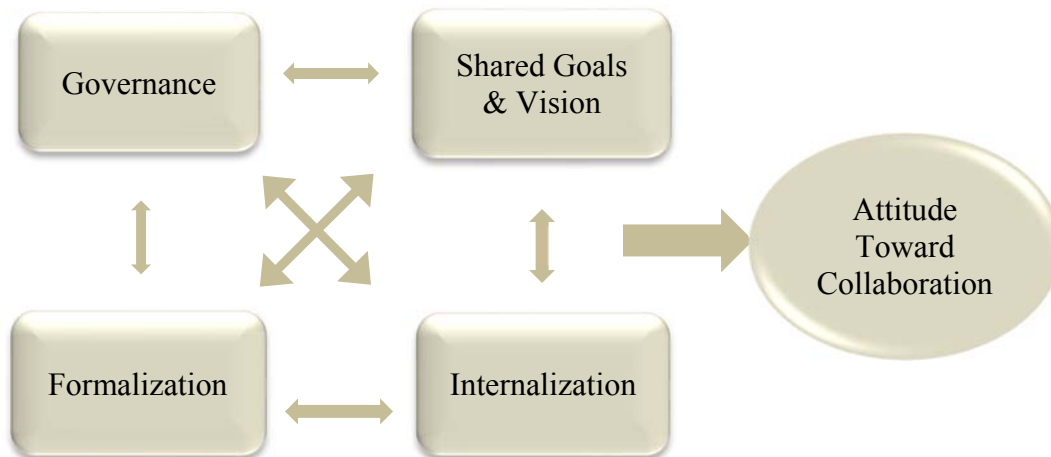
care. Tools which support information exchange may include registries or electronic medical records (D'Amour et al., 2008).

Using the ten determinants, D'Amour et al. (2008) developed a typology indicating stages of collaboration: active, developing, or potential/latent collaboration. These typologies are visual frames of reference where in the collaborative process stakeholders may currently reside. In the Active stage of collaboration, collaborating health care practice groups exhibit the presence of most of the indicators of successful collaboration at the highest level on a range of 1-3 (1 having minimal evidence of an indicator and 3 having positive evidence of an indicator). Practice groups in the developing stage exhibit some but not all of the indicators at any level. Finally, in the potential or latent stage, practice groups demonstrate minimal evidence of the successful collaboration indicators; overall lacking a majority of the indicators to sustain collaboration. Agencies, academia, and research may use this typology to gauge levels of successful collaboration.

Addressing collaboration through the theoretical lens of D'Amour's Four Dimensional Model of Collaboration acknowledges the process and components necessary for a successful collaborative effort. The Jefferson Scale of Attitudes toward Collaboration will be used to assess the outcome variable. The organizational indicators underpinning collaboration specific to school based BMI screening and referral in the state of MA will be assessed through questionnaire about the infrastructures in place, within schools, districts, primary care settings, departments of health.

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Viewing collaboration through the lens of D'Amour, will explore the proposition that the presence or absence of these determinants will affect a provider's attitude toward collaboration. If an individual does not believe that collaboration is effective, can this be linked with lack of the components D'Amour and others see as necessary for collaboration? Conversely, if an individual has a positive attitude toward collaboration, is this supported in their work environment by the presence of successful determinants? Thus, the proposed model follows:



This model envisions attitude toward collaboration's relationship to the determinants of successful collaboration, though unclear whether a healthcare provider's attitude is a predictor or a result of the dimensions. In addition, it is unknown if individual dimensions may have stronger or weaker associations with attitude toward collaboration.

## **Review of literature**

### **Collaboration**

Collaboration takes a variety of forms in the research literature: partnership, interprofessional collaboration, interdisciplinary collaboration, integrated health services, inter-setting collaborative team (Antonelli, Stille, Freeman, 2005; Fewster-Thuente & Velsor-Friedrich, 2008; Frankowski et al., 2006; Kvarnstrom, 2008; Smith et al., 2009; Shumann, Delack, Wyatt, 2012 ). A frequently stated goal of collaboration in healthcare is improved patient outcomes enhanced by the mutual work of two or more health providers (IOM, 2011; Reeves et al., 2010; Dachiro-Marino, Jordan-Marsh, Traiger, & Saulo, 2001; Baggs & Schmitt, 1997; Hojat et al., 1999). The two healthcare professionals often cited in research literature pertaining to collaboration are physicians and nurses in the hospital setting (Fewster-Thuente & Velsor-Friedrich, 2008; Hojat et al., 2003; Taylor, 2009; Zwarenstein & Bryant, 2000). Healthcare collaboration in the primary care setting has frequently included social work (Baldwin, 2007) and more recently has added nutrition, pharmacy, mental health specialists, and medical laboratories finding evidence of weak or ineffective collaboration (Reeves et al., 2008, Baldwin, 2014). Braithwaite, et al. (2013) surveyed a variety of healthcare providers about interprofessional collaboration following 4 years of intervention learning experiences. While the findings did not reach significance, the trend indicated physicians were least positive about interprofessional collaboration while administrative staff and nurses had the most positive responses (2014).

Collaboration in healthcare has been espoused for over 50 years in various sectors of healthcare. Debate about the intent of collaboration has centered on its effects: patient care, patient safety, cost containment, integration of a wide variety of healthcare

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providers (Schmitt, 2001; Zwarenstein & Bryant, 2000). While the debate continues, research has been conducted to ascertain not only the results of collaboration but also the components of successful collaboration, the most effective interventions to support collaboration (Zwarenstein, Goldman & Reeves, 2009), and the pre-eminent model of collaboration.

DeWitt Baldwin (2007), a renowned proponent of interprofessional collaboration in the U. S., lists primary care as one of the initial practice settings which supported interprofessional collaboration. At the time, the terminology differed and was referred to as “primary care interdisciplinary teams” (p. 24) which were comprised of physicians, social workers, and nurses. These teams were put into action by Martin Cherkasky of Montefiore Hospital, New York serving patients in community and home settings. Subsequently, neighborhood health centers emerged in the 1960s, as bastions of primary care interdisciplinary teams. Comprehensive care was the credo of these team-driven organizations. While federal funding directed toward the War on Poverty sustained these programs for several years, loss of funding prompted the dissolution of much team effort. The introduction of managed care has prompted the re-interest in team practices, as insurance companies look for strategies to reduce healthcare costs. The Affordable Care Act includes the provision of funding for development of community health teams to improve patient care from the primary care setting (Abrams, Nuzum, Mika and Lawlor, 2011).

Schmitt (2001) reviewed the complex history of research surrounding collaboration in the United States (US). As the author states “research is needed that provides knowledge not only about whether collaboration generally makes a difference, but, also, more specifically what mix of collaborators for what purposes makes a differences for what outcomes and at what costs” ( p.47). Schmitt’s review acknowledges

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the deficit in research surrounding collaboration starting from conceptualization to actual research. Research about collaboration often lacks the delineation of collaboration: were the researchers examining the global concept of collaboration, the specific components, the structural elements, the process of collaboration, collaboration as an outcome, or rather collaboration as an intermediate outcome with the final outcome being somewhat more concrete, such as a care plan? This lack of delineation makes it challenging to assess the findings of a single study but even more challenging to compare studies.

Some developed countries with socialized medicine have legislated interprofessional collaboration (Reeves et al., 2010). Australia implemented national government policies such as *Enhanced Primary Care and Medication* to support interprofessional teamwork in the community setting (McNair, 2001 in Reeves et al., 2010). In 1995 the government of Brazil began the *Family Health Program* to address interprofessional work as a method to improve primary health care throughout the country (Brazilian Government of Ministry, 2004 in Reeves et al., 2010). Spain has developed policies to support a strategy to “Tackle the Challenge of Chronicity in the Basque Country” (Nuno-Solinis, et al., 2013). Both Canada and the United Kingdom have a history of interprofessional collaboration shored up philosophically, legislatively, and financially by Health Canada and National Health Services, respectively (Reeves et al., 2010). It has been found that compared to other countries the US falls far behind other developed countries in financially supporting team based care (Abrams, et al., 2011).

The vast amount of research on collaboration with primary care conducted in the US originated within hospitals, and focused on geriatrics (Schmitt, 2001; Reeves et al., 2010). The Veteran’s Administration Hospitals and Outpatient Clinics Research on elder care has permitted the study of patients followed from inside the hospital to their homes. The work of teams around geriatric patients has demonstrated the positive results of

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collaboration between providers inside the hospital, those in clinics, and in patients' homes (Schmitt, 2001). Length of inpatient stays was reduced for patients in collaborative care reducing overall cost of care. While initial cost of establishing teams and conducting assessments on patients was higher for patients in the collaborative team approach, the long term costs were less, as patient care was introduced and managed at an earlier stage of disease processes. Care of elderly patients from hospital to the community has demonstrated effective collaboration through the Transitional Care Model which has not only shown positive patient outcomes but also cost savings by reducing the rate of re-admissions (Naylor, 2011)

An exemplar of interprofessional collaboration within the US was that of magnet hospital programs. This nursing developed program of collaboration between nurses and other hospital based professionals while initially driven by a nursing shortage, has resulted in nursing retention and improved job satisfaction among nurses. Other benefits from this initiative have been improved patient outcomes and increase in collaboration and teamwork (Kramer & Schmalenberg, 1988 in Reeves et al., 2010). Subsequently, improvements in collaboration generated a healthy work environment where individuals perform at their best level (Blake, 2013).

Quality improvement often encouraged collaboration through teamwork in sites which formed natural teams, such as emergency and operating rooms. *Transformation of the Operating Room* (Sorbero, Farley, Mattke & Lovejoy, 2009) utilized methods such as checklists and time-outs to reduce errors in the operating room. This concept of quality improvement carried through to primary care where the *Patient Centered Medical Home Model*, introduced by the American Academy of Pediatrics, was recommended to improve patient outcomes via strategies such as communication, teamwork, and innovation (AAP, 2009). While the motivation for patient centered medical homes was

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focused on the patient, much of the work to implement this coordination of care is still in the learning phase. A recent study by Burnet, Gunter, Nocon, Gao, Jin, Fairchild, and Chin examined the perspective of pediatric primary care staff and their patients' parents regarding PCMH qualities and satisfaction (2014). No correlation was found between total PCMH total quality scores and parent/patient experience, however the sub-score for quality improvement showed a positive relationship to patient experience, while case management showed a negatively inverse relationship to patient experience. Some forward movement is occurring; however room for improvement still exists.

While much of the research regarding collaboration is derived from the hospital setting, research about primary care settings has begun to emerge. D'Amour and colleagues (2008) pursued evidence of collaboration between practitioners from the hospital setting to their counterparts in primary care practices or clinics. Four diverse areas regions of the province of Quebec, Canada were engaged for a case study of their programs involving perinatal care: from in hospital birth to newborn assessments in the home. In this descriptive case study analysis, managers and healthcare professionals from each of the four regional areas were interviewed about the thoughts concerning collaboration. In addition, written policies, procedures, agreements regarding collaboration among these agencies were analyzed for scope and detail. D'Amour et al. (2008) found wide variation in the structure and function of the linked organizations; resulting in differing levels of successful collaboration.

Weinstein (2006) proposed improvement in the care of children through the collaboration between school-based health centers (SBHCs) and primary care practices. Weinstein, a physician, describes a unique population of providers, the majority of whom are nurse practitioners, who work in school based clinics. As Weinstein reports, SBHC nurse practitioners have the potential to collaborate with physicians on a number of

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student health concerns, including childhood obesity. A review of Michigan SBHCs, overweight and obese students participating in a Healthsmart program run by the health centers demonstrated a 63% self-reported improvement in healthier food choices, 50% had increased their physical activity outside the program, and 42% had either maintained or decreased their BMI. Weinstein suggest that primary care offices are often limited on time and follow-up while schools have protracted access to children. Working together, primary care and SBHCs can support one another in effecting change in the child.

Opportunities to support collaboration between primary care and other healthcare members have become more vital as the number of primary care providers and their availability diminishes. Henize, Beck, Klein, Adams and Kahn (2015) indicate the effects poverty, lack of education and domestic violence may have on a child's health and wellbeing combined as the 'social determinants of health.' Pediatric primary care providers cannot be expected to resolve or manage all of these contributory factors however they need to communicate and work with the resources and other healthcare providers in their communities. The ACA has begun to support primary care practice; improving communication with existing healthcare resources in the community is a means to support not only the physician but also the patient.

### **Evidence of successful collaboration between school nurses and physicians**

Despite a paucity of information about school nurses' and primary care providers' perceptions on collaboration, there has been evidence in the research literature of occurrences of collaboration between these two providers (Delago et al., 2001; Frankowski et al., 2006; Sorof, Turner, Franco, & Portman, 2004; Heuer & Williams, 2015). Collaboration has not specifically been defined by any of these researchers; however, the generic concept of parties working toward a mutual goal is implicit in these case studies.



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Delago et al. (2001) described a study in which school nurses across a district were recruited to assist primary care clinics in reading the results of tuberculin skin tests planted in the primary care office. The original intent of the study was to discern which option patients would most prefer for tuberculin skin reading: return to clinic or go to school nurse. The majority of parents designated their choice to return to the clinic for final reading within 48-72 hours however, this follow through did not occur in a majority of cases. The authors reported that most follow-up clinic appointments were not kept and students risked having to repeat the skin test which would necessitate at least two more primary care visits. The researchers in the midst of the study removed the blinding of the school nurses to improve the efficacy of the skin test reading. It became clear to the researchers that informing school nurses of students who had not returned for skin readings allowed the nurses to track the students and complete the test. Ultimately, the success rate of the TB reading was much higher than the clinic had previously experienced, demonstrating the benefits to student health and cost containment realized as a result of collaboration between primary care and school nursing.

One preeminent exemplar of collaboration between SNs and physicians has occurred through Asthma Action Plans (AAPs). The introduction of the Asthma Action Plan (AAP) opened a mode of information and communication between physicians and SNs to improve the management of childhood asthma. Multiple studies, including those described below, have investigated Asthma Action Plans (AAPs), because of its potential to provide wrap-around care for the child including reinforcement of treatment strategies; discussion about child's level of self-management and coping, as well as education of child and family. In conducting these studies, researchers have not only supported the use of this plan of care management tool but also improved communication and coordination between physicians and SNs.

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Talyor-Fishwick et al., (2004) conducted focus groups with physicians, SNs and parents using a needs assessment format to discover the barriers to effective childhood asthma care. Findings included lack of education about asthma for all three groups. SNs also identified the lack of consistent care among low-income asthmatic children, reporting that low income families often used the emergency department rather than a medical home. In addition, lack of asthma care plans hindered the treatment of children, noting that only 13% of asthmatic students had an AAP at school. In a three year randomized control trial, among SNs who had AAPs on file at school, Levy, Heffner, Stewart, and Beeman (2006) found: 1) active nurse case management improves the care of children with asthma and 2) communication with a medical provider by a nurse is essential to overall care of the child and family.

Borgmeyer, Jamerson, Gyr, Westhus and Glynn (2005) interviewed SNs, many of whom reported Asthma Action Plans improved their confidence and ability to manage the individual child's asthma symptoms and treatment. However, these same SNs estimated that only 28% of their students had AAPs at school. In addition, SNs reported a lack of communication with physicians regarding asthma, occurring "rarely/not at all" for 41% of participants, and "occasionally" for 47.8% of participants.

A ten year study, the Healthy Learner Asthma Initiative, included partnership with physicians; specifically to increase the use, transmission, and follow through of AAPs. As a result of this study, SNs devised two communication tools with parents and physicians, respectively: Asthma/breathing Problem Visit Notification and Asthma Medical Request/referral (Erickson et al., 2006a; Erickson et al., 2006b). Splett et al. (2006) details the multiple outcomes of the initiative, one pertinent to this discussion; SNs' improvement in communication with health care providers regarding asthma

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concerns with approximately half of these interactions resulting in either medication changes or updated AAPs.

In a separate intervention study, Frankowski et al. (2006) found that AAPs were underutilized by healthcare providers. Education of community professionals, SNs, physicians, respiratory therapists, school principals and others demonstrated a significant improvement of AAP implementation and distribution to schools.

Asthma is only one of the many health issues facing school age children and youth. In a related study Sorof et al., (2004) compared the findings of a hypertensive screening in the school setting versus those from physician offices who had been referred to a specialist for hypertension. The authors found consistency in children referred from both the physician office and the school setting. While this study does not directly reflect collaboration, instead it indicates the capacity to collaborate by demonstrating that school based screenings maybe as accurate as those in a physician office. Findings also suggest that school based screenings may free up some of the valuable time of the physician.

Heuer & Williams describe a primary care provider – school nurse intervention regarding a significant child behavioral/mental health issue – Attention Deficit Hyperactivity Disorder. Similar to the Asthma Action Plan, the ADHD Identification and Management in Schools (AIMS) framework improved communication between school and primary care providers. Individualized Educational Plans and/or 504 plans become the mode of management transmission with the SN as the liaison between school and primary care. Primary care Nurse Practitioners support the SN by informing parents of their role and establishing communication parameters between SNs and PNPs. This model demonstrated active collaboration between primary care pediatric nurse practitioners and SNs to the direct benefit of children with ADHD.

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Lastly, an article by Foley, Dunbar, and Clancy describe two “collaborative initiatives” between school nurse and physicians: the Pioneer Valley Asthma Coalition in Springfield (PVACS) and the Pilot project to Address Disparities for Students with Diabetes (PPADD). While the latter project was coordinated with endocrinology specialists, the former project centered on the connection between school nurses and primary care providers. Similar to the previous asthma studies, the PVACS established a connection between school nurses via an Asthma Champion and primary care providers. One positive outcome from the collaboration was a coordinated plan for the care of child experiencing an acute asthma episode. While the child would initially receive treatment in school from the nurse, they would then be evaluated by their provider in that same day, ultimately reducing the incidence of emergency room visits by asthmatic children for this catchment area (2014).

All of these exemplars substantiate collaboration between school nurses and primary care providers as a means to potentiate outcomes for students. The processes and mechanisms need to be addressed by those directly involved –physicians and SNs, so that any tools or systems created will be valuable to those using them. Several of the strategies employed to improve the acceptance of AAPs and connectivity between SNs and physicians are consistent with the Four Dimensional Model of Collaboration. Some of the same efforts used to advance AAPs in schools may be utilized to address management of childhood obesity. Studies on AAPs indicate the process to achieve successful collaboration needs to be deliberate, organized, and theoretically based. Individual participants’ attitudes toward a collaborative venture regarding childhood obesity as well as organizational structures to support them must be assessed. Organizations and governing bodies have begun to

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implement strategies to attempt to stem the tide of childhood obesity. While infrastructure is integral to successful collaboration, if the other components are lacking, the collaboration may still struggle. This may be the current state of affairs with childhood obesity in Massachusetts (MA).

In the present scenario of widespread childhood obesity in the United States, many regions have surged ahead to put legislation and mandates in place attempting to reverse the trend. Massachusetts is one state which implemented school based BMI screening and referral in response to childhood obesity. The implications of this mandate on the practices of both SNs and pediatric physicians, their response to the legislation as well as their perception about their ability to establish a collective effort regarding childhood obesity will be considered in this study.

### **Demographics and Practice Characteristics Associated with Collaboration**

Collaboration is vocally supported by many organizations and yet health care providers continue to struggle with making effective collaboration occur. The necessary components for collaboration may reside in several areas both internal and external to the healthcare provider. First and foremost may be perceptions of the individual provider themselves; for instance, if a provider sees no value in collaborating then likely they will not spend time attempting to collaborate. Do characteristics such as gender or culture influence one's perception of the need for collaboration? A handful of studies explored provider and practice characteristics which may influence a provider's capacity to collaborate.

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Pietras et al. (2012) surveyed MA pediatricians regarding school based BMI screening in the final three months of inaugural year of the mandate. Thirty-seven percent of pediatricians were unaware of the mandate, regardless of practice location (rural, urban, suburban) or type (solo, group or healthcare clinic/hospital) despite the mandate involved sending referrals for primary care follow-up. Approximately 80% of pediatricians surveyed disagreed or strongly disagreed that mandated school based BMI screening would improve communication with schools. In addition, only 23% of pediatricians responded that school based BMI screening would help with patient care. Despite this negative view, there was a significant association between urban practice location and positive opinion of school based BMI screening. In addition, of the four options (solo, group, hospital, or community health center) only pediatricians working in community health centers demonstrated a significantly positive association with a positive view of school based BMI screening. Multivariate analysis found urban practice location to be an independent correlate of positive view of school based BMI screening. Race/ethnicity of patients was so closely aligned with practice location that it could not be adjusted for in the multivariate analysis. The researchers did not separate socioeconomic status of patients for this study. Despite some of the mixed evidence regarding school based BMI screening by MA pediatricians, the authors still encourage pursuit of collaboration between schools and physicians to address obesity. Part of the mixed receptivity to school based BMI screening may involve the lack of infrastructure in implementing this mandate. Another

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consideration might be that pediatricians are unfamiliar with ways in which to improve communication with schools.

Studies utilizing the Jefferson Scale to measure collaboration between physicians and nurses have conflicting findings regarding the role gender plays in attitude toward collaboration. Hojat et al. (2003) in a comparative study of four culturally diverse countries – U.S., Israel, Italy, and Mexico, gender of the respondents was not correlated with attitude toward collaboration. This is confirmed in a study by Taylor (2009) comparing the attitude toward collaboration among anesthesiologists and nurse anesthetists. Despite the higher prevalence of females among nurse anesthetists, there was no association between gender and attitude toward collaboration. Juxtaposed to these findings are two studies which report gender differences toward collaboration. Pevida (2009), in a study among graduating nursing and medical students who had participated in an educational component regarding interprofessional collaboration, found that women, whether nurse or physician, scored higher on the Jefferson Scale. Ward et al. (2008) reached this same conclusion when surveying undergraduate nursing students; coincident with increasing levels of education, women had more positive attitude toward collaboration than men. Level of experience and/or years of experience also demonstrated more positive attitude toward collaboration in a study of Chinese pediatric workers (pediatricians, pediatric nurses, medical and nursing interns, as well as nursing and medical students) (Wang, Liu, Li, Li, 2015).

## **Childhood overweight/obesity**

### ***Definition***

A public access medical dictionary reports obesity to be “the state of being well above one's normal weight” (Medicinenet, 2009). Reilly (2007) expands the previous definition to “a disorder in which the body fat content has become so high that it creates health problems or an increased risk of health problems.” In 2005 the Institute of Medicine asserted: “Individuals 2 to 18 years of age with BMI [Body Mass Index] of greater than or equal to 30 kg/m<sup>2</sup> or greater than or equal to the 95th percentile for age and gender (whichever is smaller) should be considered obese” (Krebs et al., 2007, p. S194). Other terms associated with childhood obesity may include overweight, which is currently designated as BMI between the 85th to 94th percentile for age and gender, as well as the newer designation “extreme obesity” which is measured as  $\geq 120\%$  of the 95<sup>th</sup> percentile (Pan, Blanck, Sherry, Dalenius, Grummer-Strawn, 2012).

Many debates and inconsistency have taken place among the medical community in use of the terms obese and overweight with children, instead designating the categories “overweight” and “at risk for overweight” respectively, creating even more confusion among parents and interested parties about the true level of concern. In 2007 the executive committee of the American Academy of Pediatrics, following the 2005 recommendation of the Institute of Medicine (IOM), designated obesity to be applied to children who's BMI is greater than 95%, and overweight BMI is 85-94% (Krebs et al., 2007). Prior to 2007, the literature may refer to childhood overweight and at risk for overweight. One may



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still find current articles published which contain the language “overweight and at risk for overweight” in place of obese and overweight respectively. Inconsistent language to discussion of health concerns has only perpetuated the sense among families that their child’s weight status is not a problem. A recent study demonstrated that families felt there was no weight problem because the primary care provider did not bring up the issue in an office visit (Perrin, Skinner, & Steiner, 2012). Conversely, the language used by providers to address a child’s weight was labeled inappropriate by many families and did not help the family seek a solution (Puhl, Peterson, & Luedicke, 2011).

### ***Prevalence***

The National Health and Nutrition Examination Survey (NHANES) for 2011-12 collected by the Centers for Disease Control and Prevention (CDC) indicates 16.9% of children ages 2-19 are obese (>95% for Body Mass Index for age) compared with 5% in 1976-80. Obesity prevalence broken down by age groups: 8.4% of children ages 2-5 years (down from highest level of 12.1 in 2009-2010), 17.7% of children ages 6-11 years (down from highest level of 19.6% in 2007-2008) and 20.5% of children 12-19 years (highest level on record) (CDC, 2012). The escalation of childhood obesity continued despite recommendations such as the goals of Healthy People 2010 which had anticipated returning childhood obesity rates to 1980 baseline figures of 5%. The current Healthy People 2020 has adjusted expectations of reduction in childhood obesity by establishing a target decrease of 10% in each age category (Healthy People 2020, 2010). In the Progress Updates for the Healthy People 2020 Goals, the has been

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little to no detectable change in obesity rates among children 2-19 years of age from 16.1% in baseline years 2005-08 to 16.9% in most recent years 2009-2012 (Healthy People 2020).

In addition, this health epidemic is drawn along economic and cultural lines with significantly greater incidence and prevalence of overweight and obesity among the lower socioeconomic segments of the population (Bethel et al., 2009). As reported by the CDC, while the overall rate of obesity among all boys 12 -19 years old nationwide in 2011-2012 was 20.3% the breakdown by ethnicity paints a different picture. In this same year 12.6% of white males, 19.1% of black, non-Hispanic males, 24.1% Hispanic males, 24.2% of Mexican American males and the newest subgroup, 11.5% non-Hispanic Asian males are obese. Different distributions are seen with 12-19 year old females however ethnic disparities persist: overall obesity is 20.7% with 15.6% white females, 20.5% non-Hispanic black females, 20.6% Hispanic females, 17.4% Mexican American girls and 5.6% non-Hispanic Asian females (not considered reliable results) classified as obese (Fryar, Carroll and Ogden, 2014). Even more striking is the disparity along socioeconomic lines. Data collected by the Pediatric Nutrition Surveillance System since 1998 specifically among low income preschool age children from 30 states, demonstrated the prevalence of obesity and extreme obesity had risen to a high of 15.36% and 2.22% in 2004 to the most recent levels of 14.94% and 2.07% (Pan, Blanck, Sherry, Dalenius and Grummer-Strawn, 2012). While the prevalence rates are in decline, they have not returned to the 1998 levels of 13.05% and 1.75%. Within this preschool age group the ethnic disparities emerge

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once again; American Indian/Alaska Native and Hispanic having the highest prevalence rates across all years. MA SNs demonstrated this economic disparity by comparing prevalence across socioeconomically diverse towns in the initial year of the school based BMI screening (Smith, 2010). Subsequent school based BMI screening demonstrated this same low income: high rate of obesity correlation when comparing Percent overweight and obese children versus median household income (MA DPH, 2012)

### ***Consequences of overweight/obesity***

Consequences of overweight and obesity may be categorized into immediate concerns followed by projected, long term risks. In the immediate time for a young obese child, some of the consequences are musculoskeletal problems ranging from joint pain to impaired mobility (Reilly, 2007), increased incidence of pulmonary dysfunction including asthma and sleep apnea (Must & Strauss, 1999), decreased school attendance subsequent to above health issues (Daniels, Queen, & Schumacher, 2007), weight based victimization through a variety of sources (Klaczynski, 2007; Puhl, Peterson & Luedicke, 2011) and lastly, decreased health related quality of life reported by obese children as young as 5 years old (Schwimmer, Burwinkle & Varni, 2003; Williams, Wake, Hesketh, Maher & Waters, 2005). Long term consequences include: increased risk of lifetime obesity and subsequent incidence of premature mortality, cardiovascular problems, Type 2 Diabetes, hypertension, non-alcoholic fatty liver disease (NAFLD) and cancer (Reilly, 2007, Must & Strauss, 1999, Loomba & Sanyal, 2013; Krebs et al., 2007). A recent study using secondary data from the

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Wisconsin Longitudinal Study, found that among women designated as obese based on their high school photos were found to be not only obese but also have more depressive symptoms at their current age of 65 years. These findings point to the increased likelihood of depression projected into the future of obese youth (Martinson & Vasunilashorn, 2016). Narayan, Boyle, Thompson, Sorenson, & Williamson (2003) have proposed that of the children born in the US in 2000, one out of every three will develop Diabetes Mellitus in the course of their lives. Researchers reported in 2001 only 3% of newly diagnosed Diabetes Mellitus (DM) among adolescents were Type 2 however, a decade later 45% of new DM cases among adolescents are classified as Type 2 (D'Adamo & Caprio, 2011).

### ***Prevention and Early Identification Recommendations***

As Dietz reported, studies have indicated that almost 80% of obese adolescents will continue into adulthood as obese (2004). Freedman et al. concur as well as finding that obese children had increased likelihood of becoming obese adults (2005). Many recommendations have been made to improve the identification and treatment of childhood obesity. Koplan, Liverman and Kraak (2005), representing the Committee on Prevention of Obesity in Children and Youth, delineated both short and long term actions to address this epidemic. Immediate actions are required to introduce solutions because randomized control trials will be too far into the future to wait for their findings. Instead, the committee suggests using the evidence collected to date and utilize methods that have found to be effective. One such action includes: "Conduct annual assessments of each student's weight, height, and gender- and age-specific BMI

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percentile and make this information available to parents” (p.14) while primary care providers are urged to measure BMI and discuss healthy lifestyles with child visits. Koplan, Liverman and Kraak (2005) as well as Homer (2009) propose that obesity needs to be addressed not only on a public health level but also on the individual level. Thus, health care providers at all levels and in all venues must become active participants in this discourse.

Federal as well as state and local policies have attempted to bring childhood obesity prevention measures to the forefront. Following implementation of child obesity prevention programs, Green, Sim & Breiner as editors of the Committee on Evaluating Progress of Obesity Prevention Efforts Food and Nutrition Board presented an extensive proposal to standardize measuring the efficacy of obesity prevention efforts (2013). A brief history of legislative measures, on the federal, state, and local levels to address childhood obesity in the school systems will be reviewed. In addition, some of the consequences of these political actions will be considered.

### **Policies regarding child health**

#### ***Federal Level***

Lawmakers, supported by the recommendations of public health organizations, nurses, physicians, dietitians, and others, enacted Section 204 of the Child Nutrition and WIC Reauthorization Act of 2004. Section 204 is commonly referred to as the (Local) School Wellness Policy mandate represents an extension of the existing legislature concerning food subsidies to children and

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families. Addressing childhood obesity through the schools was an opportunity to create an environment which may support nutrition and physical activity in a measurable, consistent manner. Implied by the name, Local School Wellness Policy, the federal government wanted to leave the specifics of the policy in the hands of local stakeholders. Thus state and local school boards and districts would have more control over their policy and less government restrictions (Agron, Berends, Ellis, & Gonzalez, 2010). The primary stipulation on this policy was that schools which received federal funds for National School Breakfast and Lunch Programs were mandated to have a wellness policy in place by the start of school year, 2006.

Two major complications of this policy requirement became obvious in the following months and continue to be problematic. This legislature was dispensed to schools and districts with no funding to organize and carry out this policy but rather carried the notification that funds for free and reduced lunch payments would be restricted should schools fail to develop a wellness policy. Sample policies were provided on various websites, with some states creating model policies for their schools which ran the gamut from suggestions to requirements (Chriqui et al., 2010; Belansky et al., 2009; Seo, 2009). The implication of this mandate was that the schools that served the highest needs populations (children receiving free and reduced lunch due to poverty), could potentially be denied the continued funding for the breakfast and lunch programs if they failed to develop and institute a Wellness Policy; diverting time, energy, and resources away from already strained budgets. A comprehensive review of

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scientific and grey literature regarding environmental interventions to address childhood obesity, including school wellness policies, conducted by Brennan, Brownson and Orleans (2014) found wide variation in approach and evaluation. Many gaps existed even in the studies indicating the need for consistency in evaluation and sustainability in order to fully assess both policies and interventions. Despite the variability, school wellness policies addressing nutrition and physical activity still demonstrated promising and second tier efficacy respectively (2014).

The second complication arose from the lack of regulatory power of the United States Department of Agriculture (USDA). While the USDA does not regulate the sale of sodas and snacks, it did establish what nutrients should be provided in school breakfasts and lunches. The USDA's authority to regulate food in schools has wrestled back and forth with state and local school boards for the past 4 decades with the most recent restoration occurring on December 13, 2010 with the Healthy, Hunger Free Kids Act of 2010 (USDA, 2010). The USDA, with the support of the Farm Bill, will provide more fruits, vegetables, whole grains, and non- and low-fat milk to schools. Yet the USDA continues to have little regulatory power. As of 2007 only 20% of meals served by schools adhered to the fat content regulations set for school meals by the USDA. There is also a discrepancy between meals offered by school food services and those that are bought by students. While 85% of school meals in the School Breakfast and Lunch Programs met the requirements for protein, vitamins, and minerals, only 71% of actual meals served met these same requirements (Gordon, Crepinsek,

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Nogales, & Condon, 2007), indicating that students are not purchasing the full nutritional meal offered them – instead students are purchasing competitive foods which are not only less nutritious. A final note, school food services are often financially self-sustaining which may drive the sale of non-nutritive food in schools as this is a source of income for school systems with little to no funding.

### *State mandated measures*

Preceding the federal mandate for the School Wellness Policy, some states had begun to implement measures which they felt would begin to address the problem of childhood obesity. Many measures have passed through state legislatures in recent years in response to the significant rise in childhood obesity. Boehmer, Brownson, Haire-Joshu, and Dreisinger (2007) found 717 bills and 134 resolutions focused on childhood obesity prevention efforts were introduced across all 50 states in the years 2003-2005 alone. While several of these bills applied to the environment, many more pertained to schools. Of these, one hundred twenty-three bills were enacted while seventy-one resolutions were passed. BMI reporting was a segment of both bills and resolutions; 37 bills were introduced with only 8 bills enacted and 2 resolutions offered with 1 passed. Bills regarding BMI reporting fell into two categories: requiring *or* allowing schools to collect BMI data and report information in conjunction with childhood obesity intervention efforts (2007).

West Virginia was one of the states included in the legislation articles by Boehmer et al., (2007) with the inclusion of a bill in 2005 to address the childhood obesity epidemic through the school setting, part of the West Virginia



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Healthy Lifestyles Act. A joint effort between investigators from West Virginia University, West Virginia Rural Health Education Partnership, and the Coronary Artery Risk Detection in Appalachian Communities (CARDIAC) worked with, and in schools across West Virginia to carry out the mandates and conduct epidemiologic studies. One of the mandates included collection of BMI in the school setting. Ultimately there were two routes of BMI collection: by the school nurses or by CARDIAC researchers, thus needing active consent by parents for their child(ren). Less than 40% of eligible students were given consent by parents to have their BMI measured by the CARDIAC team. The second mode was via height and weight measurement as part of the Fitnessgram testing which was mandated by the legislation and was conducted by the Physical Education teacher. As part of the schools' curriculum, active consent is not required instead parents have to actively seek to remove their child from the class. Ultimately, this division led to aggregate data rather than individual data reporting.

A much more controversial state legislation involving school based BMI collection was that of Arkansas. Unlike West Virginia which started their program through research based avenues and involved only families which gave their approval, Arkansas included Act 1220 into the state legislature (Thompson & Card-Higginson, 2009). As mentioned previously, the annual collection and report of student BMI with potential health risks to families was the focus of subsequent repeal attempts (Phillips et al., 2010). Despite various debates, Arkansas has continued with this screening and referral process.

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Twenty states currently have BMI or body composition measurements assessed in school as required by state law. Of these twenty states, only nine states are mandated to notify parents of the BMI or body composition of their child (Linchey & Madsen, 2011).

### ***Local government/district/school level mandates***

As mentioned previously, school wellness policies have been implemented due to the federal mandate, resulting in a broad spectrum of policies. These policies reflect school boards and administrations but may be influenced by community advocates or school health committees, if they exist. Some schools and district have instituted policies such as increased physical education time, offering recess, restriction on the use of food &/or recess as an incentive or disincentive. While the individual policies are too lengthy and individualized to go into here, one unique example is: Boston Public Schools are mandated to have water available to students, having removed all sodas and high calorie beverages out of the schools as of 2004. The ban has been noted to decrease the amount of sugar sweetened beverage consumption by Boston high school students from 2004 to 2006 (Cradock et al., 2011)

### **Providers**

Without communication or collaboration between various health care providers, many resources may remain unavailable to the child and family. First, however, collaboration between SNs and physicians, both on the individual as well as structural levels must be assessed. The MA school based BMI screening and referral mandate may have been implemented quickly and lacked certain

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professional organizational supports creating an obstacle rather than opportunity (Pietras et al., 2011). The following section will present what research, if any, exists around the various providers' (MDs and SNs) perceptions around collaboration around childhood obesity and/or school based BMI screening.

### ***School Nurses***

The school nurse professional organization, National Association of School Nurses, supports the measurement, reporting, and referral of students' BMI (NASN, 2013a). The support of school administration in making this process happen in schools is still being addressed. School nurses express the need for more support in educating children and families about healthy nutrition and physical activity (Moyers, Bugle, & Jackson, 2005, Steele, Wu, Jensen, Pankey, Davis & Aylward, 2011, Jain & Langwith, 2013). School nurses have been involved in the dilemma created by school-based BMI percentile measurement and reporting (Hendershot, Telljohann, Price, Dake, & Mosca, 2008; Stalter, Chaudry, & Polivka, 2011; Flaherty, 2013). While school nurses have measured height and weight for many years, it is only recently that the move toward referring students for follow-up by primary care providers has come to the forefront (Barta, Neighbors, Mann and Lloyd, 2011). Volkman & Hillemeier (2008) when interviewing school nurses about their role found "effectiveness in communicating" with local physicians to be a key element in the efficacy of caring for a child, as well as directly related to the nurses' personal satisfaction with school health services.

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School nurses have been instrumental in collecting data on school children. One recent Quality Improvement project conducted in western MA uncovered health disparities among school children with Type 1 Diabetes Mellitus. Children in low socioeconomic towns were infrequently prescribed insulin pumps while children in middle and high socioeconomic towns were overwhelmingly prescribed insulin pumps to manage their diabetes (DPH Priority Needs Report, 2012). The same physician/groups were seeing children from all three economic sectors however management of diabetes was inconsistent. In order to begin to address this disparity, and educate pediatricians about the role of school nurses, a collaborative meeting was held in which local pediatricians were introduced to local school nurses as well as educated about school health (Foley, Dunbar Clancy, 2014).

### ***Physicians***

Some of the same barriers reported by physicians regarding asthma care (Cabana, Chaffin, Jarlsberg, Thyne, & Clark, 2008) are echoed regarding obesity care (Story et al., 2002; Klein, et al., 2010): unfamiliarity with national guidelines, low self-efficacy regarding counseling, anticipated poor patient compliance. He, Piche, Clarson, Callagan and Harris (2010) found similar results when surveying Canadian family physicians and community pediatricians concerning practices, perceived barriers and needs to effectively manage childhood obesity. Providers indicated their perceived success rate to be very low which contributed to other barriers such as lack of time and limited training.

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Physicians express difficulty in addressing weight issues with families for a variety of reasons; because the family must already know, takes too much time, only addressing those who are significantly obese (Barlow, Richert, & Baker, 2006), little to no responsiveness from families, and reflection of own personal weight status (Jain, 2010). Trowbridge, Sofka, Holt, & Barlow (2002) surveyed pediatricians, PNP's, and dieticians concerning personal and practice characteristics as part of a larger needs assessment around management of childhood obesity. While all professionals with fewer years in practice tended to have lower BMIs, dieticians were most likely to follow adult daily dietary guidelines of fruit and vegetable consumption. All groups, including those with healthy BMIs, reported less activity than recommended for adult physical activity of 30 minutes 5 days per week (2002). Only supposition can be drawn from this data, however as indicated by Jain (2010), personal characteristics of the professional may influence their practice.

Despite this bleak view of childhood obesity assessment and treatment, opportunities exist which may support the not only the child but also the provider. As far back as 1998, Hacker and Wessel (1998) proposed that SNs and School Based Health Center (SBHCs) could optimize the care of children in the school setting. While SBHCs are primary care settings located within school buildings, they were not there to usurp the role of the SN or the primary care practitioner, but rather to expand it and allow for integrated services. Hacker and Wessel (1998) strongly support collaboration between these two health care providers to benefit school age children and youth. Several interventional studies have

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demonstrated the effectiveness of collaborative care regarding children with a variety of health needs: ADHD, diabetes, behavioral health issues and special health needs (Heuer & Williams, 2016; Finch, et al., 2015; Foley, Dunbar & Clancy, 2014; Nageswaran, et al., 2013).

### **Professional Guidelines, Models of Practice, and Communication Tools**

D'Amour et al., (2008) delineated 10 indicators of interprofessional collaboration. Several of these indicators reflect on the attributes of the individual provider and their professional practice. Use of professional guidelines may exemplify the individual allegiances of professionals. The infrastructure D'Amour et al., (2008) poses as necessary for successful collaboration may be typified as participation in the patient centered medical home model and/or Essential School Health Services. Care plans or other formal methods of communication used by SNs and physicians may be viewed as Formalization Tools described by D'Amour et al., (2008), as a concrete system to enhance collaboration.

Guidelines have been developed to support the physician in assessment, diagnosis, and treatment of childhood overweight and obesity (Barlow & Expert Committee, 2007; Daniels, 2009; Klein et al., 2010; Kirschenbaum & Gierut, 2013). Additionally, research has found that if children and adolescents are identified to the primary care provider in the obese range, there has been demonstrated use of further diagnostic tools to assess other potential health risks often associated with increased adiposity (Dilley, Martin, Sullivan, Seshardi, & Binns, 2007). Nurse practitioners have developed their own guidelines for addressing and managing childhood overweight and obesity: Healthy Eating and

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Activity Together (NAPNAP, 2006). NASN initially developed the School Nurse Childhood Obesity Prevention and Education which was subsequently been revised to School nurse Child Obesity Toolkit (SCOT), an educational training for school nurses to improve their knowledge about obesity prevention and management as well as their skills in communicating with primary care clinicians (Kaufman & Schantz, 2007).

Patient centered medical homes (PCMH) are a health care delivery model which supports the integration and co-ordination of the care of patients. An essential principle of this model is stated by the American Academy of Pediatrics to be: “the medical home works with a coordinated team, provides ongoing primary care, and facilitates access to and coordinates with, a broad range of specialty, ancillary and related community services” (AAP, 2012, p.1). A select number of practices in MA have been selected by the Executive Office of Health and Human Services to receive training in patient centered medical home model (EOHHS, 2010). Forty-six primary care sites in MA were chosen of the original 84 which submitted for training which will span over two years. Ultimately, all primary care practices in MA were to be designated as PCMHs by 2015 (2010).

Essential School Health Services Programs, also developed by the Executive Office of Health and Human Services has supported school health programs for more than 20 years (EOHHS, 2013). In order to be considered an ESHS school, the district must apply, which includes having the support of administration not only within the school district but also the MA Department of Health. Each school must also have the support of principals, special education

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directors, technology directors and athletic directors. An integral goal of ESHS status is linkage to community primary care providers. There are 400 school districts in MA (MA DESE, 2012), 72 districts reported as belonging to the ESHS program decreased from the maximum involvement of 109 districts in 2001 (Leibowitz, 2013).

Formalization as envisioned by D'Amour et al. (2004) may include tools or method physicians and SNs may currently use to communicate with one another. Development of communication tools by school nurses specific to diabetes and asthma care have been noted previously (Bobo et al., 2009; Erickson et al., 2006b; Splett et al., 2006). While unique to United Kingdom, communication systems such as “asthma registers” improved the treatment and management of students with asthma (Proctor, Brooks, Wilson, Crouchman, and Kendall, 2015) Other tools such as Individual Health Care Plans (IHPs) for children with special health needs and ADD are implemented by school nurses (Heller & Tumin, 2004; Heuer & Williams, 2016). The Body Mass Index Screening and Referrals are a system used by several school and districts to identify and refer under/overweight and obese children for medical evaluation (Jain & Langwith, 2012) Practices involved in the ESHS and PCMH initiative are expected to have distinct procedures in place (EOHHS, 2010; EOHHS, 2012).

### **Response rates of health care providers to surveys**

A meta-analysis by Shih and Fan (2008) of thirty-nine studies conducted within the past ten year compared responses rates to mail and web-based surveys. The researchers established criteria for “web-based surveys” as email or mail



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notification of a link to a site containing the survey. A mail survey is the standard paper survey sent and returned via the postal service. Across all the population types examined, only one group showed higher response rate to web-based surveys than paper survey: college population. In direct contrast, professionals, particularly physicians, demonstrated the lowest association with web-based over paper surveys indicating physicians are more likely to respond to a paper survey than a web-based survey shih and Fan, 2008; McLeod, Klabunde, Willis & Stark, 2013). The only other variable achieving statistical significance in accounting for the variance in response rates was follow-up reminders. At least one reminder increased the rate of response for both paper as well as web-based surveys. Of note, the response rate of paper with one reminder increased rates more than 14% more than web-based with one reminder.

An acceptable response rate to mail surveys is approximately 65% (Polit & Beck, 2008); however, this is not necessarily consistent with health care professional. In a review of 321 mail survey studies, among physicians the response rates are typically lower than the general population, 54% versus 68% respectively (Asch, Jedziewski, & Christakis, 1997). Additionally, response rates to surveys among healthcare professionals, as well as the general population, has been declining in the past decade McLeod, Klabunde, Willis & Stark, 2013; Cho, Johnson, Van Geest, 2013). In a review of 117 large scale surveys (greater than 500 respondents), McLeod, Klabunde, Willis and Stark (2013) found a trend of declining response rates from a high of 61% of studies reporting greater than 60% response rate in 1998-2000 to a low of 36% among studies published between

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2005-2008. In a randomized study of 4 physician types (family medicine, internal medicine, obstetrics/gynecology, and pediatrics), follow-up mailings produced an overall greater effect on response rate than any incentive, particularly among pediatricians (Delnevo, Abatemarco, & Steinberg, 2004). Beebe, Locke, Barnes, Davern and Anderson (2007) conducted a study comparing the mixing of web and mail survey on physician response rates. The researcher found that mailed surveys followed by a web survey demonstrated better response rates than Web survey followed by mail survey. However, a significant limitation of this study was that it was conducted in a single hospital which had recently converted to electronic medical records system and the survey was used to assess this electronic system.

Typical response rates to web-based surveys are less than that of mail surveys by as much as 11% (Shih & Fan, 2008, Sheehan, 2006; Cho, Johnson & Van Geest, 2013). Therefore, response rates of 40 to 60% may be expected. Due to this lower rate, the web surveys will be left open beyond the timing of the mailed surveys to optimize the number of responses since the Web-based surveys will be sent to nurses. A review has shown that nurses also have a participation rate similar to that of physicians, typically fewer than 60% (Cook, Dickinson & Eccles, 2009). In a web-based survey of MA pediatricians, a response rate of 40% was achieved (Pietras et al., 2011), while a web-based survey of MA SNs elicited a 28.5% response rate (Pulcini, DeSisto, McIntyre, & Dowd, 2011).

### **Scales to Measure Collaboration between Physician and Nurses**

Dougherty and Larson (2005) uncovered 325 articles pertaining to nurse-physician collaboration between the years 1990 and 2004. Dougherty and Larson

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applied rigorous criteria to these tools: 1) have been used in actual research of nurse-physician collaboration, 2) the psychometric properties of the instrument be reported in a peer reviewed journal, and 3) the psychometric article must be cited in a minimum of 2 articles in the ISI Web of Science Index Expanded (<http://wos.mimas.ac.uk>). Five instruments met these criteria: Collaborative Practices Scale (CPS) by Weiss & Davis (1985); Collaboration and Satisfaction with Care Decisions (CSACD) by Baggs (1994); Jefferson Scale of Attitudes toward Physician and Nurse Collaboration by Hojat et al. (1999); Collaboration with Medical Staff of the Nurses Opinion Questionnaire (CMSS of NOQ) by Adams, Bond, and Arber (1999); ICU RN-MD Questionnaire by Shortell, Rousseau, Gillies, Devers, and Simons (1991). In addition to the above instruments, a recently developed scale by Ushiro (2009) *Nurse-Physician Collaboration Scale* – was included in the review of tools.

All of the above mentioned scales were reviewed in terms of: authors' professional lens, salient components of the scale including theoretical framework, settings for the initial and subsequent use of the scale, validity and reliability parameters, and extent of research utilizing the scale since original development. Key components of a scale deemed essential included: use in the United States, applicability to a community based setting, nurse and physician responders, view of collaboration grounded in a broad perspective rather than single patient events. In addition, the respondents may be from different agencies or organization and thus not tied to a single organizational structure, and lastly, the scale included the roles of both providers in collaboration (Table 1).

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All of the above scales have been tested primarily in the acute, hospital-based setting. The top three setting from which scales to measure collaboration have arisen are: intensive care units (both adult and pediatric), operating and emergency rooms. Inherent in all these setting is the pace of care and the requirement for fast, clear decisions which may require frequent updates. While the pace of information exchange may be slower, the need for effective, streamlined care of the patient should not diminish outside the four walls of the hospital.

The care versus cure concept appears in more than one scale (Hojat et al, 2003; Ushiro, 2009). While nurses are considered the care providers and physicians the cure providers, the rationale for including this terminology in the scales is recognition of the distinct roles of physicians and nurses. Acknowledgement of the separate but equal contributions by each professional is essential to collaboration (Corser, 1998; Petri, 2010).

Jefferson Scale of Attitudes toward Physician and Nurse Collaboration by Hojat et al. (1999) was initially developed within the auspices of the Thomas Jefferson University School of Medicine in an attempt to ascertain the need for and efficacy of education of medical students and nursing students about both professional roles and relationships. In the initial study, the authors surveyed first year medical students and upper class and graduate level nursing students who had participated in a curriculum involving co-education of both professionals as well as instruction in role relationships. In a subsequent study with practicing physicians and nurses, the authors had hypothesized in hierarchical social cultures

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such as Mexico and Italy, physicians would dominate patient care and collaboration would be negatively perceived. Parallel patterns would follow in equalized social environments, exemplified by the US and Israel; physicians and nurses would contribute equally to patient care and collaboration would be perceived positively by nurses and physicians (Hojat et al., 2003). While some of their hypotheses held: physicians did often dominate care in Italy and Mexico, however, in the US and Israel, collaboration was not as positively viewed as anticipated.

The Jefferson Scale attempts to gauge the level to which a healthcare professional may perceive the importance of collaborating, e.g. enough to include in the education of nurses and doctors, distinguish differences in the role of the nurse and doctor, contribution of each professional to the care of a patient. This scale which had originally been entitled “Measuring Attitudes toward Nurses” (Hojat & Herman, 1985) has gone through several iterations and a focus change, including title to the current Jefferson Scale of Physician-Nurse Collaboration, each time editing the number of statements included in the scale. The final iteration contains 15 statements on a 4 point Likert scale of strongly agree to strongly disagree. The factors determined to be reflected by the scale are: “shared education and collaborative relationships, caring as opposed to curing, nurse’s autonomy, and physician’s authority” (p. 208). While the iteration in the 1999 article contains 20 statements, factor analysis eliminated 5 statements which did not have any factor loadings for the four factor designated (Hojat et al., 1999,

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p.214), leaving 15 statements. The statements numbered 1-15 are divided into factors as follows:

Factor I: Shared education and collaborative relationships: statements 1, 3, 4, 5, 6, 14, 15

Factor II: Caring versus curing: statements 2, 7, 9

Factor III: Nurse's autonomy: 11, 12, 13

Factor IV: Physicians' authority: 8, 10

In examining the breakdown of the factors, a higher score in Factor I indicates a more positive attitude toward inter-professional collaboration and inter-professional education. A higher score in Factor II is interpreted to be a more positive view of the unique role of nursing in patient care, including the psychosocial and educational components. A higher score in Factor III translates to a greater receptivity toward nurses' active involvement in patient care- and policy-making decisions. Finally, a higher score in Factor IV indicates a negative perception of the dominance of physicians in the care of patients. In the breakdown of the four factors, three of the four are considered highly reliable while the fourth factor, owing that factor is comprised of only two statements results in weaker reliability.

In the current version (Hojat et al., 1999), a higher total score indicates more positive attitude toward collaboration. The reliability for this study was  $\alpha = .84$  for medical students and  $.85$  for nursing students indicative of good reliability of this survey. The effect size estimate of the mean difference was moderate at  $.66$ . In a more recent study (Hojat et al., 2003) the authors compared

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practicing physicians and nurses from four unique cultures; US, Israel, Mexico and Italy which demonstrated a reduced but still adequate reliability coefficients of .70 for Israeli and Italian nurses and .76 for Italian physicians at the lowest end of the spectrum. In the US the reliability coefficients were .74 for nurses and .78 for physicians indicating more than adequate reliability. Another recent study conducted in Turkey by Yildirim et al. (2005), the researchers found Cronbach's alpha at .71 and .75 which reflects adequate reliability.

Yildirim et al. (2005) study includes practicing physicians and nurses as well as medical students. The nurses' educational level spans a spectrum broader than that encountered in the US, ranging from Master's level to high school level nurses. While Turkey's high school level nurse may be the equivalent of certified nurse assistants in the US, the inclusion of this group into the study may reflect an entirely different view of nursing role and decision-making capacity. This study utilized a unique statistical testing to classify participants. Using total score of 48 as indicative of positive attitude toward collaboration, the researchers predicted an odds ratio for all groups based on demographics (education, professional degree, secondary versus tertiary hospital). In doing so the researchers found more positive attitude toward collaboration 1.39 times more among nurses than physicians and 1.57 times more likely among residents than experienced physicians.

Taylor (2009) chose the Jefferson Scale of Attitude toward collaboration in observing the connection between anesthesiologists (as physician) and nurse anesthetists (as nurses). The Cronbach's alpha for total scores for the entire

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respondent group was .894, however there was a decided discrepancy between anesthesiologist with  $\alpha = .844$  and nurse anesthetists with an  $\alpha = .654$ . Despite this finding, the research did reveal some interesting findings; gender was not correlated with positive attitude toward collaboration, reinforcing the past findings by Hojat et al. (2003) across multiple cultures. There was a significant difference in attitude toward collaboration between disciplines, with nurse anesthetists being more positive toward collaboration than anesthesiologists; a finding which concurs with the prior patterns of nurses being more receptive to collaboration than physicians. Of note, as nurse anesthetists increased years in working with anesthesiologists, attitude toward collaboration decreased.

The Jefferson Scale possesses some limitations for use in the community setting. Hansson, Arvemo, Marklund, Gedda, & Mattson (2010) surveyed primary care providers (General Practitioner) and district nurses in a single region of Sweden using the Jefferson Scale. District Nurse in Sweden may be considered comparable to visiting nurses in the United States; district nurses may work in a clinic setting but also conduct visits to patients at home. Two questions are hospital-setting specific: #9 “Physicians and nurses should contribute to decisions regarding the hospital discharge of patients” and #11 “Nurses should be involved in making policy decisions concerning the hospital support services on which their work depends.” Hansson et al. (2010) attempted to mitigate this issue by rephrasing one statement to a unique timeframe. Hansson et al. (2010) agreed that the content of the question had not changed with the timeframe reference modification and thus maintained the validity and reliability of the original scale.



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Using this same rationale, primary care providers as well as school nurses, are required at a minimum to have worked in a hospital setting during their education. Hansson et al. (2010) found district nurses were significantly more positive about collaboration than general practitioners, consistent with other findings using the Jefferson scale (Gillen, 2007; Hojat et al., 2003; Pevida, 2009; Yildirim et al., 2005; Taylor, 2009; Alcusky, Ferrari, Rossi, Liu & Maio, 2015; Wang, Liu, Li, & Li, 2015).

In summary, the Jefferson Scale of Attitudes toward Physician- Nurse Collaboration possessed multiple unique attributes: 1) the scale was tested and validated in several countries including the United States; 2) tested outside the realm of the hospital setting; 3) included both nurse and physician viewpoints as respondents to the scale; 4) the respondents were not from a single organization (i.e. hospital or unit); 5) the scale moved beyond the focus of a single patient event to an overall generalized view or perceptions of collaboration; 6) focused on the mutual aspects of the individual providers' roles in collaboration without the influence of management style/environmental structure/work culture (see Table 1).

A new tool developed by Nuno-Solinis, Zabdegui, Arce, Rodriguez, and Polanco (2013) describe the development of a questionnaire based on the Four Dimensions of Collaboration Model (FDCM) which was intended to monitor as well as evaluate the status of specific interprofessional collaborative efforts in the Basque Country, Spain. The instrument is generalized and was intended to determine the perceptions of healthcare providers who should be working together

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but function at separate levels of care and in different organizations. The article describes the construction of the tool while results from the use of the instrument are in the future.

### **Summary**

Last, we are left with the gap in the literature: school nurses and primary care providers' attitudes to collaboration around overweight and/or obese children.

The attitudes and perceptions of providers regarding collaboration must be assessed before going forward. While majority of the healthcare research focuses on nurse-physician collaboration in the hospital setting, only a handful of studies have broached this topic with community health. The perception of, and intent to collaborate between school nurses (SNs) and Pediatric Primary Care Providers (physicians) has not been delineated. This study seeks to determine school nurses and primary care providers' attitudes toward collaboration in general, and specifically regarding childhood obesity with school based BMI percentile referral as a point of initiation. While pediatricians in MA have recently been surveyed about their perception to the mandated school-based BMI screening and referral (Pietras et al., 2011), there are other physicians who also provide medical care to children and adolescents (family medicine physicians) who have not been surveyed or interviewed. In order to maximize the potential of professionals involved in the care of a child with obesity and their family, the attitudes toward

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collaboration, practice consistent with collaboration, and the perceived benefits or barriers toward collaboration need to be ascertained.

This information may lay the groundwork for strategies or tools to enhance collaboration. This study seeks to determine the practice/provider demographics which may be most closely associated with a positive attitude toward collaboration. In determining the optimal provider/practice demographics, strategies or mechanisms may be introduced with improved receptivity. Opening the door for physicians and SNs identify barriers and benefits to collaboration may allow for their concerns to be acknowledged and addressed.

## **CHAPTER 3 METHODS**

### **Study design**

The current study used a descriptive, cross sectional, comparative design with both quantitative and qualitative analyses. The survey was conducted in mixed-mode format (both postal and electronic survey) with physicians and SNs.

### **Sample**

Inclusion criteria included physicians, who were able to read and write English and practiced at least one year in MA (and therefore had the possibility of having received a BMI referral from a school nurse). School nurses who were able to read and write English, currently practice in a school setting in Massachusetts, and have participated in school based BMI screening and referral for at least one year were eligible for inclusion.

### ***Size and Setting***

The exploratory nature of this research combined with no stated hypotheses negated a power analysis. The number of participants was estimated based on the number of variables proposed in the study. According to Nunnally and Bernstein in Munro (2005), there should be approximately 10 participants for each variable to be included in the regression equation. For the purposes of this study the following variables were considered for sample size: Jefferson Scale of Attitude toward RN-MD Collaboration, provider and practice demographics separately, and the ten constructs of the FDMC model. Thus for each group, SNs and physicians, a minimum of 130 participants were required to include all

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possible variables. A probability sample was derived from the target population of approximately 4000 physicians which included approximately 2560 pediatricians and 1565 family physicians who identified themselves as pediatric primary care providers in MA (MA Registration Board of Medicine, 2011). Approximately 1500 SNs from Massachusetts (MA) were approached for participation.

The response rates for this study, (12.5% for physicians and 9.2% for SNs) were much lower than the anticipated responses rates of approximately 40% for physicians and 45% for SNs. The estimated response rates were based on the findings from previous studies (Davern & Anderson, 2007; Delnevo, Abatemarco & Steinberg, 2004; Pietras et al., 2011; Polit & Beck, 2008; Pulcini, DeSisto, McIntyre, & Dowd, 2011; Shih & Fan, 2008). Due to the low number of participants the number of independent variables included in the regression analysis was selected on the basis of theoretical and statistical significance.

### ***Recruitment and Participation Flow***

Permission was granted by the MA Department of Health, School Health Services to send the current survey materials to MA School Nurses (SNs). Utilizing a listserv of MA SNs, an electronic invitation, consent to participate in the survey, link to survey, follow-up reminders, and a letter of appreciation were transmitted to SNs statewide. The researcher did not have direct access to the listserv but submitted all electronic documents and links to the DPH School Health Services director who then included these email correspondences to SNs on the listserv. This listserv of SNs provides a means of weekly correspondence from the DPH who oversee School Health Services in MA. It was anticipated that

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SNs would be able to view the study materials as the listserv is a primary mode of information transmission for SNs.

Electronic surveys have some unique advantages as well as deficits.

According to Dilman et al. (2009) electronic surveys do not require a separate invitation email but rather may launch directly from an invitation with a link to the survey. Over an 8 week time frame, SNs were sent the initial invitation (with link) to participate followed by two email reminders to participate, and an email Thank You, which served as a final reminder for those who had not yet participated. Each reminder was separated by 1 week. A request was placed by the researcher to add a third reminder as the second reminder was not as visible in the nursing e-newsletter as the previous notifications had been. Though the reminders and majority of responses were completed within one month, the survey was left open until the final day of school, giving SNs opportunity to complete the survey at a later time. No surveys were started or completed beyond the 4<sup>th</sup> week. Using standards for electronic surveys: "If response from one email reminder to the next diminishes, no other reminders are necessary. If responses increase from one reminder to the next, another reminder should be sent" (Dilman et al., 2009). After the third reminder, the number of responses to the survey diminished from the previous reminder. A final electronic communication was a Thank You which included a final request to those SNs who had not completed a survey. Additional detail regarding this process is presented in Figure 1.

One hundred thirty eight SNs began the survey yielding a response rate of 9.2%; however, 114 completed the survey demonstrating a completion rate of

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83%. The majority of SN respondents who started the survey completed more than 90% of the questions. Those who did not complete the survey responded to less than 30% of the questions. Seventeen percent of all respondents (n=24) stopped responding before or within the demographics sections. Among those who did respond to the demographics sections, their responses were compared using descriptive statistics and logistic regression to determine any significant difference between completers and non-completers. The descriptive statistical results are listed in Table 6. Imputation was not feasible with this subgroup thus non-completers were removed from further analysis.

Physicians were not only recruited differently than SNs but were also sent a paper copy of the survey as opposed to an electronic version. A compact disc file of all physicians registered to practice in MA was purchased through the MA Board of Registration in Medicine by the investigator. This file contained physicians' names, business addresses, specialties and other information. Due to the large number of physicians and the projected cost of multiple mailings to more than four thousand physicians, a random sample (N = 576) of two primary care specialties (pediatrics and family medicine) was chosen for recruitment. The number of recruited participants was based on previous studies and response rates for physicians (Pietras et al., 2011; Polit & Beck, 2008; Shih & Fan, 2008) as well as the anticipated statistical analyses. A random selection of 288 providers for each specialty was created using the random list functionality in Microsoft Excel software. Initial mailings were sent to the random sample of physicians inviting them to participate in the upcoming survey. The survey, which paralleled the SN

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survey, was distributed over an 8 week time frame by postal mailing. A pre-notification letter including consent information and a link to an online version of the survey was mailed 4 days prior to the first mailing of the survey. Initial mailing of the survey was followed by a reminder postcard mailed one week later. A duplicate survey was mailed to non-responders one week after the reminder postcard. A final notification letter was mailed to non-responders one week following the duplicate survey mailing. The physician participation algorithm is seen in Figure 2.

A total of 72 physicians responded to the survey yielding a response rate of 12.5%, 51 (71%) of the respondents were pediatricians and the remaining 21 physician (29%) respondents were family medicine physicians. A total of 38 surveys (19 pediatricians and 19 family medicine practitioners) were returned to the investigator marked "Return to Sender" with no forwarding address. These surveys were not included in the initial count of 72 respondents. Among providers who did return the survey, 7 declined to participate for the following reasons: retired (n=2), had not practiced primary care in several years or not currently in primary care (n=5), leaving 65 respondents. Two physicians completed the survey twice, with only single surveys from each used in data entry. The vast majority of physician respondents (96%) completed paper surveys and 4% (three respondents) used the electronic survey. Only 2 of the 3 online survey respondents completed at least 80% of the survey. The third respondent completed less than 10% of the survey leaving a large gap in information which could not be imputed, thus the survey was excluded from analysis. The physician



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respondents counted for data analysis was 63. The completion rate for all paper surveys was 87%. Any statistical comparison between physicians who completed the survey and those who did not complete the survey was impossible because the incomplete physician surveys only contained the reason(s) the provider could not complete survey (e.g. “retired”, “no longer in primary care”) and no other information.

### **Informed Consent, Confidentiality and Human Subjects**

Consent of the participant was requested prior to starting the survey (See Appendix D) and verified by their completion of a checkbox indicating the participant understood the informed consent. Participants were notified that they may decline participation without any repercussion and may decide not to complete the survey at any time. They were notified that no identifying information would be collected. The benefits to this study would be the knowledge gained on attitudes towards and health care practice affected by collaboration between SNs and physicians; no risks were anticipated for this study.

All information from the surveys has been kept confidential. No identifying information of physicians, SNs, clinical practice sites or schools was requested. In addition, mailed surveys were issued a code to avoid multiple mailings to providers who may have completed the survey. All data were de-identified prior to analysis. All collected information was kept on the investigator’s secure computer with single external hard drive devoted to storing data from the study.

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All paper files were kept in a locked cabinet in the researcher's office in a secure location available to only the investigator.

Institutional Review Board (IRB) approval was obtained by the investigator from Boston College IRB prior to any data collection.

### **Procedures and Data Collection**

Data were collected via an encrypted Qualtrics web-based survey site and a mailed paper survey. SNs' responses were collected electronically, while physicians received paper surveys distributed through the United States Postal Service, with an option to respond via the Qualtrics site.

Research literature has debated the use of incentives to increase response rates. Dillman et al. (2009) concluded that small gifts of appreciation are best included with the initial questionnaire. The general population responds to small token incentives, as small as \$2.00. Increasing the amount of the incentive to \$5.00 or \$10.00 does not increase the response rate substantially enough to incur the added cost. Interestingly, physicians as a group appear to only respond to much higher levels of incentive - \$25.00 to \$100.00. Similar to paper surveys, small financial incentives improve response rates for electronic surveys; however, these incentives are difficult to orchestrate effectively via email without loss of anonymity. Due to the questionable improvement in response rate and challenge in maintaining confidentiality, financial incentives were not used in this study.

## Measures

The survey instrument included a series of closed and open ended questions.

Closed ended questions regarding provider characteristics and practice demographics were used to define the sample and are outlined below. Additional information regarding these questions and coding of responses can be found in Appendices A & B and Tables 2 & 3, respectively.

- a) Age of provider
- b) Gender of provider
- c) Specialty (physicians only) or highest educational level (SNs only)
- d) Years in practice
- e) Practice/school type: group/hospital/solo/community health center (physicians only) or elementary/full/middle & high school (SNs only)
- f) Community type: urban/suburban/rural
- g) Total number of students (SNs only) or Daily average number of patients (physicians only)
- h) Socioeconomics of students/patients
- i) Designation as medical home (physicians only) or essential school health services (ESHS) program (SNs only)
- j) Closed ended questions which reflected various components of the Four Dimensions of Collaboration Model (e. g. communication between providers; knowledge of other professional; number of school based referrals made to physicians including; responses to referrals; practice guidelines followed by physicians and SNs).

An adapted version of Jefferson Scale of Attitude toward Physician-Nurse Collaboration (Hansson et al., 2010) was included in the survey instrument. The total JCAS score indicated the participant's attitude toward collaboration and was the dependent variable in this investigation.

The Jefferson Scale of Attitudes toward Physician-Nurse Collaboration Scale, as adapted by Hansson et al. (2010), was used with permission of the author of the original scale (see Appendix C). Respondents answered a 15 item 4-

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point Likert scale from strongly agree to strongly disagree. Total possible scores ranged from 15 to 60, a higher score indicating more positive attitude toward nurse-physician collaboration. Hansson et al. (2010) slightly modified the Jefferson Scale by changing the frame of a single statement. The original scale distributed to hospital based nurses and physicians posed statement # 9:

“Physicians and nurses should contribute to decisions regarding the hospital discharge of patients” (p.80.) This statement was not directly applicable to the nurses and physicians in the community setting. Hansson et al. (2010) rephrased the question as follows: *“Imagine yourself in a situation where you work at a hospital, what do you then think about the following statement; Physicians and nurses should contribute to decisions regarding hospital discharge of patients”* (p.80). As all physicians and nurses have had to spend a significant portion of their education in a hospital setting, the basic tenet of the statement remains the same.

The Jefferson Scale of Attitudes toward Physician-Nurse Collaboration has undergone a total of three iterations prior to arriving at its current version. The original scale demonstrated a Cronbach’s alpha of .84 for medical students and .85 for nursing students (Hojat et al., 1999). Subsequent iterations of the scale have resulted in an abbreviated 15 item scale whose use by other researchers has demonstrated alpha levels adequate for research, .71 (Yildirim et al., 2005) to .87 (Fields et al., 2004). In the current study internal consistency was determined for each provider type by Cronbach’s alpha for the 15 item JSAC. Cronbach alpha for

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SNs and physicians was .72 and .90 respectively, indicated adequate to strong reliability as well as consistency with previous studies.

Open ended short answer questions were also included in the survey instrument to allow participants to share their thoughts regarding the benefits and barriers to collaboration between SNs and physicians. This gave providers the opportunity to briefly express the problems as well as the opportunities regarding collaboration with one another. Additionally, a single open ended question asked providers to describe in detail their perspectives and/or experiences regarding SN and physician collaboration around childhood obesity. While providers may see the value in collaborating around specific, immediate issues such as asthma or diabetes, they may view childhood obesity as too challenging to address on individual patient level. Thus, there may be unique issues regarding collaboration between SNs and physicians around individual children with obesity issues.

### **Data Analysis**

#### **Data Preparation**

Qualtrics®, v 2013 (Provo, UT) an online survey software system, was utilized to distribute the electronic survey to SNs. Data were exported directly from this software into SPSS for Windows v. 22 (SPSS Inc., Chicago, IL). The data obtained from the paper surveys completed by physicians was manually entered by the investigator into SPSS for Windows v.22 (SPSS Inc., Chicago, IL).

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Prior to statistical analysis, data were evaluated for normality, missing values and outliers. Skewness and kurtosis were assessed on interval variables (Age, Years in MA Practice, Jefferson Scale of Attitudes toward Collaboration (JSAC), Average Number of Daily Patients/Total Number of Students). Interval and categorical demographic variables, with the exception of multiple response sets, were evaluated for missing values using the Missing Value Analysis in SPSS. A variety of methods are available to address missing values; multiple imputation was utilized to replace missing values in variables with less than 10% of missing cases. Multiple imputation was based on one or more characteristics of the sample population. The only variable which necessitated imputation was Age using Years as a SN, and Highest Education as proxy characteristics. Missing values for the outcome variable, total JSAC scores, were handled by case mean substitution as indicated by the JSAC authors (Appendix F) where missing values were replaced with the “mean of other relevant variables from the person with the missing value” (Polit, 2010). Using the Scoring Algorithm for the JSAC: “In the case of a respondent with 3 or fewer unanswered items, missing values should be replaced with the mean score calculated from items completed by the respondent” (Hojat communication).

Descriptive statistics were conducted on all study variables. Descriptive statistics for categorical variables included percent and frequency, while ordinal and interval variables included univariate analysis of mean, median, range, standard deviation and skew. Frequency and distribution plots identified outliers and assessed for normality (skewness and kurtosis). Bivariate analyses were run

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on all study variables to determine any significant correlations between the dependent variable (total JSAC score) and the independent variables. All statistical analyses used 2 tailed tests at  $\alpha = .05$  level of significance.

A single continuous variable, Total Number of Students, did not display a normal distribution, demonstrating a left skew and high kurtosis. This was likely due to the outlier effect of 7 responses determined by SPSS to be beyond 1.51 Interquartile Range (IQR), with 3 of these responses beyond 3.0 IQR as determined by boxplot (Meyers, Gamst & Guarino, 2013). Complicating this picture was the entry of zero students by 6 nurses despite this value not identified as an outlier by SPSS. In order to determine the shift created by these values, descriptive statistics for Total Number of Students were conducted with and without the 3 highest outliers as well as the 6 zero values. The compared mean, median and standard deviation are presented in Table 4. While a shift is noted in the mean number of students it is not so large as to disrupt the statistical analysis while the loss of these 9 respondents to the data analysis using a listwise deletion would have reduced the sample size considerably. In addition, a comment made by a nurse with “0” students identified this nurse as a School Nurse Leader who oversees other nurses. Some School Nurse Leaders provide direct patient care and have served as SNs for several years. The investigator had no direct knowledge of the respondents and in consideration of the above respondent’s comment, the decision was made to keep all responses and recode the variable into 4 categories (0-250, 251-500, 501-750,  $\geq 751$ ). Recoding captured the two means

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(with/without outliers) into a single subgroup as well as retained all responses available for analysis.

Inferential statistics were used to describe the means of physicians and SNs on their total JSAC scores. The number of participants did not allow for separating the physicians into sub-groups; specifically physicians could not be divided into pediatricians and family medicine physicians for comparison with SNs. Thus, two group analyses, t-tests, were used to compare the means of the total scores of the collaboration scale. T-tests allow us to ascertain whether the differences in group mean scores occurred by chance or reflect an actual difference. The t scores should have a normal distribution centered on the mean. In t-tests the two variables under consideration follow certain assumptions: the independent variable must be categorical, thus the two groups must be mutually exclusive and each subject may only have one score. The second or dependent variable may be ordinal, interval or ratio; however, it must meet the requirement of homogeneity, thus the variances of the two groups will be similar (Munro, 2005). In this study, an example of the nominal, independent variable was provider type, either physician or SN, while the total score of the JSAC was the dependent variable. A comparison of the mean total collaboration scores for each group indicated which group had a more positive attitude toward collaboration. Because the directionality of the scores was unknown, a two tailed t-test was performed.

ANOVA testing was used to determine differences among the means total scores of the Jefferson scale for subgroups of the 2 main groups (physicians and



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SNs). While t-tests examine the difference of the means between only two groups, ANOVA examines the difference among means of subgroups. Similar to t-tests, there are basic assumptions which must be met regarding ANOVA: 1) the dependent variable must be continuous and normally distributed; 2) the groups or independent variables are mutually exclusive, and 3) the groups have equal variances (homogeneity of variance). ANOVA may determine ‘between group differences’ as well as ‘within group differences’. If the between group difference statistically exceeded that of the within group variance then the means of the groups were considered significantly different (Munro, 2005).

The correlation coefficient, Spearman’s rho, was used as the level of measurement of the independent variables at the ordinal level compared with the dependent variable which is an interval level of measure. Independent variables were correlated with the dependent variable (total JSAC score) to determine if: 1) any correlation existed, 2) if correlation did exist, was it linear or non-linear (curvilinear, cubic). A correlation matrix of these values indicated the bivariate relationship between the core variables, highlighting the strength of the relationships between each of the independent variables and the outcome variable (Munro, 2005).

Independent variables may be highly correlated with one another, causing potential problems such as multicollinearity. Multicollinearity may be determined by including “tolerance” measures in the analysis. Those variables which demonstrated the highest tolerances (or those closest to 0) were considered collinear and removed from the regression analysis (Munro, 2005). Only 3

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variables were appropriate for this analysis: Age, Years in practice in MA, Daily average number of patients (physicians)/ Total number of students (SNs). Using Pearson's correlation, Age and Years Practicing in MA showed collinearity for both physicians and SN (.955 and .667 respectively). The decision was made to keep Age as the representative variable for analysis, removing Years Practicing in MA.

Multiple regression analysis was used to determine if any associations existed between various independent variables and the dependent variable. In order to perform multiple regression analyses, a sample size had previously been determined to require 10 respondents per variable. The total respondents included: 177, sixty-three physicians and 114 SNs; the limit on independent variables was set to 6 variables. The dependent outcome variable, Jefferson Attitude toward RN-MD Collaboration Score, ranges from 15 to 60 (based on a 4 level Likert scale of 15 statements); may be considered an interval level or continuous variable (Munro, 2005). All the independent variables were normally distributed therefore no transformation of the variables was required.

Dummy coding was used to compare the groups using one group as a control group (Munro, 2005). Due to the low response rates, it was more effective to compare variables with three levels by dummy coding. Thus, a group with three levels (e. g. community type) compared urban with suburban and rural combined. A second dummy analysis compared suburban with urban and rural combined. Dummy coding then permitted post hoc analysis of subgroups.

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In order to determine which independent variables should be included in the multiple regression analysis, several methods could be used for entry of the independent variables into the equation. For the purposes of this analysis, the stepwise method of inclusion into the regression equation was used. Each highly correlated variable was entered individually. After entry of a subsequent variable if the former variable became non-significant, the former variable was removed from the equation until all variables were considered (Pedulla, 2009).

Statistical significance, as well as theoretical judgment, was used to select the most appropriate variables for inclusion. Any independent variable determined by bivariate analysis to have significant correlation with Jefferson Attitude toward MDRN Collaboration Score was included in multiple regression analysis. The following independent variables, on the basis of findings from physicians regarding school based BMI screening (Pietras et al., 2011) were thought to have significant correlation, however, they were not the only variables included in the regression analysis.

- a) Community of practice (3 levels: rural, urban, and suburban)
- b) SES of practice/school (2 levels: above or below 40% on public assistance)
- c) Unique practice type (2 levels: medical home or ESHS)

The above variables, as well as provider type (SN, physician) were analyzed for the amount of variance each accounted for in the total variance.

### **Qualitative Analysis**

Summative content analysis was conducted to determine the most salient barriers and benefits of collaboration. Summative content analysis is the process of discovering keywords or phrases in written material (Hsieh & Shannon, 2005). While this method has been used in the examination of texts and books, it may also be used to examine transcriptions and writings. In this process, the first step was to count the appearance of particular words and note the frequency of their use. The word count was associated with the author of the words and the context of the writing. In this study the words were associated with the author's provider type (physician or SN), as well as the individual's total JSAC score. Any patterns within groups were noted.

While word count was the initial process, descriptive content analysis was conducted to discover the meanings of words or phrases. Statements or phrases were grouped together regarding barriers and benefits. The intent of this analysis was to draw specific themes which keep providers from collaborating and/or themes which facilitate providers working together, as viewed by the providers themselves. The terminology providers employed to discuss the benefits and barriers may indicate their level of frustration or happiness with collaboration. This information may have been a reflection of the quantitative data obtained earlier in the survey, but not fully captured by closed ended questions. An attempt was made to determine if there was any contextual link between terminology used and the individual authors' positive or negative attitude toward collaboration.

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Data from the open ended questions regarding collaboration between physicians and SNs around childhood obesity enriched the quantitative data. Qualitative content analysis was conducted using the process as described by Graneheim and Lundman (2004).

Content analysis was used to examine “meaning units” as responses around a single experience or focus. The meaning units were then read for manifest content as the overt description of the experience or focus. These descriptions were subsequently condensed to their core meanings; shortening the unit without loss of core content. Beneath this surface layer, lay the latent content interpreted by the researcher as the underlying meanings of the respondents (2003). The latent content becomes “abstracted” via “descriptions and interpretations on a higher level” (Graneheim & Lundman, 2003, p. 106). Emerging from the meaning units codes are “categories” or “a descriptive level of content and can thus be seen as an expression of the manifest content of the text” (Graneheim & Lundman, 2003, p.107). While the categories remained on the manifest content level, themes explore the common underlying messages interpreted by the researcher. Though there were many categories, only a singular overarching theme was explicated.

### **Data Management**

Electronic files were de-identified, and then stored in encrypted format on a dedicated external drive of a computer to which only the investigator has access. Qualtrics is an encrypted website to which only the investigator has access to the survey responses. Paper surveys were de-identified and the results transcribed into

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SPSS. The original hard copy of the paper surveys were stored in locked cabinet to which only the investigator has access.

### **Conclusion**

The survey and scale distributed to SNs and physicians was used to compare the two healthcare professional groups' attitude toward collaboration. In addition, an analysis of provider characteristics and practices associated with positive attitudes toward collaboration was conducted. Descriptive statistics allowed a basic view of variables which are not amenable to change (i.e., age, gender, size of practice) and were correlated with attitudes toward collaboration. Inferential statistics permitted multiple correlations, indicating which providers and/or practice characteristics were more positively associated with collaboration. Utilizing the Four Dimensions Model of Collaboration, the study population was assessed for indicators of successful collaboration. Lastly, content analysis allowed for a richer understanding of varied professionals' perceptions, experiences, barriers and benefits of collaboration around childhood obesity.

It was the intent of this study to use these findings to discover strategies and infrastructure which support the collaboration between physicians and SNs around childhood obesity. The BMI screening and referral process was an opportunity for SNs and physicians to develop mutual goals around children and families with weight issues. Understanding the characteristics and attitudes of both the physicians and SNs may allow for future improvement in communication

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and interaction. In determining which indicators of successful collaboration are present or deficient may offer direction for further efforts.

## **CHAPTER 4 RESULTS**

### **Introduction**

This chapter describes the results of data analyses. Descriptive, bivariate, and multivariate analyses are reviewed and describe the general attitudes and practices of school nurses and physicians toward collaboration in the care of obese children.

### **Characteristics of Study Sample**

The sample consisted of 114 of SNs and 63 physicians who met the inclusion and exclusion criteria established for this study (Figure 1). The demographic characteristics are displayed in Table 5. The typical SN in this study was a woman approximately 52 years old with a baccalaureate degree who had been practicing in the school setting for about 12 years and was a member of the National Association of School Nurses. The typical physician study participant was more likely female than male, approximately 51 years old and had been practicing in pediatrics for about 19 years and was a member of the American Academy of Pediatrics.

SNs who completed the study were compared to SN non-completers (See Table 6). Logistic regression was used to identify any statistically significant differences for group membership as completers versus non-completers. Only 3 variables had enough responses to be included in the analysis: Age, Years in MA as SN, and Highest Education Level. Age and Years in MA as SN were entered as continuous variables while dummy coding was used for categorical variables with each level of educational degree entered as a dichotomous variable. No



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significant differences were noted between SN who completed the survey versus those who did not complete the survey regarding Age, Highest Education Level, or Years in MA as a SN. While this analysis does not capture all sample characteristics, it does suggest that non-completers were similar to SNs who completed the survey.

Many similarities were noted in the sample characteristics, including both personal traits as well as practice demographics (Table 5). There were two notable differences between the two provider types. Gender differences were noted as one hundred percent of the school nurses were female, while two thirds (67%) of the physician sample were female. Secondly, there were differences noted in the caseloads of the two provider types. SNs reported the size of the school for which they were responsible as typically, the larger the school the more students and subsequently the more visits from students in a day. Physicians were asked instead for the average daily patient load. SNs were responsible for an average of 631 students (range =0- 4,750) while the physicians indicated they saw an average of 18 (range 0-30) patients each day. Ultimately, SNs and physicians were more alike than dissimilar.

*How do Pediatric Primary Care Providers (physicians) and School Nurses (SNs) compare in their attitudes toward, and indicators of, collaboration?*

The data utilized to describe and compare physicians and school nurses attitudes were provided by the Jefferson Scale of Attitudes toward MDRN Collaboration (JSAC) and study specific questions developed from D'Amour's

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Four Dimensions of Collaboration Model (FDCM) regarding collaboration practices.

Prior to group comparisons, the scales' internal consistency was explored by calculating the reliability coefficient alpha for both SNs and physicians. The Cronbach alpha ranged from .72 in the SN group to .92 in the physician group. These results were consistent with previous studies in which the results ranged from .70-.87 (Fields et al., 2004; Hojat et al., 2004).

The mean scores for each question of the Jefferson Scale of Attitudes toward Collaboration (JSAC) determined for SNs and physicians are listed in Table 7. The mean total scores of the JSAC were compared using t test by provider type. SNs scored a mean total of 55.05 (SD +/- 3.30, Range = 47-60), while physicians scored a mean total of 52.42 (SD +/-5.74, Range = 40-60),  $t(176) = 4.494, p = .000$ . The JSAC is organized into 4 factors: Shared Education and Collaboration, Caring versus Curing, Nurses' Autonomy, and Physician's Authority. SNs scored higher than physicians in all factors, with the scores reaching statistical significance in 3 of the factors (Table 8). Notably, both provider types scored similarly on Nurses' Autonomy and while the results did not reach significance the SNs still scored higher on this item.

The delineation of scoring by provider type demonstrated significant differences in several items (Table 6). Ten of the fifteen JSAC statements indicated a statistical difference between SN and physician respondents. Two statements, which comprise Physician's Authority (#8 and 10), demonstrated the weakest level of agreement among both SNs and physicians (Figures 3 & 4).

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In addition to the information provided by the JSAC, data related to infrastructure and its role in collaboration were also evaluated. Utilizing the FDMC as a guide, questions were developed to gather information on the internal and external factors which may impact collaboration. D'Amour et al. (2008) proposed that the presence of ten essential indicators would indicate successful collaboration. The ten attributes are grouped into four dimensions: Shared Goals and Visions, Governance, Internalization, and Formalization. Within these dimensions are the ten indicators: a) goals, b) client-centered orientation, c) centrality, d) leadership, e) support for innovation, f) connectivity, g) formalization tools, h) information exchange, i) mutual acquaintanceship, and j) trust (D'Amour et al., 2008). The four dimensions may be viewed as two levels of interactions, Shared Goals and Visions along with Internalization are based at the individual level while Formalization and Governance are based at the organizational level. Questions were developed for the survey to reflect at least a one question about each of these attributes. A brief explanation of each attribute and their corresponding survey question are described in Chapter 3. Notable FDCM components and respondents' responses are presented in Tables 10 through 13. Individual Level of Interaction (Tables 10 & 11) are the practices which each provider follows while Organizational Level of Interaction (Table 12 & 13) are the practices supported by agency infrastructure which has less individual and more professional and bureaucratic control.

***FDCM: Individual Level of Interaction***

Shared Goals and Visions

The first individual level of interaction focuses on whether collaborators are working toward same goal. In this study, goals regarding obesity treatment were assessed using a multiple response set which enabled participants to choose more than one response. The majority of goals were widely accepted by physicians and SNs with “awareness of complications of overweight and obesity” having the lowest acceptance rates (71% and 54% respectively). Only 67% of SNs selected “Decrease screen time” as a goal for overweight or obese children, while 95% of physicians choose this goal.

A second multiple response set asked providers about their use of, or familiarity with, guidelines used to manage childhood obesity. While the majority of physicians reported being pediatricians, only 3% reported using the American Academy of Pediatrics (AAP) Guidelines alone for managing childhood obesity; the vast majority (73%) reporting “a combination of recommendations”. Thirty percent of SNs were familiar with AAP guidelines. Many more SNs were familiar with Healthy Eating and Activity Together (HEAT), the childhood obesity guidelines developed by National Association of Pediatric Nurse Practitioners.

Professional membership was high for both physicians and SNs; over 75% of all respondents were members of their respective national professional organizations. This was viewed as a reflection of commitment to the recommendations of these professional organizations and their policies. A second question for SNs only was included to indicate knowledge of and training in the

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recommendations in the NASN program entitled “School Nurse Childhood Obesity Prevention Education (SCOPE).” Less than 10% of SN respondents had participated in this program.

### ***FDCM: Individual Level of Interaction***

#### Internalization

Internalization was comprised of two components: mutual acquaintanceship and trust. In this study mutual acquaintanceship was measured with three questions: know the other provider, know how to contact the other provider, and worked with the other provider. While the majority of SNs knew some of the local physicians, nearly one quarter (24%) knew all of the local physicians, and only 6% reported they didn’t know any of their local physicians. Conversely, only 19% of physicians knew all the local SNs, with as many as 37% who knew none of the local SNs. In addition to knowing the local providers, the respondents were asked if they knew how to contact their local counterpart. One hundred percent of SNs reported they knew how to contact all their local physicians. In contrast, only 74% of physicians reported they knew how to contact local SNs, leaving 21% reporting they would only know how to reach some of the local SNs and 5% reporting they would not know how to contact any local SN. The question regarding having worked together listed 4 specific options as well as the opportunity to free text under the option of “other.” The most frequently cited option of having worked together by both SNs (29%) and physicians (28%) was “health education for students, parents or staff”. Twenty-one percent of SNs chose

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“other” writing in such reasons as: health management of individual children, policy development, and infectious disease issues (i.e., setting up flu clinic). Very few physicians utilized the “Other” category and the majority of responses listed working together on individual plans of care.

Beyond simply knowing the local health care provider is the degree of trust that the health care providers have in each other. For example, does the physician trust that the SN will follow through on the established plan of care or does the SN trust that their input will be heard and included when developing the plan of care for a student? While 96% of physicians agree or strongly agree that they trust local SNs to follow through on their plans, the reciprocal was not true for SNs. Only 76% of SNs reported that they trusted the local physicians to listen to or include them in the child’s plans.

### ***FDCM: Organizational Level of Interaction***

#### Governance

In addition to the individual dimensions of collaboration are the organizational aspects which include the Governance attributes of centrality, leadership, and support for innovation and connectivity. Centrality was represented by a question regarding status as an Essential School Health Services (ESHS) program for SNs or Patient Centered Medical Home (PCMH) for physicians. Both of these programs include collaboration as an important or central component of the program. The results indicated that 72% of SN respondents belonged to an ESHS, while 52% of physicians were registered as PCMH.

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Leadership was indicated by three questions focusing on the presence of leaders or systems which supported collaboration. Respondents were given the opportunity to report not only “yes” or “no” but also “unsure” to the presence of a manager responsible for policies and procedures specifically regarding collaboration with outside agencies. Not knowing if a manager existed indicates the non-use of a possible resource. Eighty-one percent of physicians reported having a manager who handled policies and procedures, while only 19% reported none or unsure. SNs were much less clear on the availability of resources with 42% reporting they were unsure, 17% reporting there was no manager of policies and procedures available to them, and less than half (41%) reporting that they do indeed have this resource.

Specific to physicians was the role of a school physician. In this role, physicians are advisors to SNs as well as liaisons to their fellow physicians regarding issues related to school health. Working together with SNs would support collaboration; as many as 15% physician respondents indicated they were school physicians.

The SN and physician surveys had parallel questions which asked about their practice settings (e.g. type of practice for physicians and type of school setting for SNs). One unique question asked of physicians: by what route were they informed of the BMI screening and referral mandate. Less than half (41%) were notified by either their professional organization or by the Massachusetts Department of Public Health (MA DPH), one quarter were informed either by a SN directly or by the referral form arriving at their office. More than one third (34%) of

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physicians reported that they were notified of the changes in state resolutions by the media or word of mouth. Support for Innovation was assessed by questions regarding SNs' and physicians' recommendations for reasonable collaboration activities or policies/ for both routine and complex health problems. While routine health concerns were considered by the majority of both provider types to warrant a written response (68% of SNs and 78% of physicians), a greater number of SNs desired a more immediate response by phone (SNs: 22% v physicians: 14%) or email (SNs: 11% v physicians: 7%). For the child with more complex health care issues, both provider types endorsed the use of the phone (SNs: 54% and physicians: 43%) as well as face- to-face meetings (SNs: 4% and physicians: 7%) which were not considered for routine health issues.

The last indicator of Leadership was connectivity, which was operationalized as the frequency of communication between providers. SNs reported reaching out to physicians more often than the reverse. While the median groups of "2-5 times per year" and "once to several times per month" were quite similar (SNs: 70% v physicians: 65%), there was an inverse relationship between the extreme responses (i.e., "never to once per year" and "once to several times per week") and provider type. Twenty-one percent of SNs reported they contacted the local physicians weekly while 23% of physicians reporting that they rarely, if ever, communicated with SNs. Frequency of responses by provider type are available in Table 12.



***FDCM: Organizational Level of Interaction***

Formalization

The Formalization dimension of the model encompassed the logistics of collaboration. The most common methods by which physicians returned SN referrals was utilized to represent the element of “Information Exchange.” Providers were given 4 choices as well as an opportunity to enter free text. The largest number of respondents (SNs: 57%, physicians: 72%) reported returning the referral form to the parent to relay back to the other provider. The following option: verbal information given to parent by physician to verbally relay information to SN, demonstrated a discrepancy, as 30% of SNs reported this occurring while only 11% of physicians reported they managed information via this route. Still fewer providers used the phone as a means to relay information about a referral (SNs: 4% and physicians: 9%). A small number of SNs reported receiving a letter regarding referrals (4%); however, no physicians reported sending letters regarding referrals. Several providers of both types opted to write in other choices which included: faxed note/letters, visit notes, med orders, and Asthma Action Plans.

Another element of Formalization was related to standardized procedures to support collaboration between providers. This component was operationalized as written policies and procedures, as well as the actual number of referrals sent, received, and responses returned. Similar to the existence of a manager who handled policies and procedures, knowledge of the policies and procedures regarding collaboration was an indicator of the resources available to providers.

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While physicians were more certain about the manager, they were less sure about the existence of actual policies. Fifty-one percent of physicians knew there were policies and procedures about collaboration with outside agencies, while 48% were either unsure or knew there were no policies or procedures in place. SNs maintained a similar pattern of response with 36% reporting policies and procedures in place and 65% reported being uncertain or not having policies and procedures in place (Table 13).

Lastly, standardized referral forms have been the accepted form of communication between SNs and physicians regarding school based screenings for decades and were also operationalized to represent information exchange. Typically, the top section of the form is filled out by the school nurse with the school based findings; the bottom half of the form includes a space for providers to place their findings which is to be returned to the SN. Both provider types were asked about their referral rates for the most recent academic year. Specific attention was focused on the referrals that were regulated by MA; hearing, vision, scoliosis, and BMI for overweight and obesity. There was a noticeable difference for all screenings between referrals sent by SNs, received by physicians and returned to SNs. This pattern was seen for hearing referrals: 87% of SN respondents reported sending out at least 1 referral for hearing, only 65% of physicians report receiving at least 1 referral for hearing and 70% of SNs reported they received at least one response back about their referrals. In almost every referral queried there was an approximately 20 percent difference between referrals sent to physicians by SN and referrals received by physicians. There was,

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however, no direct connection between the SN and physician respondents regarding these specific referrals thus a direct comparison could not be made. Instead, a comparison of referrals sent by SNs and responses received by those same nurses was conducted (Figure 5). In terms of referrals, BMI for overweight and obesity demonstrated the greatest discrepancy between sent/returned rates.

*What associations exist between provider characteristics (e.g. age, licensure, gender, educational level, and years in practice), practice demographics (e. g. rural or urban setting, ESHS or medical home designation, economic status of community) as well as the ten constructs of the FDMC model (e. g. trust, information exchange) and positive attitudes toward collaboration scores?*

Inferential statistics were performed using the total JSAC scores as the dependent variable. T tests were used to compare dichotomous independent variables and one way ANOVAs were performed on categorical independent variables with more than 2 values. After the one-way ANOVAs were completed, a secondary analysis of the simple effects of two independent variables on JSAC total score was performed. Post hoc analyses were run on independent variables with greater than 2 values to determine if there were differences between subgroups. If Levene's homogeneity of variance was non-significant, Tukey post hoc analyses were used. In instances where Levene's homogeneity of variance was significant, most often due to unequal group sizes, Games-Howell analyses were conducted.

### ***School Nurse Findings***

Provider characteristics and practice characteristics were examined for correlation with mean total JSAC scores. Initial findings indicated that no individual characteristic was associated either negatively or positively, with attitude toward collaboration for SNs. The results for all SN variables are displayed in Table 14.

#### **Provider characteristics**

There were no significant differences in mean total JSAC scores between SNs when comparing: Gender (no comparison group), Age Groups, Highest Educational Level, Membership in National Association of School Nurses (NASN), and School Nurse Childhood Obesity Prevention Education (SCOPE) participant. Only a single variable, Years in MA as SN, demonstrated a significant difference in post hoc analysis. SNs with 11-20 years of experience had significantly higher mean total JSAC scores than SNs with only 1 -10 years of experience ( $p = .036$ ), indicating a more positive attitude toward collaboration than less experienced peers.

#### **Practice Characteristics**

There were no significant differences in mean total JSAC scores between SNs when comparing: identification as an Essential School Health Services program; percent student eligibility for free and reduced lunch program (percentage of students eligible for National School Lunch program above or below 40%), community type (urban, rural, suburban), type of school

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(elementary, elementary through high school, middle/high school), or total number of students (0-250, 251-500, 501-750, >751).

### **FDMC Attributes**

There were no significant differences in mean total JSAC scores between SNs when comparing: knows school physician, written policies and procedures, manager responsible for policies and procedures, knows local physicians, and school based screening referrals. There was a significant difference among SNs for two FDMC variables: Trust and Frequency of Communication. As the Levene's test indicated unequal variances, post hoc analysis using Games-Howell indicated there was a significant difference ( $p=.021$ ) between SNs who communicated once to several times per month than those who communicated only 3 to 5 times per year with the more frequent communicators scoring more positively than those who communicated less often ( $p = .036$ ). Similarly, ANOVA analysis revealed a significant result for Trust; however, Levene's test of homogeneity was also significant indicating unequal variances. Once again, owing to the very unequal subgroup sizes, a Games-Howell post hoc analysis was conducted. Both of the subgroups on the disparate ends of the trust spectrum (strongly disagree and strongly agree) scored more positively on attitude toward collaboration than SNs who 'tended to disagree' with trusting the local physicians ( $p = .013$  and  $p = .047$ , respectively).

### ***Pediatric Primary Care Provider Findings***

The same bivariate analyses were conducted with physicians to determine if any correlation existed between individual groups and total mean JSAC scores. Between groups variance were found to be significant for a small number of variables (See Table 15). These findings were subsequently used in the regression analysis.

### **Provider Characteristics**

There were no significant differences on the mean total scores of the JSAC between physicians when comparing dichotomous variables: gender, specialty (Pediatrician or Family Medicine) and status as School Physician. Among the categorical variables, Years in Practice in MA and Professional Membership, there were also no significant differences. Conducting post hoc analysis for Age Groups, the Games-Howell analysis reflected that those respondents who were between 51 and 60 years of age were more positive toward collaboration than younger physicians between the ages of 41 to 50 years ( $p = .026$ ) (see Table 15).

### **Practice Characteristics**

Identification as a Patient Centered Medical Home, level of patient insurance eligibility (percentage of patients having no or public insurance above or below 40%), practice type, average number of daily patients all showed no significant differences among physicians when comparing mean total JSAC scores. Only community type (rural, suburban, urban) showed a significant difference, ( $p = .027$ ); post hoc testing using Tukey analysis revealed that urban physicians had higher mean total JASC score than their suburban and rural

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counterparts ( $p = .031$ ). No other significant findings were found in these analyses (See Table 15).

### **FDMC Attributes**

There were no significant differences in mean total JSAC scores found between physicians when comparing: written policies and procedures, manager responsible for policies and procedures, percent obese pediatric patients, knows local SNs, knows how to contact local SNs, worked with local SN, frequency of communication with local SNs, common format for communicating with local SNs, childhood obesity guidelines used, and school based referrals received. Two variables were significant for differences among the group including; 1) contact local SNs and 2) trust of SNs. While initial ANOVA findings were not significant, Games-Howell post-hoc analysis indicated that physicians who reported that they did not know how to contact any SNs scored more positively on JSAC than physicians who reported they knew how to contact some SNs and all the SNs ( $p = .020$  and  $.003$ , respectively). Trust of SNs indicated by Games-Howell post hoc analysis that physicians who “Strongly Agreed” with the statement “I trust the local school nurse(s) to follow through with my medical management plan of student(s)” scored more positively on the JSAC than physicians who reported “Tend to Agree” ( $p = .041$ ) (See Table 8).

### ***Regression analysis***

Regression analyses were anticipated to develop a predictor model of physicians and/or SNs with the most positive attitude toward collaboration;

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however due to lack of significant findings among SNs, only physician characteristics were included in regression analysis. Due to the exploratory nature of this work, a stepwise multiple regression method was chosen. Factors were entered into the model in a forward stepwise fashion, one factor at a time to determine its influence on the variance of the model. Independent variables included demographic data with the intent of finding a predictive model of providers with the most positive attitude toward collaboration.

Collinearity testing among variables indicated that certain variables may represent the same factor. The three continuous variables among physicians: Age, Years in MA and Average Number of Patients demonstrated a high degree of correlation (.960) between Age and Years in MA. In order to reduce the multicollinearity effect, Years in MA was not included in the model. Average Number of Patients showed only a moderate degree of negative correlation -.319 and .339 with Age and Years in MA respectively.

The demographic variables entered into model were those thought to be most likely influenced by the provider or practice setting. Variables were recoded, as needed, in order to achieve adequate cell counts. The physician variables which were recoded included practice type, community type, public insurance levels and percent obese pediatric patients. Dummy coding was used for nominal level factors such as: practice type, community type, percent obese patients and daily average of patients.



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After exploring the demographic variables, other independent variables which were part of the FDMC model and thought to have an influence on the dependent variable, were trialed in the regression model including AAP membership, PCMH status, and level of trust in other provider. Professional organization memberships (AAP) as well as organizational status (PCMH) were recoded into dichotomous variables while Trust was categorized into 3 levels (Strongly Agree, Tend to Agree, Strongly/Tend to Disagree).

The regression model for physicians included: suburban community type, 11-33% percent obese patients, 51-60 years of age (Table 16). This equation may be interpreted as: while holding all other variables constant, physicians with an 11-33% obese pediatric patient population for each one unit increase in percent obese patients their total JSAC scores decline by 3.930. Similarly, physicians who practice in a suburban location also showed a decrease in total JSAC score from the baseline of 54.38 by 2.710. Conversely, belonging to the Age Group 51-60 years improves a physician total JSAC score by 4.578. Twenty-one percent of the variance is accounted by the above specified model.

### **Qualitative Analysis**

*What are the barriers and benefits to school-based BMI screening and referral as a mechanism to address childhood obesity identified by MA pediatric primary care providers and SNs?*

*What are your thoughts about collaboration between SNs and pediatric primary care providers around childhood obesity based on your experiences?*

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Qualitative analyses were performed on the responses made to the three open ended questions concerning: 1) barriers 2) benefits and 3) provider's experiences with collaboration between SNs and physicians regarding childhood obesity. The intent of asking opened ended questions was to give respondents the opportunity to express their thoughts beyond that which had been explored in the closed ended section of the survey. Two types of content analysis were utilized; short responses barriers and benefits were analyzed with summative content analysis which focuses on the frequency with which phrases or expressions are used by multiple authors. The more lengthy responses to thoughts and experiences were analyzed using descriptive content analysis as larger themes could be interpreted from the responses.

The first two questions were chosen to allow providers with varying levels of experience with collaboration to share their ideas regarding the advantages and disadvantages of collaboration. These questions were intended to elicit brief responses with 3 single lines provided for free text. As such, providers kept their responses concise, sometimes single words. The analysis was consistent with summative content analysis (Hsieh & Shannon, 2005) using keywords or phrases and the frequency of usage in written text as indicative of consensus. The two provider types were compared for commonality as well as differences.

The third and final question was given more free text allowance which permitted lengthy in-depth responses. Responses were then coded and categorized using qualitative descriptive content analysis (Graneheim & Lundman, 2004). The descriptive analysis of the responses presents the manifest level or surface understanding; underlying this is the qualitative content analysis. Moving from the descriptive to the content

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analysis involves the development of condensed meaning units with latent content and condensed meaning units with interpretation of the meaning units. SNs and physicians were compared using a single meaning unit with “thoughts about collaboration around childhood obesity” as the focus.

### ***Benefits***

Participants were given the opportunity to respond in free text to the following prompt:

*Please list potential benefits(s) of collaboration between pediatric primary care providers and school nurses in addressing childhood obesity.*

All respondents were given the opportunity to enter at least 3 possible benefits to collaboration between physicians and SNs around childhood obesity. Ninety-two nurses (81%) and forty-eight (76%) of physicians chose to submit at least one benefit associated with collaboration. The total number of benefits listed by SN was 211. Physicians entered far fewer total benefits (n = 97).

Benefits fell into 5 major subheadings for SNs and physicians. While four of the headings were very similar, the 5<sup>th</sup> heading differed between the provider groups. The categories “**Continuity of Care**”, “**Better Health Outcomes**”, “**Supporting Each Other**”, and “**Improved Communication or Collaboration**” were noted for both provider groups. Two categories were determined to be unique to each provider type: for SNs the 5<sup>th</sup> category was “**Connectivity to Parents**” while for physicians the 5<sup>th</sup> category emerged as “**Role of the School Nurse**”.

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## School Nurses

Benefits for SNs could be categorized into five subheadings listed in order of most to least frequent occurrence (Table 17). Figure 6 depicts the percentages of SNs identifying each category.

1. **Support Each Other.** One of the topmost reasons cited among SNs as a benefit to collaborating ( $n = 36$ , 39% of 92 SN respondents). This category identified the positive outcomes if providers were giving a consistent message to children and families. The category was captured by such thoughts as, *“Different professionals saying the same things”*, *“Parents are more likely to take obesity seriously if both the nurse and the doctor are working together”* and *“Kids hear the same message.”*

2. **Better Health Outcomes.** This category appeared as frequently as Support Each Other among SNs’ listed benefits ( $n = 36$ , 39%). SNs listed benefits ranging from improved general wellbeing to decreased bullying, better school performance, and improved mental health as viewed through such statements as *“Healthier students and subsequent healthier future adults”* and *“Improved mental health/decreased bullying”* as well as *“Help child realize, how important this is, for their own health. Make it real.”*

3. **Communication/Collaboration.** This category most frequently incorporated the actual expression ‘collaboration’ into the benefit and was listed 4<sup>th</sup> in frequency ( $n = 22$ , 10%). It captured such ideas as teamwork, improved communication and positive sentiments toward collaboration. Among SNs the

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following excerpts denoted this category: *“Takes a team to make a difference”*

*“Student will feel special when both of us collaborate for their benefit” and “To collaborate to offer educational programs for parents, collaborate [sic] resources.”*

**4. Connectivity to Parents.** ( $n = 20, 9\%$ ), While this category matched Communication/Collaboration, it was unique to SNs. Nurses proposed that collaboration between SN and physicians may draw parents into the conversation. It was most often listed in the second benefit text box and was exemplified the following quotes *“Improved parental response/involvement”, “Better support system for child and family”* and *“We both have a different relationship with the parent/guardian.”*

**5. Continuity of Care.** This category was cited least by SNs ( $n=13, 14\%$ ) however those who cited it often entered it more than once. This benefit included concepts such as continuity of plans or goals, SN availability to students, more accurate information to providers, and improved follow through. Some of the SN examples include: *“We would all be on the same page!”* and *“We will know what the child has been hearing from the pediatric PCP, and what parent has been explained, can clarify and monitor at school”*.

### Physicians

Benefits for physicians could be categorized into five subheadings listed in order of most to least frequent occurrence. The benefits are listed by category title

and frequency in Table 18. Figure 7 depicts the percentages of physicians listing each category.

**1. Supporting Each Other.** Among physicians this response was stated most frequently overall ( $n = 22$ , 35%). Though more concise, sentiments were similar to SNs and included phrases such as, *“United front”, “Students receives guidance from multiple sources.”* The parent focus was also heard, *“Parents can hear the message from more than just one of us.”*

**2. Role of the School Nurse.** This was the second most cited benefit of collaboration among physicians. This response was listed 15 times (24%). In this category physicians proposed functions for SNs in childhood obesity management such as monitoring as well as educating students. Some of the recommendations included *“Assist in monitoring blood pressure when hypertension”, “Nurse can help with groups – education and exercise, coordinating”* and *“School nurse can have more impact on daily dietary choices and on the amount of physical activity.”*

**3. Communication/Collaboration.** Among physicians, this entry was submitted third most frequently ( $n = 14$ , 22%). Abbreviated remarks by physicians echoed SN thoughts, *“Collaborative approach to treating a difficult and chronic condition”, “Cooperation better care”* and *“Education from multi-disciplines.”*

**4. Continuity of Care.** Among physicians, 19% ( $n = 12$ ) indicated this reason. Similarly, physicians chose continuity of care with SN aligned thoughts, such as:

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*“Carryover from clinic to school” and “Use motivational interviewing and goal setting across PCP and School Nurse.”*

**5. Better Health Outcomes.** While physicians also listed this in their benefits categories the frequency placed it last ( $n = 11$ , 17%). Physicians mentioned the following positive health outcomes *“Proactive approach to decreasing comorbidities associated with obesity”* and *“Decreasing stigma of BMI”*.

***Barriers***

*Please list potential barrier(s) to collaboration between pediatric primary care providers and school nurses in addressing childhood obesity.*

All respondents were given the opportunity to enter at least 3 possible barriers to collaboration between physicians and SNs around childhood obesity. Ninety-two (81%) nurses and forty-six (73%) physicians chose to submit barriers to collaboration. Among the 92, twenty-six SNs (28%) submitted only two barriers while 50% ( $n = 46$ ) entered three barriers. Among the 46 physician respondents, twenty-eight (61%) listed two barriers and half that listed three barriers ( $n=14$ , 30%).

Barriers fell into 9 categories for physicians and SNs. While five of the categories were very similar, the remaining categories differed between the groups. The similar categories were **“Lack of Time”**, **“Parental Concerns”**, and **“Role of the School Nurse”**, **“Cost”**, **“Privacy”**, and **“School Issues”**. The three unique categories for SNs were **“Difficulty Accessing”**, **“Lack of Common Goals”**, and **“Avoiding the Issue”** while physicians’ four unique categories

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included, "No Communication System", "Lack of Interest" and "Already Addressed".

### School Nurses

Barriers for SNs could be categorized into nine categories listed in order from most to least frequent. The barriers are listed by category title and frequency in Table 19 as well as Figure 7 depicting the percentages of providers for each category as submitted among all responses. A number of barriers were identified which were not aligned with any category. These included such unique responses as: location, TV, physician education. These were excluded from category listings.

**1. Lack of time.** SNs listed this very frequently  $n = 43$  (47% of total number of SN respondents). This category included such barriers as too large a patient caseload, and references to activity levels. Forty-three percent ( $n = 14$ ) of the 32 first responses listed referenced lack of time, simply using the single word 'time'. In the second and third entry spots, far fewer used the single word 'time' ( $n = 4$ , 20%) but rather used longer phrases, such as "*Finding time is difficult in busy school nurse office and/or pediatric practice*". Other than the single word "time" sentiments included "*Time to actually communicate is a major factor*" and "*80-100 student visits/day-1 nurse, our nurse leader also has a school, need a person to address improvements rather than simply getting through every day*". Some SNs advocated for the physicians, "*Pediatric PCPs too busy during the day to talk with school nurses.*"



**2. Parental Concerns.** This was the second most frequently cited barrier among SNs ( $n = 39$ , 42%). The entries included denial of issue, refusal to sign release of information, not wanting schools involved and cultural concerns. While the sentiments covered a wide variety of concerns the focus was squarely on parents as indicated by the following examples, *“Not all parents see obesity as an issue.”* and *“Parents may not approve of information being shared with the school”* as well as *“Parents get defensive don’t want nurse involved.”*

**3. The Role of the School Nurse.** While this category was listed much less frequently by SNs ( $n = 20$ , 22%) than previous category, it mentioned sentiments similar another category “Difficulty Accessing”. SNs expressed such concerns as physicians having no interest in collaborating with SN, physician’s lack of knowledge regarding SN capability in the school setting, or not considering SNs a part of a child’s health care team. The following quotes typified this category, *“Physicians need to be far more knowledgeable as to what school nurses actually deal with on a daily basis. They are not well versed in the school nurses role”* and *“The Pediatric PCPs lack of knowledge as to the role of the school as a member of a students’ health care team.”* The last exemplar hinted at the perception of SN professionalism by physicians, *“I have been told by pediatricians not to lose my “real nursing skills”(because I had prev. [sic] worked in an ER).”*

**4. Cost.** Among SNs this category was notable ( $n = 11$ , 12%) and included any issues related to money; “time is money” or not billable, lack of funding or resources, also reflected costs for families (e. g. high cost of nutritious food). SNs identified such issues as *“No programs readily available in our area. Going into*

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*Boston is too time consuming and expensive” and “income/price for nutritious food” as well as “payment issues/reduced billable time.”*

**5. Difficulty Accessing.** This category was submitted just slightly less than the previous category ( $n = 10$ , 11%) though is closely linked with ‘Role of the School Nurse’. This SN category included no return on phone calls/referrals or no interest by physician. In this particular category, some SNs expanded well beyond the single line response and their feeling of being overlooked by physicians was evident in the following statements, *“The impression I have received over the years is that school nurses are not considered as “professional” or as “knowledgeable” as hospital pediatric nurses. Physicians tend to dismiss what school nurses say, if you can ever get to actually speak to them. A significant number do not return numerous calls” and “Inaccessibility of doctors; school nurses seem too low on their list of collaborators.”*

**6. Avoiding the Weight Issue.** A group of SNs offered this as a barrier ( $n = 9$ , 10%); this category reflected the SN perception that physicians were not addressing weight issues with patients or minimize the issue, as well as not teaching families. In this category, SNs felt physicians were creating a barrier to collaboration by either not bringing up the topic of weight with families or skirting the issue as indicated by the following, *“The pediatricians measure BMI, but do they address it?” and “Still have pediatricians stating the child will ‘grow out of it.’”*

**7. Privacy Issues.** This category was expressed by several SNs ( $n = 7$ , 8%). The topic covered issues such as HIPAA and concerns that physicians did not want weight issues to go outside of the primary care office. Most often SNs spoke about physicians and projecting concerns about privacy upon them, *“Pediatric PCPs often want to keep this between them and individual for privacy”* and *“Inappropriate privacy concerns by physicians.”*

**8. Lack of Common Goals.** This was a unique category for SNs and was submitted by a small but noteworthy respondents ( $n = 6$ , 6%). This category addressed the disconnection between physicians and SNs specifically regarding weight issues for school age children. This category focused on providers not being on the same page or having different goals and priorities, as demonstrated in the following statements, *“lack of understanding re: issues related to school attendance and success”* and *“Not being on the same page about referring”* in addition to *“Obesity may be a low priority compared to the acute health needs of students.”*

**9. School Issues.** This last category for SNs showed the smallest number of respondents ( $n = 4$ , 4%) but spoke to a unique dilemma in SN – support of the SN by school administration. This category addressed problems imposed by school systems with getting supplies or access to providers or families. This is indicated by statements such as, *“This school district does not support reporting of BMI's”* and *“Supportive resources for school nurses, ex phone line, message service.”*

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### Physicians

Physicians indicated some of the same barriers as SNs; however, distinctive categories were also identified. Physicians also indicated “**No Communication System**”, BMI “**Already Addressed**” in the primary care setting, and “**Lack of Interest**” as further barriers to collaboration between the provider types. Barriers for physicians could be categorized into nine categories listed in order of the most frequent to least frequent occurrence. The barriers are listed by category title and frequency in Table 20.

1. **Lack of Time.** According to physicians, time is the first and foremost barrier to being able to collaborate ( $n = 25$ , 54% of physician barrier respondents).

Physicians used phrases which reflected a mutual lack of time, “*Time – difficult to reach, no time in a busy day to make calls*” and “*Busy professionals, no time*” as well as “*Our schedules are not consistent, nurse difficult to reach after hours.*”

2. **No Communication System.** The second most frequent response by physicians ( $n = 13$ , 28%) centered on the difficulties trying to link two separate systems to be able to communicate. The barrier is focused on mechanisms rather than people. Recognition that the collaboration was limited due to communication impasse was typified by comments such as, “*Unshared EMR*”, “*Need to create a system of communication that links consistently*” as well as “*Communication systems/mail and fax outdated*”.

3. **Parental Concerns.** For physicians, parental issues were tied for second most frequently cited barrier. Thirteen of the total physician responses (28%) referred to this issue. The sentiments surrounding parents encompassed a wide range of concerns from cultural differences, to apathy on the parent's part, to being labeled by school, as indicated by the following quotes, "*Cultural*" and "*Parental resistance*" plus "*Families feel the school is judging them*"

4. **Role of the School Nurse.** Lack of knowledge regarding the role or capability of the school nurse was identified by physicians slightly less than parent issues, with 9 physicians referring to SNs (15%). While some physicians acknowledged the workload burden of SNs, the majority of the respondents reflected their knowledge deficit of SNs as indicated by, "*No idea what the nurse would do*" and "*Lack of knowledge regarding training/qualifications of nurses to address issue*" which is counterbalanced by "*School nurse is overwhelmed with numbers of students identified*" and "*Not enough nurses in the school system*"

5. **Cost.** Physicians expressed the same financial barriers at a rate similar to SNs ( $n = 6$ , 13%). "*Lack of community resources (gyms/pools)*" and "*Poor reimbursement*" were some examples of proposed financial barriers.

The remaining 4 barrier categories were all listed by equivalent numbers of physicians and are listed in no particular order. Two categories address same concerns as SNs (Privacy and School Issues) while the remaining two are entirely unique to physicians.

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6. **Privacy.** This category appeared much less for physicians than SNs, comprising only 6% (n = 3) of all barrier responses. Entries suggested that a break in patient privacy may limit collaboration with SNs by using simple phrases such as “*Confidentiality*” and “*Patient privacy.*”

7. **School Issues.** A small group of physicians (n = 3, 6%) felt schools were barriers to collaborating around childhood obesity and tended to focus on the school’s faults and not collaboration. The following quotes suggest the barriers created by school system, “*School menus not addressing needs*” and “*Limited time given for physical education during school day.*”

8. **Already Addressed.** Very few physicians (n = 3, 6%) felt that school based BMI screening and referral was redundant and unnecessary. The following statements indicate these concerns, “*Problem already known and being addressed*” and “*If patient already coming to the practice the physician will be aware of the obesity and it may be stigmatizing to have the school nurse add to this issue.*”

9. **Lack of Interest.** This category was identified by small number of physicians (n = 3, 6%) as a barrier. The category suggested some, if not all, of the providers involved were not vested enough to seek collaboration. This was captured by phrases such as, “*Lack of interest in stakeholders*” and “*Lack of willingness on either side.*”

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### *Thoughts*

The next section will examine the longer statements submitted by respondents to the final question of the survey. The survey respondents were given the opportunity to tell about their personal experiences as well as the feelings associated with those experiences.

*The following question gives you the opportunity to tell more about your experiences. Please answer truthfully. Give your thoughts about collaborating with school nurses/pediatric primary care providers around childhood obesity.*

Twenty-eight (44%) physicians responded to this prompt, while 68 (60%) SNs entered their thoughts. Prior to coding, the participant's responses were reviewed on a descriptive level. At this level, one examines the basic information and not necessarily the underlying content. Following the basic descriptive content, more subtle meanings are interpreted by searching for codes and themes. The responses from both types of providers were analyzed using the qualitative content analysis described by Graneheim and Lundman (2003). Graneheim and Lundman indicate the process of qualitative content analysis may involve the manifest content as well as the latent content. The manifest content may present the overt message of the respondent while the latent content underlies the overt statements. Beginning the process of latent content analysis, according to Graneheim and Lundman, a unit of analysis is established. While this unit may constitute many forms in this study, a unit of analysis was chosen as the responses to: thoughts regarding SN/physician collaboration around childhood obesity. Analysis of responses by School Nurses and physicians are presented separately.

***Manifest Content Analysis***

School Nurses

Negative views of the school based BMI screening were explicitly expressed by 2 SNs who felt the school based screenings were not helpful or “*a waste of time*”. Only a single SN expressed full approval of the school based BMI screening. Comments more frequently (n=10) reflected SNs’ concerns about the repercussions following school based BMI screening: two SNs reported that local school committees stopped them from either reporting the BMI to families or sending resource information to families with the BMI results. SNs reported backlash from families who were shocked by the results of the BMI screening and families who subsequently exempted their children from future screenings. Other SNs received negative feedback from physicians, stating SNs should not be doing these screenings in school, either directly or through a parent. Other SNs felt their hands were tied by the sensitivity of BMI screening while others felt schools were simply collecting data without any follow-up, especially if the physician did not refer the child for further care.

Physicians

Among physicians, only a single physician referred directly to the school based BMI screening suggesting the wording on the referral form was too difficult for families; proposing instead that the referral form “*simply list height/weight, possibly BMI and not define.*”



***Latent Content Analysis***

Subsequent to the manifest content, underlying meanings of provider responses were sought; a major theme emerged from the subthemes which were developed from coding. The major theme which emerged for both SNs and physicians was “Lack of understanding drives frustration to the point of immobility.” This theme describes the futility many providers expressed not only regarding collaboration with someone in a different physical location but also limited by resources. These resources may include asynchronous schedules, no easily accessible system of communication, and no productive way to transmit information. Frustration was reflected in descriptions by both SNs and physicians. There were several examples of providers who conducted nutrition or exercise programs independently while there was no recognition or awareness by other providers as well as the mutual frustration or inability to effectively treat or manage childhood obesity. The frustration loomed so large that some providers stop assessing children, instead placing blame on families. The concept that “this issue is beyond my control” recurs frequently. While culminating in a single major theme, there were differences noted between the subthemes when evaluated by provider type, SNs and physicians. These unique subthemes are reviewed below. The development of condensed meaning units, subthemes and themes can be seen in Table 21 and 22.

**School Nurses**

Listed below are five subthemes which arose from SNs’ responses. Each subtheme is described and followed by exemplar quotes.

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## *Subthemes*

### **A. No connection to the other professional**

Collaboration in general between SNs and physicians supersedes collaboration specific to childhood obesity. SNs specifically referred to the lack of connectedness to physicians which was reflected in statements that suggest SNs may be considered less skilled than hospital nurses or that SNs do not need medically relevant information about their students.

*"I came into school nursing from the hospital setting where I was a well-respected member of the health care team. Once I crossed over to the school setting that experience changed. I was now questioned when I called to collaborate with pediatric PCPs and they were guarded with their responses."*

*"I have had a variety of experiences ranging from having pediatricians/specialists call me and discuss treatment (mainly mental health and diabetes issues), to having one pediatrician call my principal to complain that I was harassing him and his patients by sending home letters regarding immunization noncompliance. Pediatricians with whom I have worked in various capacities in either the office, flu clinics, or in the hospital are much more respectful of my input."*

*"I believe some physicians will think they have more important issues to deal with and no time to collaborate with us. Some will feel they handle things in the office."*

*... I have had students come back to school after open heart surgery and the only written document from a physician was "please excuse my patient....from school from 5/1 to 5/15". Of course the parent met with me and said, "The doctor said he should take it easy for the next few weeks, etc." Sometimes the parents do not give us the full reports, etc.*

### **B. There are forces beyond my control which prevent collaboration from happening**

The inability to access physicians, including a lack of returned phone calls and/or referrals weighs heavily in SNs responses about their ability to collaborate. SN responses indicated this disconnection occurred with all forms of communication.

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*“For the most part I have had very good relationships with the PCPs, I find direct (phone) works very well, written paperwork does not get filled out and returned without a great deal of follow up.”*

*“Every student in this school has an annual physical exam and yet obesity is not addressed during that office visit- which means no information for the patient, no information for the parents and no information for the school nurse.”*

*“In the 9 years I have worked at this school, which is located less than a block away from the \_\_\_\_\_ neighborhood clinic, I have never received a call back from a PCP(all pediPCPs are MDs). I have had pregnant students (8th grade), students returning from hospitalizations from asthma exacerbations, a student with a PICC line, a 1st grade student with C-Diff, all return to school without documentation from the PCP, and when I call, I am told "S/He is busy", without a word back from the PCP. NEVER”.*

### **C. I don't know how to make this happen by myself**

Some SNs described programs they implemented in their schools; however, they also described the challenges posed by external forces which may be counteracting their efforts.

*“I feel we both have our respective hands tied, school nurses are so busy ... PCP's have many time constraints and insurance companies have yet to embrace wellness... We have a lot of forces working against wellness in our culture. My school district has an overweight/obesity rate of 46%. ...*

*I work hard organizing additional non-curriculum based nutrition awareness and exercise programs at our school. We have developed a Get Healthy, Grow Strong, & Have Fun program which focuses on the federal guidelines.... Not sure exactly what they get from it all but we keep on telling them, maybe it will be in their sub-conscious enough to sink in.*

### **D. School Nurse as untapped resource regarding children and school systems**

School Nurses proposed a lack of understanding by physicians regarding actual SN function and level of expertise as indicated by the comments

*“I feel that many PCP's do not understand the role of the school nurse which includes preventative care.”*

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*"I do not think that most pediatric PCP's view school nurses as full, collaborative partners in managing the conditions, including obesity, of their patients in the school setting."*

*"Sometimes a lot of primary care providers do not understand the role of the school nurse and how it is more than just Band-Aids and ice packs. It would be wonderful for all of us to be on the same page when it comes to what we can and can't do in the school."*

*"As a school nurse I find it often difficult to talk with primary care providers, it is rare, yet we have a lot of knowledge history and insight about our students."*

Active efforts to change this scenario were described by a SN,

*"\_\_\_\_\_ just sponsored a professional development program last week in which \_\_\_\_\_ School Nurses presented on their initiative to connect with area providers. ... The \_\_\_\_\_ School Nurse Leader has presented at Pediatric Grand Rounds at \_\_\_\_\_ Medical Center, which is a big step. For individual districts and school nurses, finding a way to connect with pediatricians and other health care providers remains a challenge."*

### **E. How can collaboration around obesity happen?**

The issue of obesity felt so overwhelming for many SNs that collaboration did not seem feasible. Obesity is difficult to diagnose, difficult to treat, and it is difficult to garner support from families so that collaboration seems almost insurmountable.

*"Obesity is like the silent, slow moving disease that we can put off to discuss another day. It's a very uncomfortable topic."*

*"It would be helpful but many parents are sensitive about this issue."*

*I think the single most important factor is the home eating environment and a commitment from the primary caregiver, Mom Dad or other to adopting a healthy lifestyle. Our efforts should be towards supporting families.*

Some SNs posed questions rather than describe an experience of collaboration,

*"We have not coordinated with the primary care physicians in regards to obesity. Who do you think should initiate this collaboration? What type of programs should the school be offering and should this be put on/in the schools?"*

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Repeatedly SNs indicate that not only is collaboration nonexistent, the topic of obesity remains in question by physicians and so they never reach the stage of collaboration:

*“Required physicals received from PCP rarely have student's BMI recorded. When asked if PCP has recommended or discussed weight issues, rarely has student discussed or initiated a weight reduction plan”.*

*“Local PCP never initiates dialogue with the local school nurses or share any information on their protocols for addressing obesity.... Obesity is rarely listed as a diagnosis or medical problem for any child.”*

*“While there is improvement in addressing the issue of obesity not all PCP's are on board and do not discuss with parent forthrightly. ‘They'll grow out of it’.”*

### **F. Collaboration around obesity *could* happen**

While many SNs questioned if collaboration around obesity could possibly occur, a small group of SNs suggested there may be processes for making this happen. However, suggesting pathways to collaboration implies this is not the current state.

*“I would love to see a yearly professional meeting between local pediatricians and school nurses to discuss obesity issues in detail and produce guidelines that both the physicians and school nurses could work towards achieving. Face to face meetings allow the pediatricians and school nurses get to know each other on a much more personal level and be able to work cohesively towards the end goals of healthier students.”*

*“I believe there is opportunity for better collaboration in terms of mutual goal setting, follow up and assessment of families and students.”*

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### Physicians

Most physicians referred in general terms to the issue of obesity and the difficulty in addressing, treating, and managing on an individual patient/family level. While the major theme was consistent with SNs, their subthemes were subtly different.

#### *Subthemes*

##### **A. No connection to the issue or person**

Physicians may simply lack knowledge regarding SNs and/or childhood obesity; two physicians reported,

*“I would like to do this but have never been contacted by a school nurse (nor have I tried to reach out) - the onus is on both of us, I guess.”*

*“... I don't know how we could implement an open dialogue with school nurses for such a small need.”*

##### **B. Competing forces**

Beyond not knowing the other provider there were other factors that impeded the physicians' ability to collaborate including the substantial amount of mandatory paperwork and ongoing time constraints.

*“Worry it would increase my already heavy paperwork burden. How can it become more than just forms and record keeping?”*

*“There are time constraints on both sides to come up with a mutually acceptable approach to addressing the issue as well as f/u with the status of students.”*

##### **C. How can collaboration around obesity happen?**

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While logistics is one subtheme, this subtheme focuses specifically on the challenge of obesity itself. Similar to SNs, some physicians expressed the ongoing dilemma of childhood obesity as well as the lack of forward motion on this issue.

*“The most frustrating part of our work! Not sure that school nurses can do much.”*

*“Obesity is a very difficult topic and health issue to turn around. ... Health care providers can try to educate people but the outcomes are rarely rewarding for the amount of effort required.”*

*“I don't feel it's made a huge impact, except in a few select cases.”*

*“Obesity is a very difficult topic and health issue to turn around. It is time consuming and only the patient and his/her family can ultimately make changes necessary to reverse obesity.”*

### **D. Limitations of School Nurses**

Some physicians expressed concerns that SNs were very limited in their scope and that the topic was already addressed in the primary care setting.

*“School nurses' role largely limited to mandatory screening and triage of acute illness.”*

*1. School nurses have little control on types of food provided in the cafeteria or the amount of time and quality of physical activity the school provides. 2. Need to find time to make it happen. 3. Need to develop a plan that is feasible for all parties and that also has ongoing monitoring of effectiveness.*

*“I do think that it is addressed in the primary care office already. The nurse could certainly augment the overall care and well-being of the patient/student.”*

### **E. Collaboration around obesity *could* happen**

Several physicians were optimistic about collaborating with SNs, some even suggesting methods to facilitate the process; however, it was clear that none of these strategies were currently happening.

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*“Very much in favor. Trusted individuals. Groups are useful in school too!”*

*“I think there needs to be a "physician/provider champion" of obesity at our clinic to be the expert in collaboration with schools. ...It needs to be "carved out" in a thoughtful, proactive and mindful way that is sustainable...”*

*“I think if somehow a team approach model could be est. via guidelines we could make the biggest difference. Also, I think sharing of handouts/computer messages/any education materials could help us with collaboration.”*

*I would love to help nurse create active programs ... (CrossFit, running) programs during recess.”*



## **CHAPTER 5 DISCUSSION**

This study begins to explore the knowledge gap regarding collaboration between primary care providers and school nurses, in general, and specifically, as it pertains to childhood obesity. The Four Dimensions of Collaboration Model was used as a foundation for the development of a survey utilized to collect data from the key stakeholders in this collaboration; school nurses and pediatric primary care providers. In addition to researcher developed questions, the Jefferson Scale of Attitudes toward MD/RN Collaboration, a validated scale of nurse-physician collaboration, was included with the survey. Finally, open ended questions were included to give participants the opportunity to explain their beliefs regarding the barriers and/or benefits to collaboration as well as their personal thoughts and experiences regarding collaboration around childhood obesity.

The findings from the study derive from quantitative as well as qualitative data. The two methods did not always demonstrate agreement, which is an important finding in itself. While providers often expressed a positive attitude toward collaboration using the scored instrument, their personal thoughts often spoke of the challenges they faced attempting to collaborate. Some of these sentiments may reflect general barriers to collaboration, but they may also reflect the inherent difficulties in assessing and treating childhood obesity. The intent of this study was to examine the attitudes towards and practices associated with

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collaboration between SN and physicians. In addition, insight into the barriers, benefits, and experiences regarding collaborating around childhood obesity as viewed by health care providers were identified.

### **Sample characteristics and demographics**

The study participants were school nurses (N=114) and pediatric primary care physicians (N=63) who have practiced in the state of Massachusetts for at least one year, during the period of time when school based BMI collection and referral was a statewide mandate. Comparison of the study sample as representative of the population of SNs and physicians will be considered before describing their attitudes towards and practices of collaboration.

#### **School Nurses**

The SN sample included in this study reflected a group of primarily middle aged women who have worked as SNs for approximately 12 years and are primarily members of the National Association of School Nurses (NASN) and serve schools in the Essential School Health Services (ESHS) program. A national survey of school nurses is conducted bi-annually, with the two most recent collections being conducted in 2013 and 2015. Comparing the current study's sample with the nationally available data on SNs suggests that this sample is generally representative of SNs across the country. In 2015, Mangena & Maughan investigated over 8000 of SNs via an online survey. The average age of SN respondents in this study was slightly younger than the national average; however, the national survey's largest age group (48-56 years old) closely mirrored the

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current study's largest age group (Mangena & Maughan, 2015). Also in line with the national statistics, the number of years practicing as a SN in this study was similar to the 2013 results which indicated that on average SNs practiced 11.2 years (Mangena & Maughan, 2013). Among the 8000 NASN 2015 survey respondents, 57.1% reported being active members of NASN. The current study was open to any MA SN; however 68% of SN respondents were NASN members. This high rate of NASN membership may reflect a strong connection to NASN via the local affiliate, Massachusetts School Nurse Organization MSNO.

Many schools combine grade levels across a wide variation; therefore, it is difficult to determine mutually exclusive categories. The current study indicated that the greatest percentage of SNs was employed in elementary school settings, which supports the findings reported by national studies (Mangena & Maughan, 2015). Along with school type, SNs in this study reported being responsible for between 0 and 4750 students; with 501-750 students being indicated as the most frequent size group. This finding is also consistent with NASN 2015 data which indicated that the average number of students per school nurse in the New England region was between 588-849 students (Mangena & Maughan, 2015).

In terms of practice location, the majority of SNs in this study reported that they worked in a suburban location. NASN 2015 statistics indicate that 50.9% SNs work in a suburban location, 30.6% in a rural area and 25.1% in an urban location (Mangena & Maughan, 2015). Massachusetts, unlike much of the United States is not considered a highly rural state. Therefore, the composition of

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SNs practice locations followed more closely the Common Core of Data (CCD) demographics held by the National Center of Educational Statistics (NCES) of predominately suburban settings, followed by urban and then rural locations (NCES, 2007). However, in the current study, more respondents were from urban locations (29% vs 23%) and less from rural location (8% vs 15%) than noted in the CCD. Some of this difference could be accounted for by population changes since 2007. In addition, rural SNs often cover multiple schools and may not feel they have time to participate in non-priority tasks (Hines, Cole, Martinez and Kauffman, 2015).

MA SN respondents reported more advanced academic degrees than the national average; 44% of SNs holding Masters or doctorate degree while only 11.5% of SNs nationally possess Master's degrees (Mangena & Maughan, 2015). This finding is consistent with MA Department of Public Health, School Health Division Report regarding the Essential School Health Services (ESHS) program. The most current report (2012) of 72 districts indicates among SNs serving in ESHS schools, 35% had advanced degrees (Master's or above) and 25.1% for partnering schools (DPH, 2012). Research and advancing education are encouraged and supported in the ESHS program.

Other possible reasons why study participants may have reported a greater number of advanced degrees is that in MA most SNs are salaried using the teachers' Collective Bargaining Agreement (CBA) with remuneration for advancing levels of education. In addition, MA is a renowned center of education

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with several local opportunities to advance nursing education including a graduate program specific to school nursing (e. g. Cambridge College Masters of Education in School Nurse Education, Northeastern University School Nurse Academy).

Sixty-eight percent of the SN respondents indicated that they were NASN members, which is slightly higher than the national levels reported in the NASN2013 and NASN2015 surveys, 65.6% and 57.1% respectively (Mangena & Maughan, 2015). There are a number of potential reasons for this reported difference. Mangena and Maughan (2015) suggest that the decline noted between 2013 and 2015 may be related to the active recruitment of non-NASN members for the 2015 national survey. In addition, Gaelmore (2012) noted that only 20% of eligible SNs across the United States were members of NASN. One possible explanation for the rate of NASN memberships in Massachusetts may be that increasing membership was a part of the strategic plan for the Massachusetts chapter of NASN for the 2012-2015 period (MSNO, 2016).

A high proportion of respondents may reflect a unique combination of two factors: NASN membership and ESHS participation. Both of these professional organizations encourage involvement in school nursing research. As mentioned previously, a high number of respondents were members of NASN. In addition, the recruitment of MA SNs for this study was conducted through the MA SN listserv, an electronic database organized and maintained by the MA Department of Health's School Health Services which is closely tied to ESHS programs. SN

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members of ESHS districts are strongly encouraged to participate in SN research.

In the recruitment email to SNs, the investigator identified herself as a SN conducting research specific to school nursing. This may have increased the number of respondents as 72% reported belonging to ESHS programs.

An integrative review by Schadewaldt, McInnes, Hiller and Gardner (2013) which included both qualitative and quantitative data from 27 studies identified barriers and facilitators to NP-Physician collaboration. The most common barrier found was a “lack of awareness by physicians of the scope of practice of NPs, their level of education, and what is inherent in their role” (2013, p.5). While other barriers were also identified, both physicians and NPs in this review were reported to support collaboration.

The high percentage of advanced degree SNs, though not necessarily NPs, in the current study may have resulted in a more positive attitude toward collaboration as indicated in both the general nursing and nurse practitioner literature. At the same time, the high percent of Master’s prepared SNs may also explain the degree of frustration identified in some respondents comments regarding a lack of physician understanding related to their role and capabilities.

### **Pediatric Primary Care Physicians**

Physician characteristics were also explored for their agreement with current physician population characteristics. Pietras et al. (2012) examined the response by MA pediatricians to the school based BMI screening and referral

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mandate in MA. Members of the MA chapter of the American Academy of Pediatrics (MCAAP) were surveyed using the Pediatricians' Attitude toward BMI Screening in Schools Scale (PABSIS). As part of PABSIS survey, Peitras et al. (2012) collected demographic information on their survey participants. These demographics were utilized as comparison for the current study's physician characteristics as they represent a very similar population

The results of the current study indicated a slightly higher percentile of female physicians than Pietras et al. (2012) reported. Historically, pediatrics has the highest proportion of female physicians than any other medical specialty (Spector et al., 2014). While Pietras et al. (2012) surveyed only members of MA Chapter of the American Academy of Pediatrics (MCAAP), the current survey was opened to a random sample of physicians who were licensed by the Board of Registration in MA. The vast majority of MA pediatricians in the current survey reported being members of AAP (95%), closely mirroring the MCAAP.

Other physician characteristics included average age, which was the same as the AMA national data which indicates that the average age of physicians in the US is 51 years of age (AMA, 2014). The impact of gender and generational effect on pediatricians' workstyle were identified by Spector et al. (2014) who reported that 4 generations simultaneously occupy the profession. This was reflected in the current study where the most frequently cited physician age groups were 30-40 year olds and individuals over 61 years of age. Age may have a significant impact on attitudes toward collaboration as it may influence not only

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work style but also perceptions of autonomy and the hierarchal structure of healthcare professionals. Years in Practice may also influence practices and attitudes as this factor statistically correlated with Age. The current study revealed a much more novice group of physicians than was reported by Pietras et al. (2012). Forty-three percent of respondents in the current study reported being in practice between 1-10 years, while Pietras et al. (2012) reported that only 16% of their sample were novices. This difference in years in practice may be reflective of the survey topic and its importance to each age group. It is possible that younger physicians may be more attuned to collaboration and willing to participate in the current survey; while older physicians may have wished to voice their feelings about school based BMI screening.

As with the SNs participants, designation of practice community location was based on zip codes and the National Center for Educational Statistics (NCES) designations of urban, suburban, and rural areas. The highest percentile of physician respondents reported suburban practice locations which corresponded with the results reported by Pietras and colleagues (2012). Similarly, nearly half (47%) of respondents in this study reported working in group practice settings which was also consistent with national averages (Pietras et al., 2012). Pietras reported that slightly more pediatricians worked in solo practices than the current data indicate; however, a solo designation in the Pietras study included 1 *or* 2 physicians. The results of the current study indicated a higher percentile of physicians worked in community health centers yet the physician sample



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investigated in the current study closely correlated with the most current national data on physicians (AMA, 2014).

### **Attitudes toward MDRN Collaboration**

Provider's attitudes toward collaboration were determined by scores on the Jefferson Attitude toward MDRN Collaboration Scale. Total scores, as well as factor scores of the instrument (Shared Education and Collaboration, Caring versus Curing, Nurses' Autonomy and Physicians' Authority) were considered.

The mean total JCAS scores by provider type indicated that SNs were significantly more positive toward collaboration than physicians. However, despite this statistical significance, total mean scores were very high for both provider types. While no previous studies have investigated these constructs in SNs and physicians, nurses have historically scored higher on measures of collaboration when compared to physicians. Brown, Lindell, Dolansky and Garber (2015) investigated nurses in a Level I trauma center using the JSAC and reported similar mean JSAC scores to those identified in this study. Similarly, following an educational intervention regarding interprofessional collaboration, both medical residents and nurses demonstrated improvement in total JSAC scores; however, nurses scored higher than the medical students, in both pre and post intervention scores (McCaffrey et al., 2012).

Researchers working outside of the inpatient arena have also reported higher scores in nurses using the JSAC. Hansson and colleagues (2010) reported

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that district (visiting/homecare) nurses had a more positive attitude toward collaboration than the general practitioners with whom they shared patients.

Alcuskys, Ferrari, Rossi, Liu, & Malo (2015) found a similar scoring pattern among nurses and physicians in recently established medical homes.

In the current study, three of the four factors of the JSAC revealed significant differences between provider types: Shared Education & Collaboration, Caring versus Curing, and Physicians' Authority. The fourth factor, Nurses' Autonomy, was ranked highly by both provider types. SNs were more positive regarding Shared Education & Collaboration and Caring Versus Curing factors; but were more negative toward Physician Authority than physician respondents.

Looking more closely at the individual statements comprising the JSAC Factor Shared Education and Collaboration, 3 statements directly refer to interprofessional education. Physicians scored significantly lower than SNs on two of the three specific statements as well as the third statement though not reaching statistical significance. In contrast, support for collaboration was voiced in the physician qualitative data in the category "Collaboration around obesity could happen" in which physicians proposed strategies to enhance collaboration. One physician's comment, "Training in collaboration is much better today and old ways die off" suggested a more optimistic future enriched by interprofessional education.

**Provider characteristics and practice demographics associated with attitude  
toward collaboration**

While there were no statistically significant findings regarding SN demographics, some interesting trends were noted in regards to years in practice. SNs with the least experience (1-10 years) scored lowest in attitude toward RN-MD collaboration. This may be explained by the fact that novice SNs may lack the experience and affiliation with local physicians. This phenomenon has been previously reported in the literature. Wang, Liu, Li & Li (2015) investigated attitudes toward collaboration in Chinese student nurses, medical students, nursing (a category unique to China) and medical interns, experienced pediatric nurses, and practicing pediatricians. The authors reported that both student nurses and medical students scored lowest on the JSAC, indicating the most negative attitudes toward collaboration among the six groups.

Some of the SN qualitative responses suggested that physicians were much more reluctant to communicate with SNs in the community (school-based) setting, as compared to a hospital setting where the nurse may have established herself as a respected and valued member of the healthcare team. The challenges faced in the initial decade of a school nursing career are captured in responses by SNs who have transferred from hospital based nursing to school based nursing. In the hospital setting, nursing is given all the same information as the medical providers. In the school setting the transfer of medical information is inconsistent or may not even occur. Given this level of frustration, it may be that many nurses

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leave school nursing after the first few years. It appears though if SNs continue into a second decade of school nursing, the youngest SNs were more positive in their attitude toward collaboration than other SN age groups in their second decade of career. This may be explained as many SNs may be establishing themselves in the first decade of their SN careers or that these individuals may have had some positive experiences and still view the potential for collaboration as tenable.

A predictive model of SNs attitude toward collaboration (either positive or negative) could not be determined. This may be interpreted as there is no one type of nurse who is more open to collaboration than any other. As the mean total scores indicate, and as previous studies suggest, most nurses, including SNs, think positively of collaboration. However, the qualitative responses related to this construct speak to the struggles SNs face in attempting to collaborate with physicians.

In contrast to SNs, a predictive model of physicians' attitudes toward collaboration was developed and included the following factors: moderate (11-33%) percentage of obese patients, working in a suburban community, and being between the ages of 51-60 years. Physician respondents who worked in suburban communities had a more negative attitude toward collaboration than their urban and rural counterparts. These findings are similar in part to the work of Pietras and colleagues (2012) who surveyed MA pediatricians about school based BMI screening. Their findings indicated physicians in urban settings had a more

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positive attitude toward BMI screening than their counterparts in non-urban locations which they theorized may be due to the higher incidence overweight/obese pediatric patients though percent obese patient was not significantly associated with the PABSIS scale (2012).

Unlike Pietras and colleagues (2012), the model developed from the current data indicates a novel finding and suggests that having a relatively small or moderate percentage of obese pediatric patients had a negative effect on physicians' attitude toward collaboration. It is possible that the percent of overweight or obese patients may be related to the practice community as the incidence of childhood overweight and obesity has been found to be linked to socioeconomic status (Liebowitz, Foley, Gapinski, Sheetz, Smith, 2012; Ogden, 2010). It is also possible that suburban physicians may encounter fewer children with weight issues and therefore may be less likely to identify the need to collaborate or perhaps feel it is "already addressed" and does not warrant collaboration. However, there is no definitive knowledge available regarding this phenomenon and therefore a need for future research in this area to better understand how the percentage of obese patients or practice setting may influence attitudes toward MDRN collaboration.

Despite these negative factors, a third variable, physicians' age (51-60 years) reflected a significantly positive effect on attitudes regarding collaboration. This also represents a new finding as the literature concerning age and attitude toward collaboration has primarily focused on younger professionals, nursing

students and medical residents. One can theorize that by 51-60 years of age, physicians have become comfortable in their role and recognize the value of working with others. This remains untested and indicates an area for future research, as this age group of physicians has not typically received education around interprofessional collaboration.

### **Four Dimensions of Collaboration Model (FDCM)**

Provider attitude was only one aspect of collaboration; provider responses regarding practice characteristics also demonstrated the presence of successful collaboration as proposed in the Four Dimensions of Collaboration Model (FDCM). Providers were asked to respond to queries addressing patient goals, visions, knowledge and trust of other professions, as well organizational support, leadership, and structural capacity for collaboration. While there are no established measurements for these dimensions, the results from this study provide an initial glimpse into beginning to understanding how these affect collaboration.

### **Client centered vs other allegiances**

The majority of both physicians and SNs reported membership in their professional organizations; however, utilization of clinical guidelines published by these respective organizations was less apparent. The vast majority of physicians indicated that they used a “combination” of guidelines without specifying a specific set. Klein et al. (2010) found that only slightly more than half (56%) of pediatricians self-reported being very or somewhat familiar with

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American Academy of Pediatrics (AAP) overweight/obesity guidelines. This infrequent utilization of the recommended professional guidelines is further illustrated by parental report. Liang, Meyerhoerfer and Wang (2012) reported that few pediatric healthcare providers followed guidelines (specifically, American Medical Association (AMA) guidelines) to counsel adolescent overweight and obese patients. While 86-88% of patients had their height and weight measured by providers, only 40-62% were given either dietary or exercise advice by the healthcare professional (Liang, Meyerhoerfer, Wang, 2012). Similarly, a study by Sesselberg, Klein, O'Connor and Johnson (2010), found the strongest factor related to Family Physicians' attitude toward BMI screening and counseling of overweight pediatric patients was limited by the providers' own self-efficacy. This finding was further supported by a seminal study by Cabana, et al. (1999) who constructed a theoretical model of physician barriers to following practice guidelines which included low self-efficacy as one of the major attitudinal barriers.

Underutilization of professional guidelines by pediatric healthcare professionals has also been demonstrated when screening for other conditions, such as pediatric hyperlipidemia. While the primary barrier to screening was reported to be discomfort with managing lipid disorders, the second most frequent response was unfamiliarity with current AAP guidelines (Dixon, Kornblum, Steffen, Zhou, & Steinberger, 2014). Guidelines serve not only to standardize care but also to provide the evidence upon which practice is based. The use of

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professional guidelines allows individual providers to follow evidence based principles, which they may not have the time and resources to develop independently. Non-adherence to guidelines may also indicate a conflict of allegiance to the client, professional organization, or the physician's own autonomy. Cabana et al. (1999) proposed this as one of the attitudinal barriers to guideline adherence, suggesting that providers may not agree with either the use of specific guidelines or guidelines in general. Reasons for lack of agreement with the guidelines, specific or general, may include lack of confidence in the guideline developer, impracticality of guidelines, and challenge to personal autonomy (1999). While contemporary guidelines are frequently developed through large committees and organizations, physicians may still find clinical guidelines as a challenge to their autonomy and personal judgements for their patients.

A similar pattern of knowledge deficit among childhood obesity guidelines was noted in SNs. Thirty-two percent of SNs were familiar with the AAP Four Step Approach. The majority of SNs (46%) reported familiarity with the Healthy Eating and Activity Together (HEAT), the clinical guidelines for children with weight issues developed by National Association of Pediatric Nurse Practitioners (2006). This rate of recognition may be related to the high percentage of SNs who reported advanced nursing degrees, although not necessarily as Nurse Practitioners. Twenty-three percent ( $n = 26$ ) of MA SNs reported they had a Masters' of Science in Nursing; of these only two identified as



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Nurse Practitioners. Matriculating through a Masters' academic program as well as professionally working with a pediatric population may have exposed this group of nurses to opportunities to speak with Pediatric Nurse Practitioners or attend a National Association of Pediatric Nurse Practitioner Conference and thereby increase their exposure to these guidelines.

### **Shared Goals and Visions**

Among physicians there was a higher level of agreement for all the identified goals with the lowest level of endorsement being noted for "awareness of complications of obesity." However, the results from SNs revealed less overall consensus. An interesting and somewhat counterintuitive result for the SNs indicated there was a discrepancy regarding the goals of decreasing screen time and increasing physical activity. These finding appears to be in conflict with Moyers, Bugle and Jackson (2005) as well as Nauta, Byrne and Wesley (2009) who both explored the knowledge of SNs in Missouri and New Jersey regarding obesity in school children. The same tool was used in both studies, a revised 55 item questionnaire which contained a subscale about etiology of childhood obesity. In both studies SNs identified "a sedentary lifestyle" as a major cause of obesity (95.3% and 98% respectively).

It is not clear why the SNs results indicate this discrepancy and further research is needed to understand the perception among SNs of screen time and sedentary lifestyle. It may be that the SN respondents may have conflicted views about decreased screen time in a school setting which relies heavily on computer

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use. In addition, one cannot rule out that the question was not clear for the SNs as some may not have understood they could make more than one choice or the choices were not stated clearly. Perhaps one might consider that some SNs do not consider they make goals for obese patients but rather help patients/students follow through on their personal goals.

### **Mutual Acquaintanceship**

This aspect of collaboration was measured by asking SNs and physicians about their knowledge and trust of the other professional and the findings reflect another weakness in the capacity to collaborate. A lack of mutual acquaintanceship was noted in greater than one third (37%) of physicians and 6% of SNs, as participants reported not knowing each other on a personal or professional basis. Frequency of interprofessional communication was tied into this concept, as SNs who communicated more frequently with the local physician had more positive attitudes toward collaboration. While there is no literature concerning frequency of communication between SNs and physicians, the importance of SN and provider communication has been highlighted. Heuer & Williams (2015) reported on the elements required for optimal Pediatric Nurse Practitioner coordination of care for the school age child with ADHD and included specific communication parameters between the pediatric provider and the child's SN.

Recent efforts have begun to address the need for mutual knowledge and understanding between providers. Foley et al. (2014) described two unique

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collaboration initiatives in western MA which brought SNs together with endocrinologists and an asthma coalition. The initiatives sought to improve the care coordination of children with diabetes and asthma, respectively. Both of these initiatives were successful, and led to presentations regarding these collaborations to providers at the medical center's grand rounds. Positive outcomes associated with this work included the rotation of pediatric medical students through SN's Health Office as well as physicians and medical librarian provision of continuing education to SNs (Foley, Dunbar & Clancy, 2014).

### **Trust**

While the overwhelming majority of physicians (96%) either agreed or strongly agreed that they trusted the SN to follow through on their medical management of students, fewer SNs trusted their physician colleagues. While over three quarters of SNs (76%) agreed/strongly agreed that physicians would listen to, and include their concerns about the health management of students into the medical plan of care, the qualitative data do not completely support these findings. Specifically, SNs reported that they believed 1) they are low on the list of collaborators for physicians and 2) that physicians had a lack of understanding regarding the function and capacity of SNs.

These results are related to the work of McDonald, Jayasuriya and Harris (2012) who conducted a qualitative analysis of community healthcare providers (i.e. general practitioners (GPs) and community nurses) regarding collaboration. One of the themes which emerged was "trust based on role perceptions" in which

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trust declined if the professional felt there may be overlap in the roles. In addition, “trust was based on demonstrated competency” which in part was based on the quality of a referral. Lastly, the theme “trust develops over time with good communication” could be achieved by phone conversation as long as there was receptivity and respect demonstrated by both sides.

These concepts were echoed in the current study by SN’s statements about lack of access to physicians or no information forwarded to SNs concerning mutual patient/student(s). Additionally, comments by physicians point to the lack of understanding of the SN role, no effective communication system, lack of belief in the capacity of the SN to affect change and needless redundancy of school based BMI collection. As suggested by McDonald, Jayasuriya and Harris (2012), “the interaction between trust and role perceptions went beyond understanding each other’s roles and professional identity” (p. 63). Trust is a unique component of collaboration which appears to need exposure to the other individual(s) to build. At this point in time, MA physicians seem to trust SNs on a generic basis though the reciprocal is less for SNs. Coordinated interactions, such as the School Nurse Physician Collaborative of San Bernardino County, CA (SBCMS, 2014) where organized meetings between SNs and physicians are necessary to improve trust in the other professional. Additional research regarding the lack of trust between physicians and SNs as well as processes and educations to improve trust, are clearly needed.

### **Centrality**

Centrality focuses on the presence of an organization or governing body which encourages its members to participate in collaboration. Enrollment in certain organizations (i.e. Essential School Health Services (ESHS) for SNs and Patient Centered Medical Homes (PCMH) for physicians) was used as a proxy for organizational support of collaboration. Slightly more than half of physicians reported belonging to PCMH which was consistent with the transition of primary care to the PCMH model in MA (PCMH, 2012). The higher presence of ESHS SNs may be reflected in the more positive attitude toward collaboration score; however, there is no existing literature to support this supposition. Neither ESHS nor PCMH participants demonstrated a statistically significant difference in total JSAC scores than their non-participating counterparts, thus the impact organizational enrollment had on an individuals' attitude toward collaboration is unknown.

### **Leadership**

In examining the other indicators of successful collaboration, it was clear that many pieces were either lacking or unknown by many of the respondents. Measures of leadership were represented by the presence of a manager who oversaw policies and procedures regarding collaboration with outside agencies, physician status as a school health physician, and lastly, notification of the school based BMI screening mandate to physicians. All of these factors incorporate the

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presence of leaders who either champion collaboration or who facilitate the process of collaboration.

The majority of physicians reported having a manager who handled policies and procedures, while many SNs were unsure about the existence of this leadership role in their workplace. Fifteen percent of physicians reported being school physicians. In MA, school physicians are designated as consultants for the approximately 525 districts in the state which may include public and charter schools (MA DESE, 2015). This representation of school physicians may explain why the participating physicians had less overall connection with and knowledge of SNs. A policy statement published by the AAP's Council on School Health (Devore, Wheeler & COSH, 2013) reports on the ambiguity which continues to surround the role of school physician despite the existence of the role dating back the late 19<sup>th</sup> century. Six activities were noted as common practices for school physicians, the foremost being communication with the child's own physicians. The AAP recommends physicians to communicate with school physicians rather than directly with SNs, possibly serving as a wedge between SNs and physicians. The necessity of the intermediary role of the school physician as well as its impact on collaboration between physicians and SNs suggests further investigation.

Lastly, there was little evidence of organizational leadership regarding the MA school based BMI screening and referral notification. Only 59% of physicians reported hearing of the mandate through either MA DPH or MA AAP, leaving many physicians suddenly involved in a process which they knew little

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about and had not included them from the start. These results are corroborated by Pietras et al. (2012) who reported that 40% MA pediatricians reported being unaware of the mandate. While posed from different viewpoints, it is clear that many physicians were not clearly notified of a healthcare change that would have direct implications for them and their practice.

### **Support for Innovation**

Leadership in the FDCM not only involves the presence of leaders but also innovation. Two questions asked providers to project the most reasonable methods of physician-SN collaboration regarding routine and complex health issues. For routine issues, responses from both provider types clearly supported the use of a written format, with a small percentage of providers recommending email notification. When issues involved complex health concerns, the phone was the method of choice for both providers. Rather than demonstrating innovation, responses indicated support for the existing format of written communication for routine health issues and phone conversations for complex health issues. However, the qualitative findings demonstrate some discrepancies. Several SNs reported not only a lack of returned referral forms but also no communication (written or otherwise) from physicians regarding mutual patients, especially when returning to the school setting after an extended absence. Similarly, physicians expressed concerns about increasing the already voluminous paperwork they had to manage which may explain why paperwork was not being sent to SNs.

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Innovative solutions, such as giving SNs access to children's' electronic health records, is an advancement in not only technology but also professional communication. The "Student Health Collaboration" which gave Delaware SNs access to student's electronic health records is an exemplar of innovation as well as the incorporation of SNs into the child's healthcare system (Andrews, 2014). While Delaware is a smaller state than Massachusetts, a pilot program could be trialed with Boston schools and the largest pediatric facility in Boston which includes primary care clinicians to see if there would be support for a similar initiative in MA.

### **Connectivity**

Connectivity between physicians and SNs was operationalized as frequency of communication. Thirty-eight percent of SNs reported communicating with physicians once to several times per month while the largest percentile of physicians (33%) reported communicating with SNs 2-5 times per year or less than once in 2 months. While there is no substantiated frequency of communication, the literature regarding the care of children with ADHD within the school system highlights the importance of provider communication. Heuer & Williams (2015) reported that working closely with SNs to manage these children in school was important in improving student outcomes. Communication parameters such as follow-up discussions 2-3 times per year, as well as opportunities for face to face interactions utilizing telemedicine, were suggested (Heuer & Williams, 2015). Dang et al. (2007) developed the ADHD



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Identification and Management in Schools (AIMS) practice which included 2-3 interactions between primary care and SNs to manage school children with ADHD. While this level of communication was recommended by the model, other methods of communication were also included, such as written assessment and shared treatment plans, which kept physicians and SNs in much closer contact regarding student's progress.

### **Formalization Tools**

The final dimension, Formalization, is comprised of the two elements: information exchange and formalization tools. Formalization Tools asked providers what system was currently in place for the transmission of referral information to the SN. The majority of both SNs (57%) and physicians (72%) reported that the written referral form would be handed to the parent by the physician, anticipating that it would then be relayed to the SNs via the parent or child. Many more SNs (30%) reported that they received verbal information from the parent, while only 11% of physicians reported they were sending information via this route. While the cross-sectional nature of this data do not allow for any direct comparisons, it is possible that discrepancies of this type may be the result of the parent or child not bringing the referral form back to the SN. The importance of further investigating this issue may specifically highlight the role of the family or student in this communication breakdown.

Written policies and procedures were also conceptualized as formalization tools; as these documents enhance collaboration by creating a defined system or

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process of collaboration which anyone may follow. Providers were asked if written policies and procedures for working with outside agencies existed in their worksite. While the majority of physicians and SNs knew there was a manager responsible for policies and procedures, far fewer knew if policies and procedures around collaboration with outside agencies existed in their own work settings. Lack of knowledge of these policies and procedures indicates a deficit in understanding the value and importance of having a standardized communication route or information exchange. Without this understanding, professionals or individuals may be reluctant to reach out to each other.

### **Information Exchange**

While policies and procedures are an often overlooked support, an established system of information exchange via screening and referral (vision, hearing and scoliosis) has existed between school systems and physicians for decades. A pattern of an approximately 20% difference between referrals sent out and those received by physicians was consistent across all screenings (vision, hearing, scoliosis and BMI for overweight and obesity). While this pattern suggests that physicians receive fewer referrals than SNs send, the return rate approached the sent rate for the established screening tests (91% - vision, 70% - hearing, 46% -scoliosis). Strikingly, the return rate was much lower (19% and 22%) for the newly implemented BMI screening. It is possible the family may be a confounding factor in the referral system for overweight or obese students. Referrals are sent by the SN to the child's home with the expectation that the

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parent or guardian will use this information to request an evaluation by the physician. The rate at which parents are bringing these referral forms to the provider has not been documented, however, a number of studies have observed parents' perceptions of school based screening and referral system.

Kimel (2006) queried parents of school age children who had been sent a referral for a failed vision school based screening. In addition to previously assumed barriers to parent follow-up, additional barriers were uncovered; in particular 29% of families reported that they did not feel there was a need for a professional exam. Kubik, Story & Rieland (2007) interviewed parents of elementary school children about school based screenings and referral process. In the participating schools, children were screened for vision, hearing and BMI. While parents were notified of screening results for hearing and vision, "nearly half" of participating parents (n=71) were unaware that height and weight information were being collected on their children. In focus group discussions, parents expressed concerns about SNs collecting information if results were not sent to the parents for follow-up.

BMI screening and referral has raised similar concerns, with parent notification letters the focus of recent research. Chomitz, Collins, Kim, Kramer and McGowan (2003) investigated a variety of parent response approaches to the BMI screening and referral process and reported that parents who received child specific information were more accurate in their knowledge of their child's weight status than the other 2 groups. Schwartz (2015) reported similar sentiments

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from parents interviewed about the school based BMI screening and referral process. Parental themes included: feelings about the letter itself, the health screening process, the school's role as well physician response. Each of the themes had both positive and negative subthemes. While there was a wide range of views, the majority of parents felt having knowledge of their child's health status was valuable. Parents' concerns stemmed from lack of knowledge about the weighing process and maintenance of confidentiality regarding the results.

School based screening elicits a variety of responses from parents including disbelief, inaccuracy, or malingering by their child. The outcome is that while parents report they want any information that is collected on their child, they also want to control this information. The parent continues to be the conduit for information exchange between the educational and medical home. The gap between referrals received by physicians and responses returned to SNs will remain wide unless a direct mode of communication is developed. Further research is needed to identify new and effective modes of transmission of screenings and/or referrals. Currently, based on the literature and the current study's information, referral patterns indicate a loss in information going both ways, school based screening results getting to physicians and follow-up evaluations getting back to SNs.

### **Benefits of Collaboration**

Respondents offered a handful of benefits, the majority of which matched between provider types. The majority of these benefits describe consistency in

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management, message, and support of families and children across the child's world (home, school, medical office). The final benefit suggests a direct positive effect on the child's health and wellbeing when both providers collaborate.

Reflecting back to the FDCM, one could assert that these findings support SNs and physicians having "shared goals and visions" regarding the benefit of collaboration around childhood obesity.

Hendershot and colleagues (2008) listed the benefits associated with school based BMI screening with SNs from both mandated and non-mandated schools. The top 3 benefits chosen most frequently by SNs included: 'developing awareness of the obesity problem', 'supplying evidence for policy decisions', 'educating parents and students' while 'creating a coordinated effort to address the issue' ranked 6<sup>th</sup> among benefits. While Hendershot and colleagues were focused on the BMI screening process, the current study considered the outcome of the BMI screening process.

The remaining two benefits reported in this study were unique to each provider type. Physicians indicated a single unique benefit of collaboration as: "the role of the SN". This included a variety of functions that a SN could perform although none of the listed "roles" included communication or collegiality with physicians though perhaps physicians felt this had been listed elsewhere. SNs also expressed a unique benefit of collaboration between physicians and SNs which may draw parents into the conversation about the child and would provide a better support system for the parents.

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Benefits are more elusive than barriers; studies have frequently examined barriers to collaboration and factors which may potentiate collaboration but few, if any, researchers have investigated the value providers place in collaboration. While many organizations, including IPCEC, WHO, IOC all recommend interprofessional collaboration as a positive framework to manage care of patients, the benefits are still under investigation. A small number of studies have demonstrated the benefits of interprofessional collaboration interventions. Zwarenstein, Goldman & Reeves (2009) reported on five studies which met the inclusion criteria for their systematic review. In spite of the limited number of studies, evidence of improvements in patient care, decreased hospital length of stay and total patient charges was reported.

Proponents of collaboration indicate that examples of successful collaboration have existed for several years. Baldwin (2007) indicates that “primary care interdisciplinary teams” were the forerunners of current day PCMHs and in their time were highly successful in supporting patient care in the community and homes. Others (Naylor, 2011; Reeves et al., 2010) have reported on programs such as The Veteran’s Administration Hospitals and Clinical Research on elder care and the Transitional Care Model respectively, which demonstrated improved elder care by improving collaboration between hospital and home resulting in decreased re-admissions and medical costs for elders. Qualifiers for benefits of collaboration tend to focus on cost containment: decreased length of stay, decreased re-admission, fewer medications. Less

tangible benefits such as job satisfaction and respect are challenging to quantify and yet are often cited as essential to collaboration.

### **Barriers to collaboration**

The majority of the literature about childhood obesity and healthcare providers focuses on child obesity prevention (COP) or knowledge and treatment of childhood obesity. Many of the same barriers that are described in the current study regarding collaboration around obesity are also found in the obesity prevention or treatment literature. In the current study, both SNs and physicians indicated a lack of time as the most frequently listed barrier toward collaboration around childhood obesity. In previous studies with SNs, time was the foremost barrier to conducting childhood obesity prevention programs. Steele et al. (2011) found SNs did not have enough time to address weight concerns with children and families due to other responsibilities including classroom teachings, while Morrison-Sandberg et al. (2011) reported competing priorities, such as managing children with chronic diseases resulted in little time for Child Obesity Prevention activities. Mullersdorf, Zuccato, Nimborg and Eriksson (2010) interviewed six SNs who utilized an action plan to support the management of children with weight issues. While SNs endorsed the use of the plans in assisting them with addressing individual children, they still acknowledged a lack of time as the major barrier to follow-through.

Physicians likewise reported a lack of time as one the primary barriers to collaboration around childhood obesity. While there is limited literature about

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collaboration with SNs around obesity, lack of time has been expressed by physicians as a barrier in addressing childhood obesity in primary care settings. Vine, Hargreaves, Briefel & Orfield (2013) conducted a literature review of 96 studies published between 2005 and 2012 focusing on childhood obesity and primary care. Results indicated that a combination of barriers deterred physicians from addressing childhood obesity not the least of which was lack of agreement about validity of BMI screening, lack of familiarity with BMI, and lack of education about effective treatments for childhood obesity (Vine et al, 2013).

Lastly, though one of the lesser mentioned barriers, both provider types raised the concern of confidentiality as well as Health Insurance Portability and Accountability Act (HIPAA) as deterrents to collaboration. When identifying this issue, SNs suggest that physicians did not want the issue (overweight/obesity) to go outside of the primary care office. This result is consistent with findings from focus groups with pediatricians, SNs, and primary care office nurses where pediatricians reported limiting the information sent to SNs on students' annual health reports due to concerns about confidentiality (Romano-Clarke, Hughes, Ivanis and Cronin, 2015).

### **Thoughts about collaborative experiences**

Lastly, providers were asked about their experiences with collaboration regarding childhood obesity. The manifest content indicated by the literal message of statements, indicated school based BMI screening was onerous for SNs. These responses also demonstrated the lack of some of the key components



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necessary for collaboration as defined by D'Amour and others (2006). SNs were mandated to participate in a program which may not have school leadership or organizational support, as indicated by school systems which would not supply the materials necessary to mail home the screening results or allow SNs to supplement the BMI information with educational materials.

Latent content, as interpreted through meaning units, categories and themes, presented a voice of frustration, consistently across provider types. Frustration arose from multiple sources: no knowledge of the other professional and subsequently their role and capacity; lack of knowledge regarding treatment/management of childhood obesity; systems' issues which made it almost impossible to communicate. These same issues have been previously reported for both SNs (Steele et al., 2011) and physicians (Pietras et al., 2012).

In countries where Interprofessional Collaboration (IPC) is expected due to the national healthcare model, IPC continues to progress. D'Amour et al. (2008) using the FDCM, proposed a three tiered typology of IPC, active, developing and potential. By observing each of the FDCM components separately among collaborating agencies in 3 different regions of Canada the authors were able to designate advancing levels of successful collaboration. In the US, while IPC has been proposed as a unifying solution to the current fragmented healthcare system (Baldwin, 2007) much more education, infrastructure, and support is necessary for the collaboration between separate agencies to occur.

### **Strengths of current study**

The current study has several strengths which should be recognized. Most significantly, this is the first study to assess collaboration between SNs and physicians. While several studies and models suggest collaboration between these two healthcare providers, this is the first to consider indicators of collaboration and their existence. The content analysis of the qualitative data has permitted a more detailed and richly descriptive account of the issues and concerns providers have regarding collaboration. Furthermore, this study serves as a baseline for understanding attitudes toward collaboration among SNs and physicians, an area, which until now, has been unexplored. The current findings indicate that providers know each other on a very cursory level and are unaware of each other's capacity. Nurses continue to seek collaboration, even in a very autonomous setting such as a school; however, the logistics often prevent any truly meaningful collaboration from occurring.

### **Limitations of this study and areas for future research**

In addition to the strengths, this study also includes several limitations. A significant limitation is use of the cross sectional design which provided only a single snapshot of individual's thoughts, perceptions and beliefs. The timing of the study's release may also have affected the results. In 2013 the mandated school based BMI was amended whereby SNs continue to collect BMI information on school children but do not report results to parents unless specifically requested. The time frame for public discourse regarding the

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amendment took place during the 8 weeks of the paper survey distribution. The generalizability of these results are limited due to the fact that school based BMI screening and referral is mandated in less than half of the United States; and ironically not even MA by the completion of this study. Additionally, the results are also only generalizable to SNs and physicians from MA due to the sampling process used.

The sample of MA School Nurses who responded to this study, while open to all school nurses in MA, may be limited to those who are proficient in using the electronic listserv system and/or those who read the listserv weekly letter. Inherent in using a convenience sample is the potential for sampling bias whereby the results may not represent the entire population but rather the unique respondent sample. However comparing SN non-completers with completers indicated those who did complete the survey did not significantly differ from those who did not complete the survey.

A random sample of physicians was chosen from among the larger population of Massachusetts Pediatricians and Family Medicine physicians. While random sampling reduces the sampling bias possible in a convenience sample, the small response rate presented its' own limitations to generalizability. Low response rates may produce a response bias in that those who do choose to respond may not actually reflect the larger population. Until recently, it has been proposed that low response rates reflected poor quality surveys; however, this proposal has been reconsidered. Survey response rates have been declining over

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the past several decades, many now under 50%. Researchers have begun to suggest that the size of the response may not entirely reflect the quality of the survey; instead, investigators could observe the non-responders versus the responders to determine bias in respondents (Johnson & Wislar, 2012; Rindfuss, Choe, Tsuya, Bumpass & Tamaki, 2015). One option would be to present the survey again to initial non-responders. A second option, appropriate for this study, was to compare the current study respondents with other data sources such as the AMA (2014) survey results as well as the Pietras et al. (2012) study which did report similar characteristics.

The small response rate by both SNs and physicians could be attributed to a variety of issues. Timing of the survey may be foremost. For SNs, the months of May and June, while school is still in session, is a very busy time with increasing pressure to complete annual tasks. Screenings or mandated tasks must be completed superseding any preferential tasks. Though physicians do not follow the academic calendar, the survey was delivered to physicians at a time when the school based BMI screening was once again under public scrutiny. During the eight week time frame of the postal survey, the school based BMI screening and referral system changed to a “screening only” system which may have implied a lower level of importance for the physician.

Utilizing two different methods of data collection (mailed and electronic surveys) may have introduced bias into the study. The researcher was unable to gain access to physicians email addresses to send the electronic version; as such,

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paper surveys were mailed to physicians. The ACA had encouraged primary care offices to move to electronic documentation to promote connections with other providers – medical home networks (Abrams et al., 2011). Due to the shift to electronic software, physicians may have been less inclined to respond to paper surveys. While the paper survey also included a link to the electronic version only three physicians opted to submit electronically.

Beyond the logistics of the survey, there were additional limitations. Many school age children and adolescents see Nurse Practitioners (NPs) for their primary care; however, the Jefferson Attitude toward MDRN Collaboration Scale was developed specifically for physicians and RNs. The JSAC is based on the role differentiation between providers who are educated in separate programs. Recently, the JSAC was adapted to assess the attitudes toward collaboration between RNs and other health care providers (Hojat, Ward, Spandorfer, Arenson, Van Winkle, Williams, 2015). Use of the Jefferson Scale of Attitude toward Interprofessional Collaboration in future research studies would allow for the inclusion of Nurse Practitioners as well as other health care providers involved in the care of school age children and may be better able to enhance our understanding of collaboration between SNs and all pediatric primary care providers.

Lastly, it is not simply a positive attitude toward collaboration but much more; as D'Amour et al. (2008) proposes infrastructure, policies and procedures, and other components which enable successful collaborations. This model has

been supported in a handful of studies (D'amour et al., 2008; Sicotte, D'Amour, Moreault, 2002), including the development of a questionnaire (Polanco, Solinis, Arce, Zabalegui, San Martin Rodriguez, 2012). Further research is needed to validate this model in locations other than those with socialized medicine. In the current study the survey questions developed by the researcher are reflective of the circumstances unique to MA and the school based BMI screening and referral system. The survey questions may not reflect the theoretical components envisioned by D'Amour et al (2008).

## **Implications for Nursing**

### **Clinical**

D'Amour et al. (2008) proposed the FDCM and subsequently envisioned varying levels of collaboration; active, developing, and potential collaboration. While SNs and physicians in MA demonstrated some of the indicators needed for successful collaboration, there is clearly room for growth in this area of practice. Based on the findings of the current study the following areas for improvement in SN- physician collaboration are proposed: improved understanding of each provider's role and the capacity of the organization to which the provider belongs. SNs may have limited knowledge about what resources the physician may be able to offer a family; conversely physicians may also be unaware of resources within school systems. Meeting in a collegial format will permit providers to "put a face with a name" as well as open discussions about available resources and capabilities thereby beginning to build trust in each other

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Lack of understanding by the physician regarding the SN's role and scope of practice was evident. In order to correct this lack of knowledge, it is imperative that SNs present their role as well as the resources available in schools and communities to physicians. A number of SNs reported on health and wellness activities they had conducted in their schools while simultaneously physicians were unaware of these activities as some physicians offered to either assist SNs or suggested SNs run similar types of projects. In order to improve collaborative relationships, SNs may need to more widely disseminate information about their programs especially to their physician colleagues.

Some examples of enhanced collaboration have emerged in a few school districts. Foley, Dunbar and Clancy (2012) have brought SNs and physicians together through continuing educational programs. Participating in research projects with physicians and presenting findings at Grand Rounds informed a broader population of healthcare providers about the capability of SNs. SNs need to be seen and heard at both the organizational level (i.e., Grand Rounds) as well as the local chapters of the American Academy of Pediatrics.

On the individual level, SNs need to be recognized as part of the patients' medical home. SNs have a unique perspective as a healthcare provider outside of a healthcare facility. They may see students on a daily basis and may see them in social situations outside of the home setting. They may contribute valuable knowledge to the health care team. The time has come for making SNs a part of the medical home or a recognized member of a student's healthcare team. Projects

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such as the Student Health Collaboration which gave Delaware SNs access to student's electronic health records is an innovative exemplar of improving information exchange as well as incorporating SNs into the child's healthcare system (Andrews, 2014). A joint effort of Nemours Children's Health System, Delaware School Nurses Association and Delaware Department of Education brought Delaware SNs into the patient portal system. SNs in Delaware are able, with parental approval, to view a child's primary care electronic health record. This type of linkage begins the discussion of SNs as a member of the medical home. A simple but successful use of this technology allowed a SN to view a child's change in allergy status which the parents had forgotten to notify the SN. Future plans include allowing access to enter information, such as school health office visits and test results into patients' electronic health record.

Another concept which also moves the care of the student beyond the doors of the medical office is described in a white paper published for U.S. Department of Health and Human Services Agency for Healthcare Research and Quality. The components of a medical neighborhood, address the barriers to "information flow and accountability" (Taylor et al., 2011, p.13). This document describes instances of successful care coordination which are supported by agreements between two agencies. Guidelines for care coordination agreements specify who is responsible for processes and outcomes, appropriate referrals, as well as the mechanism to evaluate the agreement. Technology has played a part in improving communication between agencies. While SNs are not specifically



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highlighted in this statement, they should be considered one of the community partners suggested in the medical neighborhood model.

Some of the other factors affecting collaboration were illuminated by the qualitative responses. Both SNs and physicians reported time constraints, whether due to a lack of mutually acceptable time or to high volume of patients, as a major limitation on their ability to connect with each other. Specific examples were given which demonstrated the positive results which occurred when providers were able to meet one another, whether it is on an individual basis or a joint meeting involving all local partners. Finding a time when providers can speak to one another, even beyond the school hours, needs to be considered by SNs if they desire to communicate directly with physicians. Alternately, an established format where the providers can discuss mutual patients may be considered. The use of telemedicine approaches may be a venue for these discussions. SNs should expect plans of care for children with any ongoing healthcare need and parents need to be aware that providers will communicate with one another in order to provide consistent care. This parental education needs to be supported in both settings, medical and educational home.

The MA Department of Health School Health Services has been instrumental in supporting SNs to promote student health and wellbeing. The School Health Services has developed school health services standards as well as orientation and continuing education for school nurses. Additionally, School Health Services oversees the ESHS program, ensuring districts are fulfilling

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requirements as part of ESHS funding agreement. This leadership organization must be sought by SNs to advocate for a secure and reliable mode of connection between physicians and SNs. Enhancing communication between SNs and physicians may be achieved through an encrypted email system. MA DPH School Health Services must also become a leader in the discussion around provider linkage.

### **Education**

A major impetus for the creation of the JSAC was to assess the level of education regarding collaboration between physicians and nurses during their training and the impact this education may have had in their professional roles. Education regarding interprofessional collaboration during training is paramount for the future of healthcare. As the results of this study demonstrate, many healthcare professionals have been in their careers for decades and the need to educate those in practice as well as those in training programs continues to be critical. Interprofessional education (IPE) has demonstrated positive results in improving collaboration between nurses and physicians in the learning setting (D'Amour & Oandasan, 2005). Taylor et al. (2011) lists training of healthcare providers in communication and team-based skills as key activities to developing the medical neighborhood. The Interprofessional Education Collaborative Expert Panel (2011) developed core competencies for academic settings to support the education of healthcare students in collaboration and teamwork. The core competencies emerged from a decade of knowledge acquisition between Canada

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and the United States (US). While Canada has moved forward much more quickly than the US, the collaborative is comprised of American Colleges of Nursing, Medical Colleges, Dental Education Associates, Colleges of Pharmacy, schools of Public Health, and Colleges of Osteopathic Medicine. These organizations have recognized the importance of this approach and are committed to the joint education of healthcare professionals so that working as a team is part of the learning process and will be part of the practice.

Park, Hawkins, Hamlin, Hawkins & Bamdas (2014) implemented an interprofessional collaboration curriculum with medical, social work and nursing students based on the original Interprofessional Education for Collaborative Patient-Centered Practice. Following completion of this program, medical students reported a significant increase in mean total scores on a variation of the JSAC: Jefferson Scale of Attitudes toward Physician –Nurse Collaboration (JSAPNC) which had been modified for use with all three healthcare workers. The authors suggested that learning together may have influenced the medical students' understanding of the role of the other healthcare professionals.

Robbens et al. (2012) conducted a brief interprofessional collaboration educational program with community healthcare practitioners including primary care providers, office nurses, home care nurses, occupational therapists and others. Small but significant improvements were noted in attitudes towards other professionals as well as team skills. Four months after completion of the program, interviewed participants acknowledged the value of the interprofessional

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education and it's persistence in their practice. In agreement with D'Amour's FDCM, Robbens et al. (2012) proposed that the IPE program content may have benefitted the healthcare professionals but that the program also provided participants with an opportunity to get acquainted with one another.

Interprofessional Education (IPE) is acknowledged as essential to safe patient care. While initial efforts were directed toward hospital based settings and healthcare professional students, practicing healthcare professionals must be included in this training. In addition, healthcare professionals in the community setting may need this knowledge even more as they must work as a team while working in distinct and separate settings.

### **Policy**

Policies which influence the ability of healthcare providers to collaborate need to be considered. Existing policies which create barriers to collaboration need to be rewritten and new policies are needed to guide the progress of healthcare communication. Innovative communication systems linking providers and electronic health records which communicate across organizations need to include policies and procedures to ensure safe transmission of patient information. Leadership support for development of tools, processes, and systems is necessary to bring separate organizations and agencies together to implement such projects.

Policies which were enacted to protect patient information continue to be barriers to provider interactions including SNs and physicians. Schools are

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regulated under the Family Educational Rights and Privacy Act (FERPA) which limits access by anyone outside the school system to students' educational records. A separate federally regulated policy, HIPAA, was intended to protect access to medical information by third parties (e. g. insurance companies) especially as health records entered the electronic age. HIPAA and information exchange between SNs and physicians has been a stumbling block for providers, limiting information exchange. While a document addressing both of these acts was published in 2008 (USDHHS & USDOE), further education and clarity is needed. MA DPH has the expertise and leadership to guide this education.

Technology becomes a part of the discussion as Health Information Exchange (HIE) approaches multi-provider access to electronic health records. In a longitudinal multiple case study, Sicotte and Pare (2010) conducted interviews, observations of team meetings, and analysis of organizational documents during the implementation of two separate HIE projects, one connecting primary care physicians' EHRs with a local hospital EHRs. The comparison of the two case studies demonstrated the value in having significant leadership and teamwork needed to implement and develop a sustainable system of HIE.

Leadership from Executive Offices of Health and Human Services who oversees statewide departments of health need to support appropriate enactment of HIPAA as well as the development of policies guiding collaboration needed both at the school and primary care level. Building the infrastructure required to facilitate the process of interprofessional collaboration is not possible without

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support from EOHHS. Similar in scope to the National Health Services of Canada, EOHHS has the administrative capability to support and provide guidance regarding IPC. The Patient Protection and Affordable Care Act (ACA) supports the widespread use of electronic health records as well as improved access to medical information. The ability to easily access electronic health records and critical patient information currently exists in many acute care settings; however, the need to expand this technology to outpatient settings will require additional support. EOHHS support will be needed to fully incorporate the EHRs in all outpatient settings with consideration of the impact on SNs and health care in school.

Lastly, the importance of incorporating time to discuss patient issues with other providers needs to be recognized as valuable by insurance companies. The National Committee on Quality Assurance (NCQA) has provided evidence on the effectiveness of the PCMH (NCQA, 2015) and has begun the expansion into setting standards for the medical neighborhood or Patient Centered Specialty Practice (PCSP). Lack of communication between primary care providers and specialists is similarly evident: “Building on PCMH to address PCP disconnect, improve communication – PCPs report sending information 70% of the time – Specialists report receiving information 35% of the time – Specialists report sending a report 81% of the time – PCPs report receiving a report 62% of the time” (O’Kane & Barrett, 2013, p.6). Specialists are beginning to be recognized as a member of the medical neighborhood, so too SNs need to be included in the

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pediatric neighborhood. The Centers for Medicare and Medicaid Service have acknowledged the value of PCMH and support their primary care physicians' time to care coordinate – with specialists. Time needs to be allotted in a provider's day to reach out to others in the Medical Neighborhood – including school nurses as a recognized healthcare provider, to build a full and complete picture of pediatric patients.

### **Conclusion**

Childhood obesity has reached epidemic proportions in the US. One intervention implemented in Massachusetts was school based BMI screening and referral. Beginning in 2009, MA School Nurses collected the BMIs of school children in grades 1, 4, 7, and 10 referring children in the underweight, overweight, and obese categories to physicians via letters sent to the child's parents/guardians. This mandate was carried out for approximately 4 years. The topic was re-opened for public discussion in 2013 due to concerns about possible bullying in relation to the screening and referral letters sent to parents and the program was subsequently restructured. Currently, school children's height and weight continues to be measured; however, only for the purposes of collecting aggregate data. Despite the changes in the mandate, this study sought to observe healthcare providers' attitude toward collaboration as well as the presence of successful collaboration indicators predicted by D'Amour et al. (2008), specifically around childhood obesity.

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Childhood obesity is only one diagnosis among many which deserve the attention of those involved in a child's life. Lack of communication between healthcare providers may lead to a duplication of efforts and a subsequent reduction in the possibility of implementing additional interventions. Trust in the capabilities of those with whom we do not work directly is challenging. Routine practices need to be put in place for providers to learn about each other, both in terms of their respective roles, as well as the resources available in varying health care venues. Clear means of communication are critically needed. While time continues to be the largest obstacle for both provider types, electronic communication is available; encrypted email and Patient Health Care Portals are already in existence. These technologies could and should be utilized to enhance interprofessional (SN/physician) communication regarding children's health care issues. Infrastructure and leadership are necessary to move this technology forward and allow these professionals to interface.

Childhood obesity is a health issue well beyond the scope of a single provider. Efforts must include not only the primary care provider but also the schools (SNs) and communities as well as students' families. Many of the components of the FDCM are necessary to connect individual providers with each other. As healthcare moves out of the hospital and into the community, communication strategies and innovative technology must be supported by professional leadership. The financial support provided to acute care facilities to implement the electronic health record systems must be shared with the



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preventive and chronic care venues involved in the care of individuals in order to sustain an optimal continuum of care. Additionally, the importance of team-based health care and the education of healthcare providers regarding these concepts must occur in community settings. Widespread interprofessional education (IPE) needs to be incorporated into both the clinical and didactic components of professional medical and nursing education. Even though this approach is currently advancing throughout academia, this education should be implemented with those professionals already in practice. There are a few recommendations to promote collaboration on an individual level, however more avenues exist to improve the other components of collaboration. As indicated by D'Amour et al. (2008), organizational dimensions must build the infrastructure for successful collaboration including knowledge development, leadership, policies/procedures, and modes of communication. This must be organized through policymakers, education, information technology, and insurance providers.

This study demonstrated the gap between physicians and SNs, despite their positive attitudes toward collaboration. This study has found that a positive attitude toward collaboration may be an integral component in collaboration but by itself cannot sustain successful collaboration. Separate, small entities, like school health offices and primary care practices are unable to connect easily, creating nearly insurmountable barriers to collaboration. Collaboration must be viewed as an opportunity to build connections through multiple methods -

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technology, education and resources to support a healthy child becoming a  
healthy adult.

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## TABLES

**Table 1.** Attributes of nurse-physician collaboration scales

<b>Scale Authors Year of psychometric publication</b>	<b>Used in US</b>	<b>Used outside hospital setting</b>	<b>Both nurse and physician respondents</b>	<b>Broad perspective of collaboration unrelated to single patient events</b>	<b>Independent of single organization al structure</b>	<b>Focus on mutual aspects of providers' role in collaboration</b>
Collaborative Practices Scale (CPS) Weis & Davis, 1985	X		X	X		
ICU RN-MD Questionnaire Shortell, Rousseau, Gillies, Devers, & Simons, 1991			X			
Collaboration and Satisfaction with Care Decisions (CSACD) Baggs, 1994	X		X			X
Collaboration with Medical Staff of the Nurses Opinion Questionnaire Adams, Bond, Archer, 1999	X					
Nurse-Physician Collaboration Scale Ushiro, 2009			X			
Jefferson Scale of Attitudes toward Physician-Nurse Collaboration Hojat et al., 1999	X	X	X	X	X	X

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<b>Table 2. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for Physicians</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (MDs)</b>	<b>Indicator of Four Dimensions Model</b>
1	Age	Recode	Interval	In years	Demographics
2	Gender	Recode	Nominal	1=female, 2=male	Demographics
3	PCPEDU	Recode	Nominal	1=Ped, 2=FMD	Demographics
4	PROORG	Multiple choice	Nominal	1=AAP, 2= AAFM, 3=Other, 4=None	Client centered vs. other allegiances
5	YRSPRTCMA	Direct question	Interval	In years	Demographics
6	NUMPTS	Direct question	Interval	Number	Demographics
7	PERPEDPTS	Recode	Nominal	1=10-25, 2= 26-50, 3=51-75, 4= >76	Demographics (exclusion criteria)
8	PRTCTYP	Recode	Nominal	1=hospital based, 2=solo 3=CHC, 4=group practice, 5=SBHC, 6=Other	Centrality
9	MEDHOME	Recode	Nominal	1= yes, 2= no	Centrality
10	INSCVRG	Recode	Nominal	1= Public insurance, 2= commercial insurance, 3= uninsured	Demographics
11	ZIP	Recode	Nominal	1=rural, 2=urban, 3=suburban	Demographics
12	WRTNPNP	Forced choice	Nominal	1=Yes, 2=Unsure, 3=No	Formalization tools
13	OFFMGRPNP	Forced choice	Nominal	1=Yes, 2=Unsure, 3=No	Leadership
14	JSAC	Recode	Interval	15-60	Dependent Variable
15	SCHMD	Forced choice	Nominal	1=Yes, 2=No	Leadership
16	SCHMDRN	Recode	Nominal	1=Yes, 2=Unable, 3=No	Mutual acquaintanceship
17	KNLSN	Recode	Nominal	1=Yes, 2=Some, 3=No	Mutual acquaintanceship



<b>Table 2. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for Physicians</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (MDs)</b>	<b>Indicator of Four Dimensions Model</b>
18	CONTLSN	Forced choice	Nominal	1=Yes, 2=No	Mutual acquaintanceship
19	TRUSTRN	Recode	Nominal	1=strongly disagree, 2=tend to disagree, 3=tend to agree, 4=strongly agree	Trust
20	WRKDWLSN	Recode	Nominal	1=CEU programs, 2=health ed. 3=research/publications, 4=other	Mutual acquaintanceship
21	COMMWLSN	Forced choice	Ordinal	1=several x/week, 2= 1x/week, 3= several x/month 4=1x/month, 5= 2-5x/year 6=1x/year 7=never	Connectivity
22(a)	REFRECHRG	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(b)	REFRECV	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(c)	REFRECBMIV	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(d)	REFRECBMIB	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(e)	REFRECS	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(f)	REFRECA	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(g)	REFRECMH	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
22(h)	REFRECI	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools

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<b>Table 2. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for Physicians</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (MDs)</b>	<b>Indicator of Four Dimensions Model</b>
22(i)	REFRECCI	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4=>25	Formalization tools
22(j)	REFRECHTN	Recode	Nominal	1=none, 2= 1-10, 3=10-25, 4=>25	Formalization tools
23	COMFRMT	Recode	Nominal	1=verbal info to parent 2= referral form to parent 3= phone to SN 4=letter to SN 5= other	Information exchange
24	REASCLBRTN	Recode	Nominal	1= written communication 2=telephone communication 3=face-to-face 4= other	Support for innovation
25	REASCLBCOMP	Recode	Nominal	1= written communication 2=telephone communication 3=face-to-face 4= other	Support for innovation
26	PERCOBPTS	Recode	Nominal	1=10, 2=25, 3=33, 4=50, 5=66, 6=other	Demographics
27	GUIDLINS	Multiple choice	Nominal	1=AAP 4 Step, 2=HEAT, 3=AMA, 4=combination, 5=other	Client centered vs. other allegiances
28	OBPTGLS	Recode	Nominal	1= decrease non-nutritive food, 2= increase physical activity, 3=decrease screen time, 4=improve intake, 5=awareness, 6= other	Goals
29	MAREG	Recode	Nominal	1= MA DPH 2=LSNs 3=referral form 4=public media 5= professional Association 6= word of mouth	Leadership

<b>Table 3. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for SNs</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (SNs)</b>	<b>Indicator of Four Dimensions Model</b>
1	Age	Recode	Interval	In years	Demographics
2	Gender	Recode	Nominal	1=female, 2=male	Demographics
3	SNEDU	Recode	Nominal	1=RN, AD 2=RN, BSN 3=APRN, 4=RN + MA; 5= RN + MSN 6=DNP, 7= Other	Demographics
4	SNPRFORG	Multiple choice	Nominal	1=NASN 2=MNA 3=SPN, 4=NAPNAP 5=Other, 6=None	Client-centered vs. other allegiances
5	YRSSNMA	Direct Question	Interval	In years	Demographics (exclusion criteria)
6	TOTNUMSDT	Direct Question	Interval	Number	Demographics
7	GRDLVLS	Recode	Nominal	1= Pre-K-5; 2= 6-8; 3= Pre-K-12; 4= PreK-8	Demographics
8	FRNREDLNCH	Direct Question	Interval	Number	Demographics
9	ZIP	Recode	Nominal	1= rural, 2=urban, 3=suburban	Demographics
10	ESHS	Forced choice	Nominal	1=Yes, 2=No	Centrality
11	WRTNPNP(2)	Forced choice	Nominal	1=Yes, 2=Unsure, 3=No	Formalization tools
12	SCHMGRPNP	Forced choice	Nominal	1=Yes, 2=Unsure, 3=No	Leadership
13	JSAC	Scale	Interval	15-60	Dependent variable
14	SCHMD	Recode	Nominal	1=Yes, 2=Unsure, 3=No	Mutual acquaintanceship
15	KNSCHMD	Forced choice	Nominal	1=Yes, 2=No	Mutual acquaintanceship
16	KNLPPCP	Recode	Nominal	1=Yes, 2=Some, 3=No	Mutual Acquaintanceship

<b>Table 3. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for SNs</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (SNs)</b>	<b>Indicator of Four Dimensions Model</b>
17	CONLPPCP	Forced choice	Nominal	1= Yes, 2= No	Mutual acquaintanceship
18	TRUST	Recode	Nominal	1=strongly disagree, 2= tend to disagree, 3= tend to agree, 4=strongly agree	Trust
19	WRKDWLPPCP	Recode	Nominal	1=CEU programs,2=health education, 3=research/publications,4=other	Mutual acquaintanceship
20	COMMWLPPCP	Forced choice	Ordinal	1=several x/week, 2= 1x/week, 3=several x/month, 4=1x/month, 5=3-5x/year, 6=1x/year, 7=never	Connectivity
21(a)	REFSNDHRG	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(b)	REFSNDV	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(c)	REFSNDBMIV	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(d)	REFSNDBMIB	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(e)	REFSNDS	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(f)	REFSNDA	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(g)	REFSNDMH	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(h)	REFSNDI	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools

<b>Table 3. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for SNs</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (SNs)</b>	<b>Indicator of Four Dimensions Model</b>
				4= >25	
21(i)	REFSNDICI	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
21(j)	REFSNDHTN	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Formalization tools
Q22(a)	REFRETHRG	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(b)	REFRETV	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(c)	REFRETBMIV	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(d)	REFRETBMIB	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(e)	REFRETS	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(f)	REFRETA	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(g)	REFRETMH	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(h)	REFRETI	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(i)	REFRETCI	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
Q22(j)	REFREHTN	Recode	Interval	1=none, 2= 1-10, 3=10-25, 4= >25	Information exchange
23	COMFRMT(2)	Recode	Nominal	1=verbal info to parent 2= referral form to parent	Information exchange

<b>Table 3. Correspondence of the Four Dimensions Model of Collaboration With Proposed Study Variables for SNs</b>					
<b>Question number</b>	<b>Variable Label</b>	<b>Item description</b>	<b>Level of measure</b>	<b>Operational definition (SNs)</b>	<b>Indicator of Four Dimensions Model</b>
				3= phone to SN 4=letter to SN 5= other	
24	REASCOLABRT N(2)	Recode	Nominal	1= written communication 2=telephone communication 3=face-to-face meetings 4=other	Support for innovation
25	REASCOLABCO MP	Recode	Nominal	1= written communication 2=telephone communication 3=face-to-face meetings 4= other	Support for innovation
26	PERCOBSDT	Recode	Nominal	1=10, 2=25, 3=33, 4=50, 5 =66, 6 =other	Demographics
27	SNGUIDLINS	Multiple choice	Nominal	1=AAP 4 Step, 2=HEAT, 3=AMA, 4=combination, 5=other	Client centered vs. other allegiances
28	SCOPE	Recode	Nominal	1= Yes, 2 = No	Client centered vs. other allegiances
29	OBSDTGLS	Recode	Nominal	1= decrease non-nutritive food, 2= increase physical activity, 3=decrease screen time, 4=improve intake, 5=awareness, 6= other	Goals

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<b>Table 4. Total Number of Students</b>		
	All Values (n=114)	Outlier Values Removed (n=105)
Mean	631	595
SD	593	369
Range	0 – 4750	25 – 1800
Skew	3.582	1.091
Kurtosis	20.582	1.026

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<b>Table 5. Characteristics of the Study Sample</b>			
	<b>Demographic Variable</b>	<b>SN n (%)</b>	<b>Physician n (%)</b>
Gender	Male	0 (0%)	21 (33%)
	Female	114(100%)	42 (67%)
Age Ranges	30-40 years	11 (10%)	13 (21%)
	41-50 years	29 (27%)	22 (35%)
	51-60 years	53 (50%)	15 (24%)
	≥ 61 years	13 (12%)	12 (20%)
Years practicing in MA	1-10 years	51 (44%)	27 (43%)
	11-20 years	51 (44%)	14 (22%)
	21-30 years	10 (9%)	11 (17%)
	≥ 31 years	2 (2%)	11 (17%)
Specialty (physicians)	Pediatrics		44 (70%)
	Family Medicine		19 (30%)
Professional Organization Membership	NASN	78 (68%)	
	AAP		41 (66%)
	AAFP		15 (24%)
SN Highest Educational Degree	Less than BS, Nursing	5 (4%)	
	RN, BS in Nursing or Other	59 (52%)	
	RN, MSN/APRN/DNP/PhD	26 (23%)	
	RN, MA/MS Other	24 (21%)	
Socioeconomic Status	≤ 40% eligible for public assistance	51 (51%)	28 (46%)
	≥ 41% eligible for public assistance	49 (49%)	33 (54%)
Location Type (as indicated by zip code)	Urban	32 (29%)	21 (34%)
	Suburban	70 (63%)	35 (57%)
	Rural	9 (8%)	5 (8%)
Total Number of Students (SNs only)	0-250 students	21 (18%)	
	251-500 students	33 (29%)	
	501-750 students	36 (32%)	
	≥ 751 students	24 (21%)	
Average Daily Patients (physicians)	0-10 patients		9 (15%)
	11-20 patients		33 (55%)
	21-30 patients		18 (30%)
School/Practice Type	Elementary	52 (46%)	
	Elementary + Middle/High School	24 (22%)	
	Middle/High School only	35 (32%)	
	Hospital based		11 (18%)
	Solo practice		7 (11%)
	Community Health Center		14 (23%)
	Group practice		30 (47%)



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<b>Table 6. Characteristics of School Nurses Completers vs Non-Completers</b>			
<b>Demographic Variable</b>		<b>Completer <i>n</i> (%)</b>	<b>Non-Completer* <i>n</i> (%)</b>
Gender	Female	114 (100%)	13 (100%)
Age Ranges	30-40 years	11 (10%)	2 (15%)
	41-50 years	29 (27%)	3 (23%)
	51-60 years	53 (50%)	6 (46%)
	≥ 61 years	13 (12%)	2 (15%)
Years practicing in MA	1-10 years	51 (44%)	5 (38%)
	11-20 years	51 (44%)	6 (46%)
	21-30 years	10 (9%)	1 (8%)
	≥ 31 years	2 (2%)	1 (8%)
Membership	NASN	78 (68%)	5 (38%)
Highest Educational Degree	Other than BS, Nursing	5 (4%)	1 (8%)
	RN, BS in Nursing or Other	59 (52%)	7 (54%)
	RN, MSN/APRN/DNP/PhD	26 (23%)	2 (15%)
	RN, MA/MS Other	24 (21%)	3(23%)
Socioeconomic Status	≤40% eligible for public assistance	51 (51%)	2 (50%)
	≥41% eligible for public assistance	49 (49%)	2 (50%)
Location Type (as indicated by zip code)	Urban	32 (29%)	1 (25%)
	Suburban	70 (63%)	2 (50%)
	Rural	9 (8%)	1 (25%)
Total Number of Students (SNs only)	0-250 students	21 (18%)	0 (0%)
	251-500 students	33 (29%)	3 (50%)
	501-750 students	36 (32%)	1 (17%)
	≥ 751 students	24 (21%)	2 (33%)
School/Practice Type	Elementary	52 (46%)	1 (20%)
	Elementary + Middle/High School	24 (22%)	0 (0%)
	Middle/High School only	35 (32%)	4 (80%)

\* Only responders who entered demographics other than consent are included.  
Not all questions were completed by all respondents.

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<b>Table 7. Mean Jefferson Scale of Attitudes toward MDRN Collaboration Mean Scores by Individual Statements for SNs and Physicians</b>					
	<b>JSAC Statement</b>	<b>SNs</b>		<b>Physicians</b>	
		$\bar{x}$	SD	$\bar{x}$	SD
1	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant	3.89	.36	3.58	.59
2	Nurses are qualified to assess and respond to psychological aspects of patients' needs	3.72	.47	3.52	.62
3	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles	3.89	.36	3.69	.53
4	Nurses should be involved in making policy decisions affecting their working conditions	3.94	.24	3.69	.49
5	Nurses should be accountable to patients for the nursing care they provide	3.96	.21	3.85	.36
6	There are many overlapping areas of responsibility between physicians and nurses	3.48	.58	3.42	.62
7	Nurses have special expertise in patient education and psychological counseling	3.52	.58	3.19	.72
8	Doctors should be the dominant authority in all health care matters	2.82	.90	2.52	.92
9	<i>Imagine a situation in which you work at a hospital, what do you then think about the following statement: Physicians and nurses should contribute to decisions regarding the hospital discharge of patients</i>	3.68	.51	3.61	.52
10	The primary function of the nurse is to carry out the physician's orders	3.13	.73	2.81	.79
11	Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends.	3.63	.54	3.60	.53
12	Nurses should also have responsibility for monitoring the effects of medical treatment	3.66	.56	3.58	.53
13	Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient	3.99	.09	3.92	.28
14	Physicians should be educated to establish collaborative relationships with nurses	3.92	.27	3.76	.47
15	Interprofessional relationships between physicians and nurses should be included in their educational programs	3.82	.39	3.68	.59
	Total	55.05	3.30	52.42	5.74

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<b>Table 8. Comparison of JSAC Mean Total and Factor Scores by Provider Type</b>					
	<b>SN (n=114)</b>	<b>Physicia n (n=62)</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>p</i></b>
JSAC Total Score	55.05 (3.30)	52.42 (5.74)	3.327	83.5*	.001***
Factor 1: Shared Education & Collaboration	26.35 (1.66)	25.32 (2.84)	2.595	84.4*	.011**
Factor 2: Caring v Curing	11.18 (0.93)	10.40 (1.51)	3.666	87.0*	.000***
Factor 3: Nurses' Autonomy	11.58 (0.61)	11.37 (0.85)	1.698	95.4*	.093
Factor 4: Physicians' Authority	5.96 (1.40)	5.32 (1.47)	2.814	174.0	.005**
* equal variances not assumed ** significant at or below .05 *** significant at or below .0025 Bonferroni correction for multiple comparisons (.05/20)					

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<b>Table 9. Comparison of SNs' and Physicians' scores for statements of JSAC</b>				
	<b>JSAC Statement</b>	<b><i>t</i></b>	<b>df</b>	<b><i>P</i></b>
1	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant	3.831	86.62*	.000***
2	Nurses are qualified to assess and respond to psychological aspects of patients' needs	2.250	99.85*	.027**
3	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles	2.668	92.43*	.009**
4	Nurses should be involved in making policy decisions affecting their working conditions	3.644	76.82*	.000***
5	Nurses should be accountable to patients for the nursing care they provide	2.066	83.78*	.042**
6	There are many overlapping areas of responsibility between physicians and nurses	.672	174.00	.502
7	Nurses have special expertise in patient education and psychological counseling	3.234	174.00	.001***
8	Doctors should be the dominant authority in all health care matters	2.149	174.00	.033**
9	<i>Imagine a situation in which you work at a hospital, what do you then think about the following statement: Physicians and nurses should contribute to decisions regarding the hospital discharge of patients</i>	.773	174.00	.440
10	The primary function of the nurse is to carry out the physician's orders	2.736	174.00	.007**
11	Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends.	.414	174.00	.680
12	Nurses should also have responsibility for monitoring the effects of medical treatment	.889	174.00	.375
13	Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient	1.999	68.82*	.050**
14	Physicians should be educated to establish collaborative relationships with nurses	2.521	83.73*	.014**
15	Interprofessional relationships between physicians and nurses should be included in their educational programs	1.651	90.15*	.102
*equal variances not assumed      **significant at or below .05 *** significant at or below .0025 Bonferroni correction for multiple comparison				

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<b>Table 10. Four Dimensions of Collaboration Model</b>		
<b>Individual Level of Interaction: SHARED GOALS AND VISIONS</b>		
<b>Component</b>	<b>SNs <i>n</i> (%)</b>	<b>Phys <i>n</i> (%)</b>
<b>Goals</b>		
<i>Goals for obese pediatric students/patients</i>	<i>N</i> = 93	<i>N</i> = 63
Decrease non-nutritive food & beverage intake	70 (75%)	61 (97%)
Increase physical activity	82 (88%)	62 (98%)
Decrease screen time	62 (67%)	60 (95%)
Improve intake of fruits & vegetables	75 (81%)	59 (94%)
Awareness of complications of obesity	50 (54%)	45 (71%)
<i>Treatment Guidelines utilized/familiarity</i>	<i>N</i> = 114	<i>N</i> = 60
American Medical Association or Other	30 (26%)	6 (10%)
Combination of recommendations	20 (18%)	44 (73%)
Healthy Eating and Activity Together	52 (46%)	8 (13%)
American Academy of Pediatrics 4 Step Approach	36 (32%)	2 (3%)
<b>Client Centered versus Other Allegiances</b>		
<i>Professional Organization Membership</i>	<i>N</i> =90	<i>N</i> =63
American Academy of Pediatrics		41 (68%)
American Academy of Family Medicine		12 (20%)
National Association of School Nurses	78 (87%)	
<i>School Nurse Childhood Obesity Prevention Education</i>	<i>N</i> = 112	<i>N</i> =
Yes	8 (7%)	
No	104 (93%)	

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<b>Table 11. Four Dimensions of collaboration Model: Individual Level of Interaction - INTERNALIZATION</b>		
<b>Component</b>	<b>SNs <i>n</i> (%)</b>	<b>Phys <i>n</i> (%)</b>
<b>Mutual Acquaintanceship</b>		
<i>Know the other provider</i>	<i>N</i> =104	<i>N</i> =52
None	7 (6%)	19 (37%)
Some	79 (70%)	23 (44%)
All	27 (24%)	10 (19%)
<i>Know how to contact other provider</i>	<i>N</i> =112	<i>N</i> = 60
None		3 (5%)
Some		14 (21%)
All	112 (100%)	43 (74%)
<i>Worked with Other Provider (multiple response set)</i>	<i>N</i> =76	<i>N</i> = 30
Continuing education programs	16 (21%)	6 (20%)
Health education for students/parents/staff	33 (43%)	18 (60%)
Research or publications	3 (4%)	2 (7%)
Other	24 (32%)	4 (13%)
<b>Trust</b>		
<i>"SN to follow through with my medical management plan of student(s)"</i>		
<i>"Pediatric MD to listen to and include my concerns about health management of student(s)"</i>		
	<i>N</i> = 113	<i>N</i> = 60
Strongly Disagree	4 (4%)	1 (2%)
Tend to Disagree	23 (20%)	1 (2%)
Tend to Agree	68 (60%)	38 (63%)
Strongly Agree	18 (16%)	20 (33%)

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<b>Table 12. Four Dimensions of Collaboration Model Organizational Level of Interaction - GOVERNANCE</b>		
<b>Component</b>	<b>SNs <i>n</i> (%)</b>	<b>Phys <i>n</i> (%)</b>
<b>Centrality</b>		
<i>Essential School Health Services (SNs)</i>		
<i>Patient Centered Medical Home (physicians)</i>	<i>N</i> = 110	<i>N</i> = 56
Yes	80 (72%)	29 (52%)
No	30 (27%)	27 (48%)
<b>Leadership</b>		
<i>Manager responsible for Policies &amp; Procedures</i>	<i>N</i> = 114	<i>N</i> = 63
Yes	48 (42%)	51 (81%)
Unsure	46 (40%)	8 (13%)
No	20 (17%)	4 (6%)
<i>School Physician</i>		<i>N</i> = 60
Yes		9 (15%)
No		51 (85%)
<i>Notified of MA regulation: School Based BMI Screening</i>		<i>N</i> = 58
Professional organization		24 (41%)
School Nurse or referral form		14 (24%)
Public media or word of mouth		20 (34%)
<b>Support for Innovation</b>		
<i>Reasonable method of collaboration for routine health concerns</i>	<i>N</i> = 111	<i>N</i> = 58
Written	75 (68%)	45 (78%)
Phone	24 (22%)	8 (14%)
Face to face meeting	0 (0%)	1 (2%)
Email	12 (11%)	4 (7%)
<i>Reasonable method of collaboration for complex health concerns</i>	<i>N</i> = 110	<i>N</i> = 60
Written	41 (37%)	27 (45%)
Phone	60 (54%)	26 (43%)
Face to face meeting	4 (7%)	4 (7%)
Email	5 (4%)	3 (5%)
<b>Connectivity</b>		
<i>Frequency of communication with other provider</i>	<i>N</i> = 113	<i>N</i> = 60
Never to once per year	10 (9%)	14 (23%)
Twice to five times per year	37 (33%)	20 (33%)
Once to several times per month	42 (37%)	19 (32%)
Once to several times per week	24 (21%)	7 (12%)

<b>Table 13. Four Dimensions of Collaboration Model</b>		
<b>Organizational Level of Interaction - FORMALIZATION</b>		
<b>Component</b>	<b>SNs <i>n</i> (%)</b>	<b>Phys <i>n</i> (%)</b>
<b>Formalization Tools</b>		
<i>Most common format for referral information return</i>	<i>N</i> =112	<i>N</i> =54
Verbal info to parent to relay to SN	33 (30%)	6 (11%)
Referral form to parent to relay to SN	57 (50%)	39 (72%)
Phone call to SN	4 (4%)	5 (9%)
Letter to SN	4 (4%)	-
Other	14 (12%)	4 (7%)
<i>Written policies &amp; procedures regarding collaboration with outside agencies</i>	<i>N</i> =113	<i>N</i> =63
Yes	40 (35%)	33 (51%)
Unsure	53 (47%)	24 (38%)
No	20 (18%)	6 (10%)



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\*mean difference is significant at the .05 level in post hoc analysis

<b>Table 14. School Nurses' Mean Total Scores on Jefferson Attitude toward Collaboration Scale by Sample Characteristics</b>				
		N	$\bar{X}$	SD
Age	31-40	11	53.18	4.14
	41-50	29	53.48	2.61
	51-60	53	53.17	2.28
	>=61	13	52.31	2.75
Highest Level of Education	AD or less	5	52.00	.71
	RN, BSN	59	53.17	2.71
	RN, MSN+	26	52.81	2.71
	RN, MS other	24	53.71	2.93
Years as SN	1-10	51	54.14	3.42
	11-20	51	55.88 *	3.00
	21-30	10	55.30	3.09
	>= 31	2	56.00	5.66
School Type	Elementary	52	55.40	2.82
	Elem + MS/HS	24	55.80	3.21
	MS/HS	35	54.20	3.56
Total Students	<= 250	21	55.00	3.05
	251-500	33	55.94	2.80
	501-750	36	54.67	3.83
	> 751	24	54.50	3.22
Community Type	Rural	9	53.56	3.54
	Suburban	70	55.50	3.08
	Urban	32	54.56	3.70
Percent Obese Students	1-10%	57	55.30	3.12
	11-33%	47	54.60	3.62
	<= 34%	3	54.67	3.22
Free & Reduced Lunch Eligibility	<40%	51	55.08	3.40
	>41%	49	55.37	3.02
NASN Membership	Yes	78	55.28	3.24
	No	36	56.58	3.43
SCOPE certification	Yes	8	54.00	3.66
	No	104	55.05	3.25
ESHS	Yes	80	55.40	3.26
	No	30	54.17	3.27

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<b>Table 15. Pediatric Primary Care Providers' Mean Total Scores on Jefferson Attitude toward Collaboration Scale by Sample Characteristics</b>				
		N	$\bar{x}$	SD
Age	31-40	12	51.75	6.17
	41-50	22	50.64	6.01
	51-60	14	55.36*	3.48
	$\geq 61$	12	53.42	5.25
Gender	Female	41	51.71	4.88
	Male	21	52.78	6.15
Specialty	Pediatrician	43	52.84	5.06
	Family Medicine	19	51.47	7.10
Years as Physician in MA	1-10	26	50.92	6.28
	11-20	14	52.36	5.83
	21-30	10	54.40	3.98
	$\geq 31$	11	53.73	5.39
Practice Type	Hospital based	11	54.00	6.05
	Group	28	51.86	4.90
	Solo	7	49.71	7.06
	Community Ctr.	14	53.21	6.66
Average Daily Number of Patients	0 – 10	9	53.33	6.24
	11-20	31	53.29	6.14
	21-30	18	51.72	4.74
Community Type	Rural	5	50.00	6.04
	Suburban	34	50.91	5.85
	Urban	21	54.86*	4.62
Percent Patients with Public/No Insurance	$<40\%$	28	52.00	4.82
	$>41\%$	33	52.97	6.10
Professional Membership	AAP	40	52.65	5.14
	AAFP	15	52.00	6.96
PCMH	Yes	28	51.93	6.13
	No	27	52.56	5.75
School Physician	Yes	9	52.67	5.70
	No	51	52.20	2.83
Percent Obese Patients	$\leq 10\%$	19	52.05	5.61
	11-33%	22	50.64*	5.80
	$\geq 34\%$	19	54.42	5.53

\*mean difference is significant at the .05 level in post hoc analysis

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Overall  $R^2 = .25$ , Adjusted  $R^2 = .21$ ,  $F(3, 56) = 6.22$ ,  $p = .001$

<b>Table 16. Summary of Stepwise Regression Analysis for Variables Predicting Physicians Attitude toward MDRN Collaboration (<math>N = 62</math>)</b>					
<b>Predictor Variable</b>	<b><i>B</i></b>	<b><i>SE B</i></b>	<b><math>\beta</math></b>	<b><i>T</i></b>	<b><i>P</i></b>
Constant	54.38	1.11		48.83	.000
11-33% Obese Pediatric Patients	-3.930	1.37	-.34	-2.87	.006
Suburban Community	-2.710	1.29	-.24	-2.10	.040
Age 51-60 years	4.578	1.56	.35	2.93	.005

<b>Table 17. Most Frequently Cited Benefits to Collaboration Categories by SNs (N = 92)</b>	
<i>Category</i>	<i>n (%)</i>
Better Health Outcomes	36 (39%)
Supporting Each Other	36 (39%)
Communication/Collaboration	18 (20%)
Connectivity with Parents	18 (20%)
Continuity of Care	13 (14%)

<b>Table 18. Most Frequently Cited Benefits to Collaboration Categories by Physicians (N = 48)</b>	
<i>Category</i>	<i>n (%)</i>
Supporting Each Other	22 (46%)
Role of School Nurse	15 (31%)
Communication/Collaboration	14 (29%)
Continuity of Care	12 (25%)
Better Health Outcomes	11 (23%)

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<b>Table 19. Most Frequently Cited Barriers to Collaboration Categories by SNs (N = 92)</b>	
<i>Category</i>	<i>n (%)</i>
Lack of Time	43 (27%)
Parental Concerns	39 (42%)
Role of the School Nurse	20 (22%)
Cost	11 (12%)
Difficulty Accessing	10 (11%)
Avoiding the Weight Issue	9 (10%)
Privacy	7 (8%)
Lack of Common Goals	6 (6%)

<b>Table 20. Most Frequently Cited Barriers to Collaboration Categories by Physicians (N = 46)</b>	
<i>Category</i>	<i>n (%)</i>
Lack of Time	25 (54%)
No Communication System	13 (28%)
Parental Concerns	13 (28%)
Role of the School Nurse	7 (15%)
Cost	6 (13%)
Lack of Interest	3 (6%)
School Issues	3 (6%)
Already Addressed	3 (6%)
Privacy	3 (6%)

<b>Table 21. Latent content analysis of SN thoughts &amp; experiences around collaboration</b>				
<b>Text Response</b> <i>Direct quotes from respondents</i>	<b>Condensed Meaning Unit</b> <i>Description close to the text</i>	<b>Condensed Meaning Unit</b> <i>Interpretation of the underlying meaning</i>	<b>Sub theme</b>	<b>Theme</b>
I have seen a range of true obesity, which is low in our school system. I feel that it is usually a lack of education / culture in many cases. Poor food habits and parents also have weight issues. Choices at home are limited due to economics or more likely in our school, time/ effort put forth in our busy lives, many prepared foods, eating out and too much screen time/ not enough exercise. I am not sure the doctors have the time to explain all the ways weight can be addressed, or are uncomfortable?? And if they know that school nurses are even able to help with / or reinforce counsel parents / kids. It would be nice to have a note back from the doctor as to what their action was, or	Obesity low in their school system. Feel obesity is usually due to lack of education, culture, poor food habits and parents have weight issues. Choices at home limited due to economics, increased time in schools, time or effort put forth in busy lives, eating out, not enough exercise. Don't send BMI letters as not screening grades. If have concern about under/overweight I ask parent what doctor has advised to open a conversation; not usually communicated verbally with physician	Not a problem, if have a concern will ask parent not physician	No connection to the other professional or issue	Lack of understanding drives frustration to immobility

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the parent tells us. I don't send out BMI letters, because my school age students are in grades that we do not screen, but the other schools do. I sometimes have a concern with under wt and or overweight and usually ask parents what their doctors have advised to open up the conversation. I have not freq. communicated verbally with the docs themselves.				
I have no interaction w/ our local pediatricians on the issue of obesity.	No interaction with physicians on issue of obesity	No personal investment		
One MD returned a form saying it was the school's fault the children were overweight b/c of the school lunches being unhealthy. MD's do not take the time to explain the risks of being overweight, the parents are also over weight, the parents are not healthy, hard for the children to be healthy	Physician blaming school for children being overweight b/c of unhealthy school lunches. Physicians don't explain the risks of being overweight Parents are not healthy, hard for children to be.	Multiple frustrations: with physicians: a. blaming schools; b. not teaching parents: if not healthy, child will follow		
Personally I don't believe collaboration is needed. Parents of obese children	Don't believe collaboration is needed because:	Overwhelmed by enormity of issue, bigger	Competing forces	

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know they are obese. Obese kids know they are obese, nationwide this has been addressed, education of all is needed. The food industry has to change, our eating habits have to change but it will be difficult. Kids dislike dietary changes put in place, they hate school lunches. Perhaps moderation should be taught. Who knows but if we keep talking about it and looking at it maybe change will happen.	1. the issue is known, 2. education is needed, 3. food industry needs to change, 4. personal eating habits need to change. 5. no one likes change. if we keep talking about it and looking at it maybe change will happen.	things have to change		
I believe some physicians will think they have more important issues to deal with and no time to collaborate with us. Some will feel they handle things in the office.	Feels physicians think there are more important issues, no time to collaborate with SNs, and will handle issues in office	Frustration with physician: no desire to collaborate with SN		
Every student in this school has an annual physical exam and yet obesity is not addressed during that office visit- which means no information for the patient, no information for the parents and no information for the school nurse. Implementing a plan to address the obesity	Every student has annual PE yet obesity is not addressed Implementing a plan to address obesity from the SNs office is difficult b/c of lack of depth from all the necessary participants	Frustration; not addressed by physicians, no info to families. Difficult to make things happen		



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from the school nurses' office is difficult because of the lack of depth from all the necessary participants for a successful outcome (i.e. parents, doctors, nutritionists, student's friends, etc.)	for a successful outcome			
I feel that many PCP's do not understand the role of the school nurse which includes preventative care. I also feel that many physicians are concerned about HIPPA laws and do not want to give information to outside providers. Finally, I feel that the topic of obesity is still very charged. MD's have a hard time talking with parents/children about this topic. Often we may get recommendations from the MD (ie "PE class every day") for a child that is obese. This involves system changes on an administration level that are hard to enact.	1. Physicians don't understand the role of SN. 2. Physicians worry about HIPAA 3. Obesity is difficult for pediatric MDs to address 4. Physician recommends practices which are not tenable for school systems (PE daily)	Frustration with physician: ignorance of SN, school role, HIPAA; difficulty talking about obesity		
I came into school nursing from the hospital setting where I was a well-respected member of the health care	Experience changed from respected member of hospital to school nursing	Untapped resource for physicians; what is our		

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<p>team. Once I crossed over to the school setting that experience changed. I was now questioned when I called to collaborate with MD's and they were guarded with their responses. Over the years that has changed some. But it continues to amaze me that we are such an untapped resource for PCPs. I was just invited to a grant meeting regarding asthma care at a hospital; they were talking about all the great plans with students and involving the VNA. There was very little mention of the school nurse until I spoke up reminding folks we are in the schools everyday with students who you are concerned about. School Nurses need to do a better job of promoting what we do.</p>	<p>Guarded responses when I called to collaborate with physicians, has changed some over the years. Still continues to amaze me that SNs are such an untapped resource for physicians; SNs need to do a better job at promoting what we do.</p>	<p>complicity in this?</p>	<p>I don't know how to make things happen by myself</p>	
<p>I work hard organizing additional non-curriculum based nutrition awareness and exercise programs at our school. We have developed a Get Healthy, Grow Strong, &amp; Have Fun program which</p>	<p>I work hard organizing non-curriculum based nutrition awareness and exercise programs at school which follows the federal guidelines. Maybe it</p>	<p>Disillusioned, worn out not knowing if positive results</p>		

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focuses on the federal guidelines. Most of the teachers are on board, which is often the hardest obstacle. We also have a nursery and extended day program. The youngest students (nursery through Kindergarten) are like sponges regarding nutrition. It is here where I feel our best efforts lie. The older students, grades 1-4 are very excited and try very hard. Middle school is, well, middle school- a tough sell for anything it seems. Not sure exactly what they get from it all but we keep on telling them, maybe it will be in their sub-conscious enough to sink in.	will be in their subconscious enough to sink in.			
I believe there is opportunity for better collaboration in terms of mutual goal setting, follow up and assessment of families and students	Opportunity for better collaboration with mutual goal setting, follow-up and assessment of families and students	Recommend interaction between physicians and SNs	How can collaboration around obesity happen?	
As a school nurse I see students more often then they see their PCPs. Parents often refer children to me for assessments before contacting	SN sees students more frequently than physician. Open communication with student's	Recommend interaction between physicians and SNs not only		

# Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

<p>their PCP. I feel that parents trust and respect my opinion when it comes to their child's health. Being able to have open communication and collaboration with a student's PCP is in the best interest of the child. School nurses have the ability to more closely monitor a student's nutrition and weight at school. I also believe that parent's need the extra support because they are not with their children all day. I strongly believe that if PCPs and school nurses met every few month's for 'round table' meetings on our area youths and health concerns that it would have a positive impact on community health.</p>	<p>physician is in the best interest of the child. Physicians &amp; SNs meet for "round table" on areas' youth &amp; health concerns.</p>	<p>on individual but community basis.</p>		
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Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

<b>Table 22. Latent content analysis of physicians' thoughts &amp; experiences around collaboration</b>				
<b>Text Response</b>	<b>Condensed Meaning Unit</b> <i>Description close to the text</i>	<b>Condensed Meaning Unit</b> <i>Interpretation of the underlying meaning</i>	<b>Sub theme</b>	<b>Theme</b>
If school lunches aren't nutritious we can't help	School lunches aren't nutritious, we can't help	School issue that pediatric physician can't fix	Competing forces	Lack of understanding drives frustration to immobility
To what degree is HIPAA interfering with communication?	HIPAA interfering with communication	Insurance issue which limits pediatric physician		
School nurses' role largely limited to mandatory screening and triage of acute illness.	SNs role does not permit collaboration regarding obesity	School nurse issue that physician can't resolve		
1. School nurses have little control on types of food provided in the cafeteria or the amount of time and quality of physical activity the school provides. 2. Need to find time to make it happen. 3. Need to develop a plan that is feasible	1. SNs: little control on cafeteria food or time and quality of physical activity in school. 2. Need to find time to make it happen. 3. Need to develop a plan that is feasible for	Why it doesn't work now & how it might	Limitations of SNs	

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for all parties and that also has ongoing monitoring of effectiveness.	all parties and that also has ongoing monitoring of effectiveness.			
I don't think it would be that helpful.	Wouldn't be that helpful.	Indifference; no personal investment	No connection with person or issue	
I would like to do this but have never been contacted by a school nurse (nor have I tried to reach out) - the onus is on both of us, I guess.	Would like to do this but never been contacted by or contacted a SN	Have no knowledge of the other professional		
Worry it would increase my already heavy paperwork burden. How can it become more than just forms and record keeping?	How can it be more than just forms, recordkeeping and more paperwork	Needs to be more than busy work		
Obesity is a very difficult topic and health issue to turn around. It is time consuming and only the patient and his/her family can ultimately make changes necessary to reverse obesity. It requires commitment to a lifestyle overhaul. In most cases, which has to come from the patient's family. Health care providers (HCPs) can try to educate people but the outcomes are	Obesity is very difficult to turn around. Only the patient and family can make the changes necessary to reverse obesity. Physicians can try to educate people but the outcomes are rarely rewarding for the amount of effort required.	Too challenging a problem for minimal results	How can collaboration around obesity happen?	

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

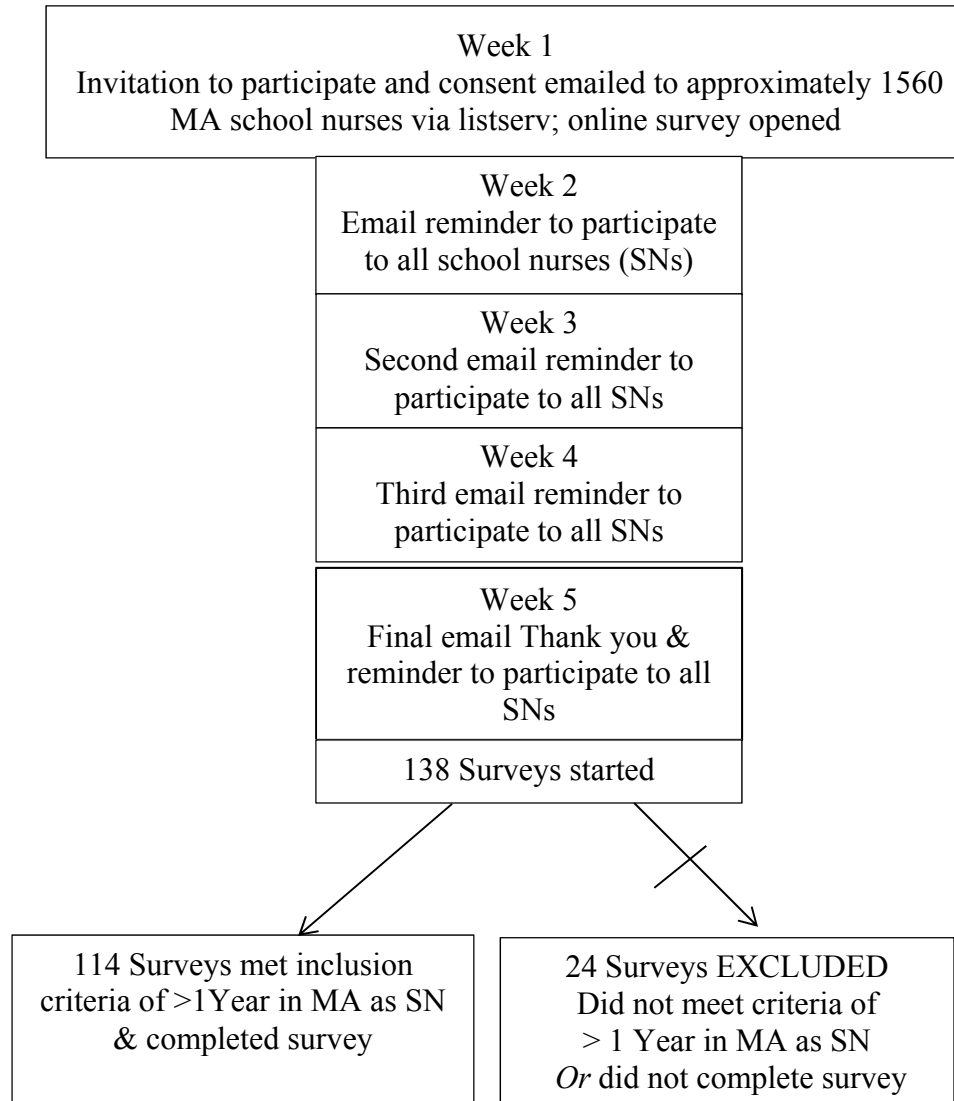
rarely rewarding for the amount of effort required.				
Excellent idea if we can find a way to make it work smoothly.	Excellent idea if find a way to make it work smoothly	Positive outlook with reservation		
I think there needs to be a "physician/provider champion" of obesity at our clinic to be the expert in collaboration with schools. This person would partner with a nurse or LPN at our office too. I find individual providers will struggle with time to call back, speak etc. in a busy day. It needs to be "carved out" in a thoughtful, proactive and mindful way that is <u>sustainable</u> then both can grow (school and pediatrician) & child may benefit (we hope).	Needs to be a "physician/provider champion" of obesity at clinic to be expert in collaboration with schools. Individual providers struggle with time to call back, speak, etc. in a busy day. Needs to be "carved out" in a thoughtful, proactive, mindful way that is sustainable.	Idea about collaboration process between physicians and SNs	Collaboration around obesity <i>could</i> happen	
I think if somehow a team approach model could be est. via guidelines we could make the biggest difference. Also, I think sharing of handouts/computer messages/any education	Team approach via guidelines Sharing of materials/education could help with collaboration	Idea about collaboration process between physicians and SNs		

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

materials could help us with collaboration.				
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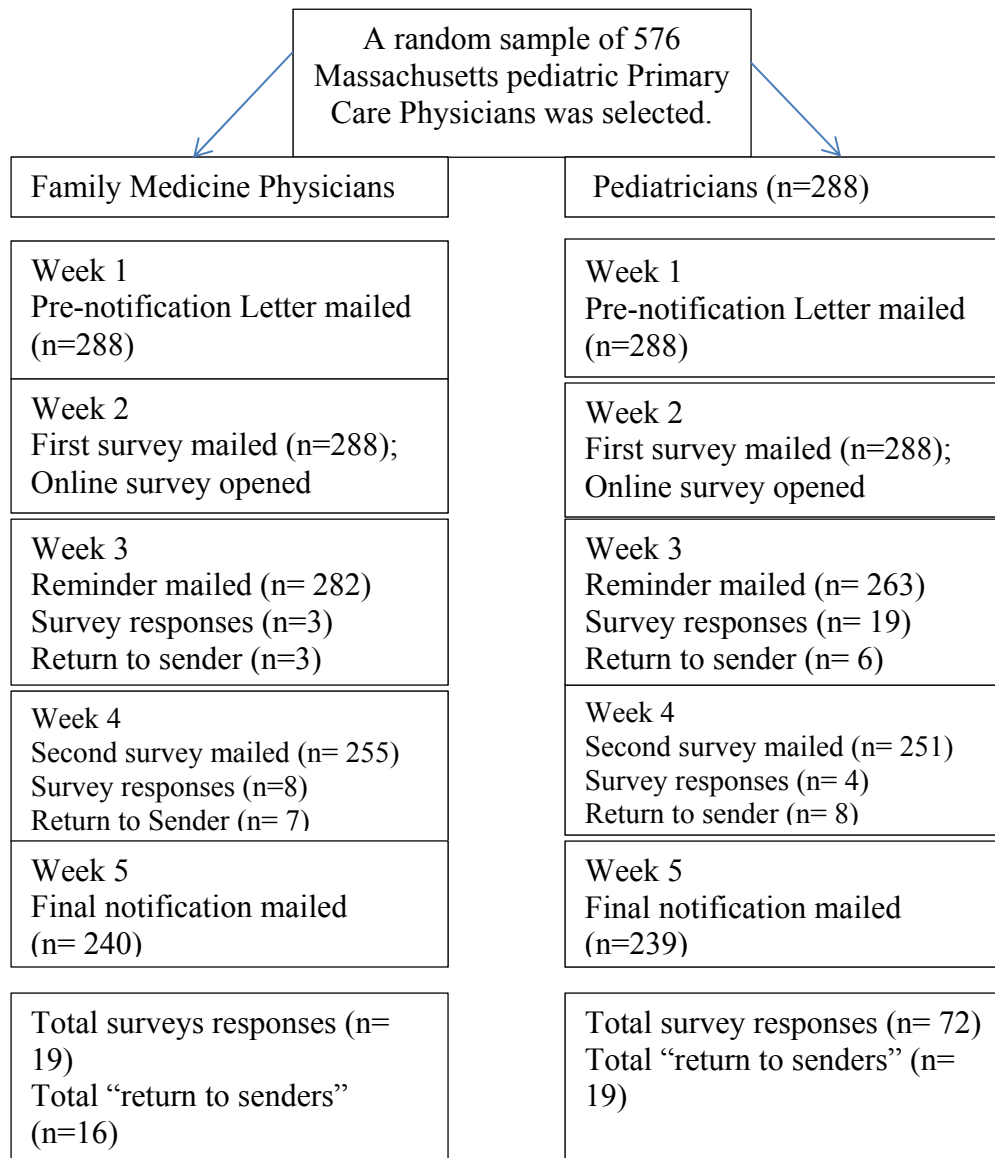


## FIGURES

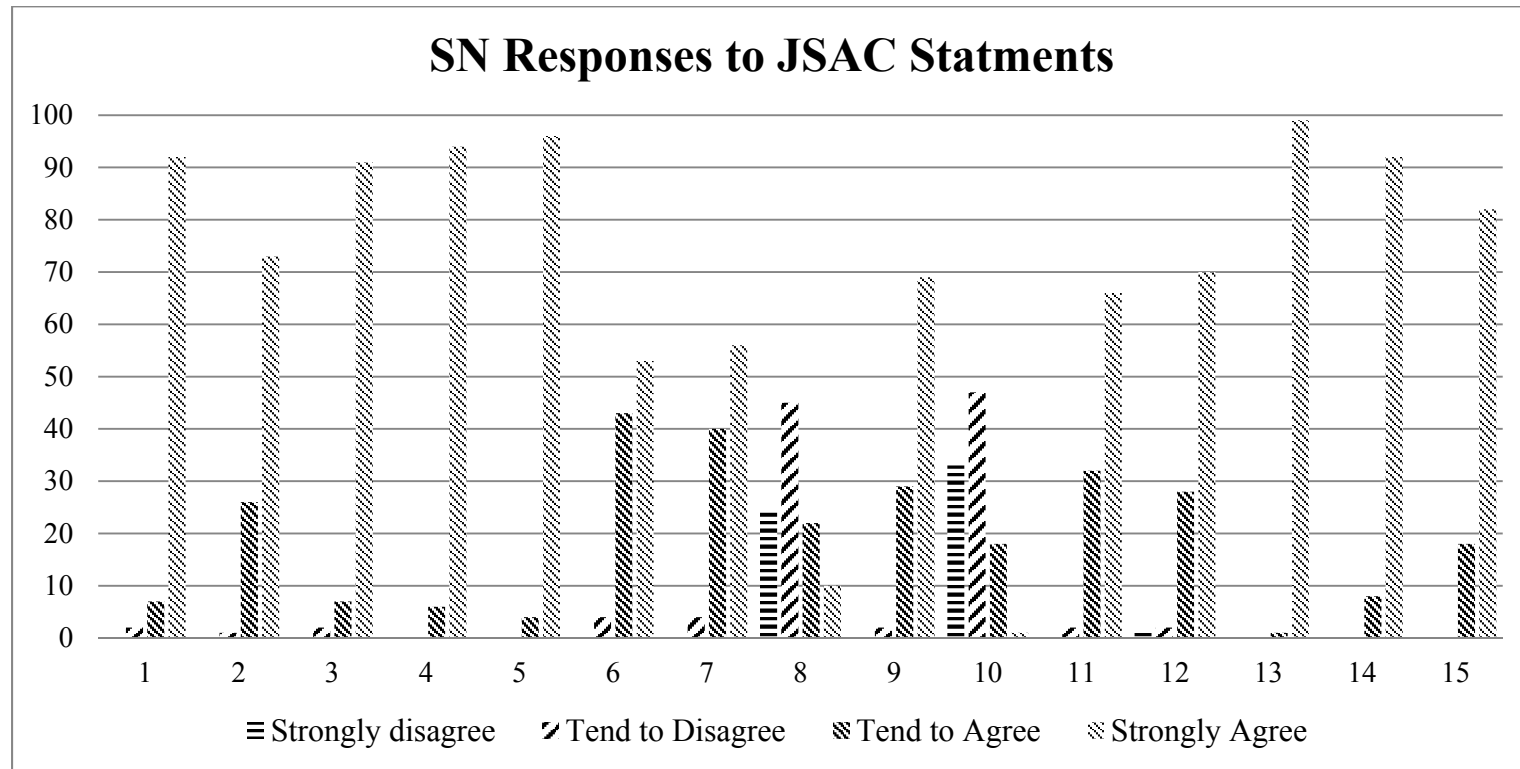


**Figure 1 School Nurse recruitment process**

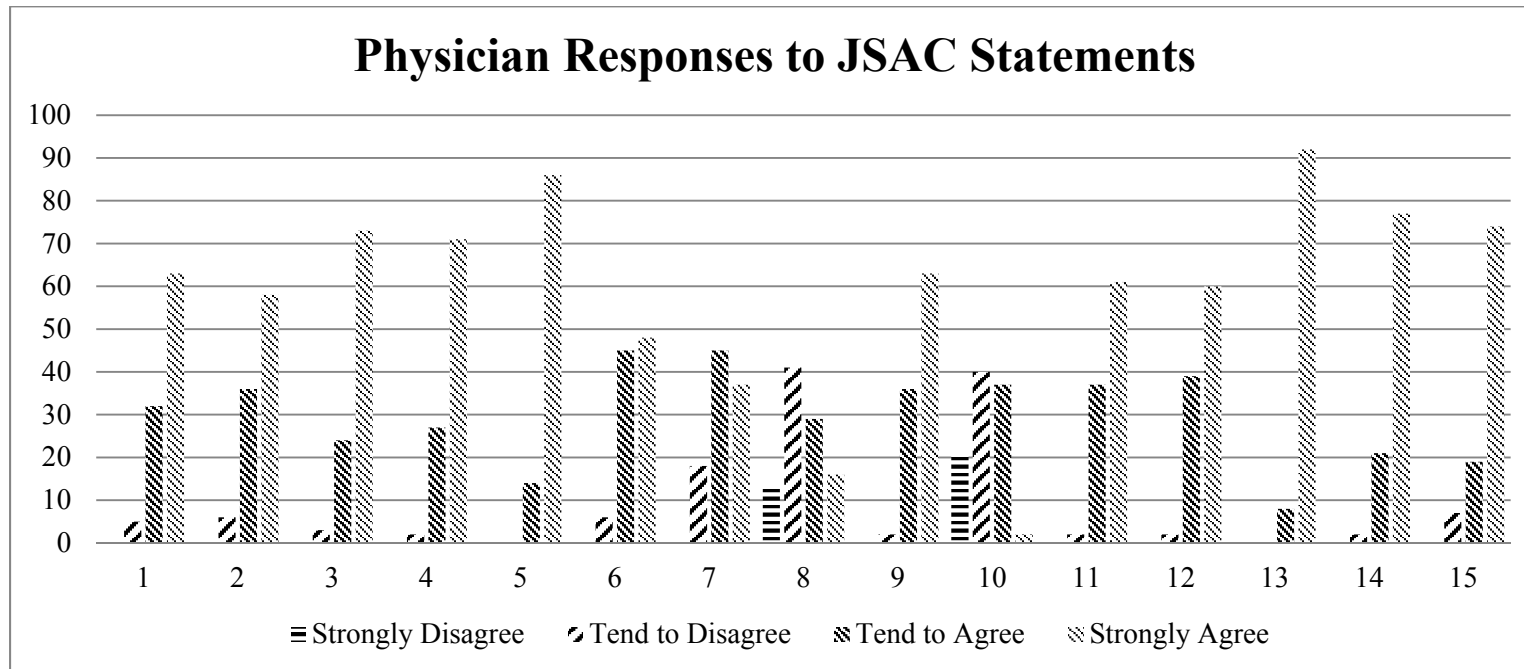
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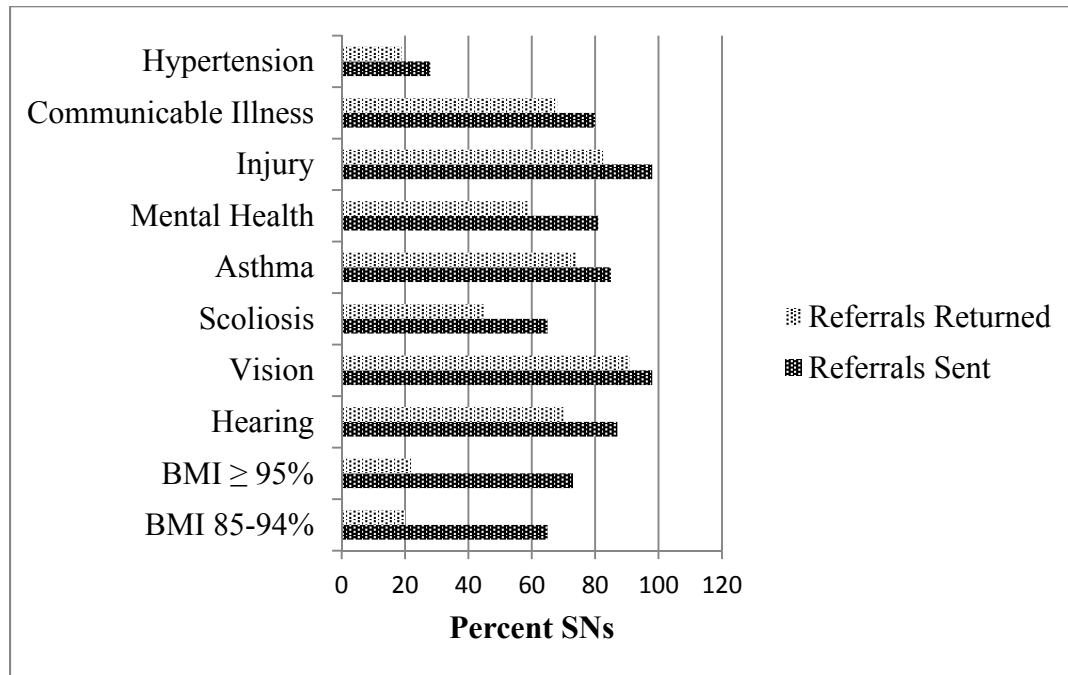
**Figure 2 Physician recruitment process**



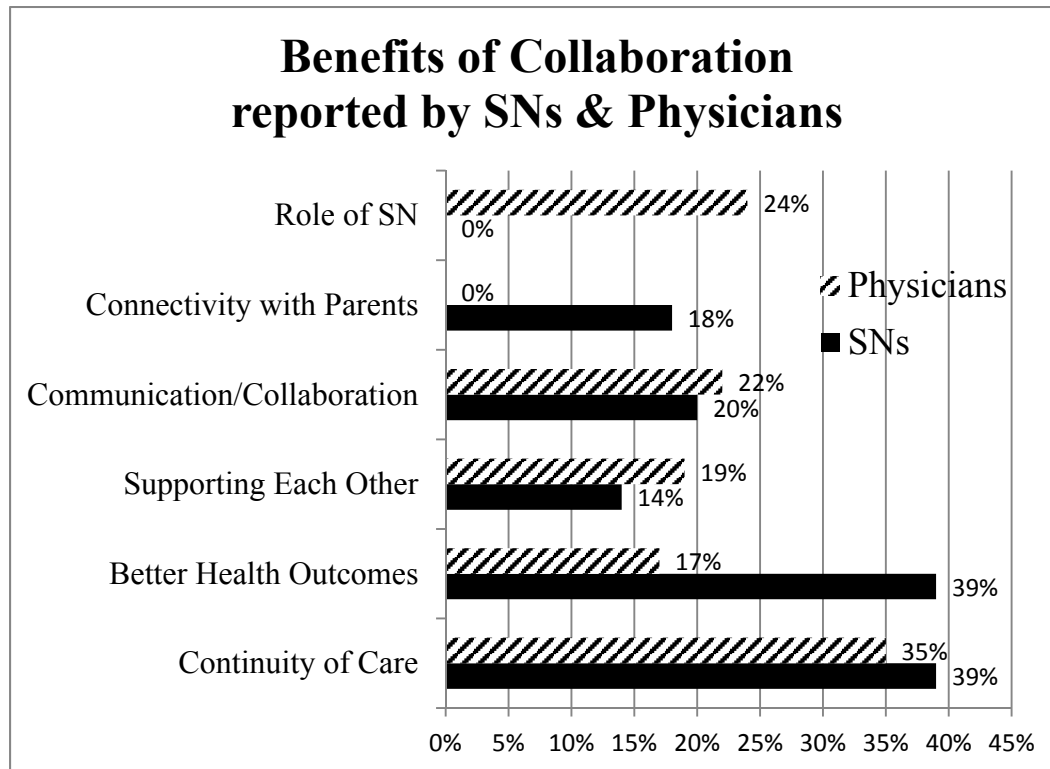
**Figure 3 Percent response by School Nurses to individual statements of Jefferson Scale of Attitudes toward MDRN Collaboration Scale**



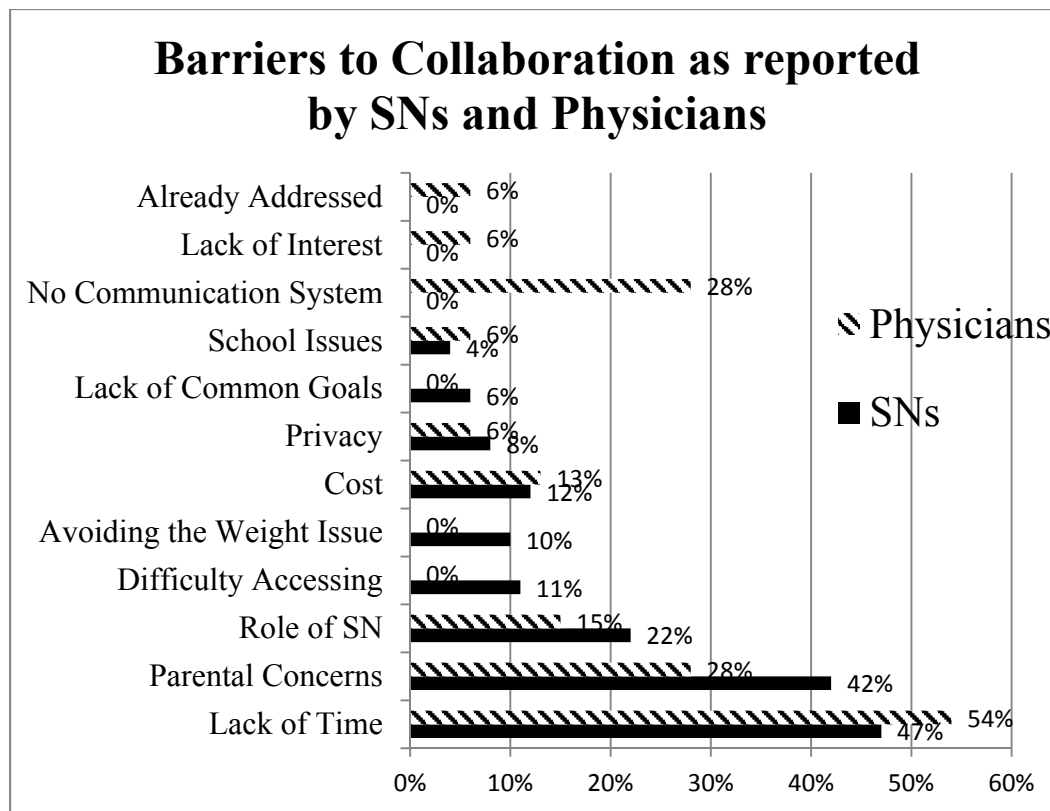
**Figure 4 Percent response by physicians to individual statements of Jefferson Scale of Attitudes toward MDRN Collaboration**



**Figure 5 Percent SNs who report referrals sent compared with responses received in 2011-12 school year.** SNs reported  $\geq 1$  referral sent or response received for each diagnostic group. The response rate for overweight and obesity referrals is substantially lower than all other diagnostic groups.



**Figure 6 Comparison of percentile ranking of benefits to SN-MD collaboration.** The five categories of benefits were ranked by percentage of providers listing in any of three possible entries.



**Figure 7 Comparison of percentile ranking of barriers to SN-MD collaboration.** Categories of barriers were ranked by percentage of providers listing in any of three possible entries.

## APPENDIX

### Appendix A

#### Primary Care Provider and School Nurse Collaboration Survey

**The following questions describe you as a pediatric Primary Care Provider.**

1. What is your current age?  
\_\_\_\_\_ years
2. What is your gender?
  - ☐ Male
  - ☐ Female
3. What is your training as a pediatric Primary Care Provider (PCP)?
  - ☐ Pediatrician
  - ☐ Family Practice Physician
4. Please indicate the professional organization(s) to which you belong  
(please check all that apply).
  - ☐ AAP
  - ☐ AAFM
  - ☐ Other, please list \_\_\_\_\_
  - ☐ Not currently a member of any professional organization
5. How many years have you been practicing as a pediatric PCP in MA?  
\_\_\_\_\_ years

**The next questions describe your practice.**

6. What is the average number of patients you see in a day?  
\_\_\_\_\_ number of patients
7. Is your practice:
  - ☐ Hospital based
  - ☐ Solo practice
  - ☐ Community health center
  - ☐ Group practice
  - ☐ School Based Health Center
  - ☐ Other, please list \_\_\_\_\_



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8. Is your practice reimbursed by insurance carriers as a "patient centered medical home"?
- ☐ Yes
  - ☐ No
9. Approximately what percentage of your patients is covered by each of the following types of insurance?
- \_\_\_\_\_ % Public insurance (e.g. Medicare/Medicaid)
- \_\_\_\_\_ % Commercial insurance
- \_\_\_\_\_ % Uninsured
10. In order to determine what type of community (rural, urban, suburban) in which your practice is located, please enter the zip code for your practice \_\_\_\_\_ zip code
11. Does your practice have an office manager or director who oversees policies and procedures when dealing with outside agencies or health care providers?
- ☐ Yes
  - ☐ No
12. Does your practice have written policies and/or procedures in place regarding collaboration with outside agencies or health care professionals?
- ☐ Yes
  - ☐ No

**The following group of questions describes your attitude toward collaboration with registered nurses.**

13. Please indicate the extent of your agreement with each of the following statements by checking a single circle. For the purposes of this study a nurse is defined as "a registered nurse who is engaged in providing or directly supervising the care of patients."

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JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION				
	Strongly Agree	Tend to Agree	Tend to Disagree	Strongly Disagree
a. A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant				
b. Nurses are qualified to assess and respond to psychological aspects of patients' needs				
c. During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles				
d. Nurses should be involved in making policy decisions affecting their working conditions				
e. Nurses should be accountable to patients for the nursing care they provide				
f. There are many overlapping areas of responsibility between physicians and nurses				
g. Nurses have special expertise in patient education and psychological counseling				
h. Doctors should be the dominant authority in all health care matters				
i. <i>Imagine yourself in a situation where you work at a hospital, what do you then think about the following statement:</i> Physicians and nurses should contribute to decisions regarding the hospital discharge of patients				
j. The primary function of the nurse is to carry out the physician's orders				

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION				
	Strongly Agree	Tend to Agree	Tend to Disagree	Strongly Disagree
k. Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends				
l. Nurses should also have responsibility for monitoring the effects of medical treatment				
m. Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient				
n. Physicians should be educated to establish collaborative relationships with nurses				
o. Interprofessional relationships between physicians and nurses should be included in their educational programs				

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**This next group of questions describes your connection to school nurses.**

14. Are you a school physician for a district?

- ☐ Yes
- ☐ No

If No Is Selected, Then Skip To #17

15. As a school physician, have you met or spoken with all the nurses in your district?
- ☐ Yes, all of the local school nurses
  - ☐ Yes, some of the local school nurses
  - ☐ No
16. Do you know your local school nurse(s)?
- ☐ Yes, all of the local school nurses
  - ☐ Yes, some of the local school nurses
  - ☐ No
17. Do you know how to contact your local school nurse(s)?
- ☐ Yes, all of the local school nurses
  - ☐ Yes, some of the local school nurses
  - ☐ No
18. *Please indicate your level of agreement with the following statement:*  
I trust the local school nurse(s) to follow through with my medical management plan of student(s).
- ☐ Strongly agree
  - ☐ Tend to agree
  - ☐ Tend to disagree
  - ☐ Strongly Disagree
19. Have you worked with your local school nurse(s) on any of the following joint efforts (please check all that apply):
- ☐ Continuing education programs for health professionals
  - ☐ Health education programs for students/parents/staff/general public
  - ☐ Research or publications
  - ☐ Other, please explain \_\_\_\_\_

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20. How often do you communicate with your local school nurse(s) on any health care issues?

- ☐ Several times a week
- ☐ Once a week
- ☐ Several times a month
- ☐ Once a month
- ☐ More than once a year but less than monthly
- ☐ Once a year
- ☐ Never

21. Over the past school year, approximately how many referrals did you receive from school nurses regarding:

	None	<10	10-25	>25
a. Hearing				
b. Vision				
c. BMI 85% - 94%				
d. BMI > 95%				
e. Scoliosis				
f. Asthma				
g. Mental health concerns (e.g. ADHD, depression, OCD)				
h. Injury				
i. Communicable illnesses				
j. Hypertension				

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

22. What was the most common format you used to respond to the school nurse about these school referrals? (Please choose one)
- ☐ give verbal information to parent to pass on to school nurse
  - ☐ complete referral form, hand to parent to return to school nurse
  - ☐ phone call to school nurse
  - ☐ letter by mail to school nurse
  - ☐ other, please give example (action plan by mail; referral form by fax) \_\_\_\_\_
23. What do you feel is the MOST reasonable method of collaboration between a SN and a p-PCP for ROUTINE HEALTH INFORMATION? Please limit your response to one choice
- ☐ Written communication
  - ☐ Telephone communication
  - ☐ Face-to-face meetings
  - ☐ Other, please list \_\_\_\_\_
24. What do you feel is the MOST reasonable method of collaboration between a SN and a p-PCP for MANAGEMENT OF STUDENTS WITH

COMPLEX OR CHRONIC HEALTH ISSUES? Please limit your response  
to one choice.

- ☐ Written communication
- ☐ Telephone communication
- ☐ Face-to-face meetings
- ☐ Other, please list \_\_\_\_\_

**This section looks at issues surrounding childhood obesity.**

25. Approximately what percentage of your pediatric patients is obese?

- ☐ 10%
- ☐ 25%
- ☐ 33%
- ☐ 50%
- ☐ 66%
- ☐ other \_\_\_\_\_%

26. What guidelines, if any, do you use for the prevention and treatment of  
childhood obesity?

- ☐ American Academy of Pediatrics 4 Step Approach
- ☐ Healthy Eating and Activity Together
- ☐ American Medical Association Guidelines
- ☐ No one single set of guidelines, but a combination of  
recommendations
- ☐ Other, please list \_\_\_\_\_

27. Which of the following goals do you have for obese pediatric patients?

Please check all that apply

- ☐ Decrease non-nutritive food & beverage intake
- ☐ Increase physical activity
- ☐ Decrease screen time (TV, video)
- ☐ Improve intake of fruit and vegetables
- ☐ Awareness of complications of obesity
- ☐ Other, please list \_\_\_\_\_

28. How were you made aware of the MA state regulation for schools to include BMI screening, in addition to vision, hearing, and scoliosis screening?

- Notified by MA Department of Health
- Notified by local school nurses
- Patient arriving to office with school referral form
- Public media (newspaper, television, Internet)
- Professional association
- Word of mouth (professional or personal)

29. Please list potential BENEFIT(s) of collaboration between pediatric primary care providers and school nurses in addressing childhood obesity.

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30. Please list potential BARRIER(s) to collaboration between pediatric primary care providers and school nurses in addressing childhood obesity.

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**The following question gives you the opportunity to tell more about your experiences. Please answer truthfully.**

31. Give your thoughts about collaborating with school nurses around childhood obesity.

Please accept my sincere gratitude for your assistance in completing a survey which may help us understand collaboration between primary care providers and school nurses, and ultimately, improve the health and wellbeing of children experiencing obesity issues.

If you have questions, comments, or suggestions about the survey please contact M. Laurette Hughes in the Boston College Connell School of Nursing at [mary.hughes.8@bc.edu](mailto:mary.hughes.8@bc.edu).



## Appendix B

### School Nurse and Primary Care Provider Collaboration Questionnaire

The following questions describe you as a school nurse.

1. Please indicate your current age.  
\_\_\_\_\_ years
2. Please indicate your gender.
  - ☐ Male
  - ☐ Female
3. Please check your highest educational degree.
  - ☐ RN, AD
  - ☐ RN, BSN
  - ☐ APRN or DNP
  - ☐ RN, Master's Degree in field other than Nursing
  - ☐ RN, PhD in Nursing or field other than Nursing
  - ☐ Other, please list \_\_\_\_\_
4. Professional organizations to which you belong? (Please check all that apply)
  - ☐ National Association of School Nurses (NASN), includes MSNO
  - ☐ MA Nurses' Association (MNA)
  - ☐ Society of Pediatric Nurses
  - ☐ National Association of Pediatric Nurse Practitioners (NAPNAP) includes MA NAPNAP
  - ☐ Other, please list \_\_\_\_\_
5. How many years have you been practicing as a school nurse in MA?  
\_\_\_\_\_ years

The next questions describe your school(s).

6. Please list the total number of children for whom you are the school nurse.  
If you cover more than 2 schools, please enter the combined number of children.  
\_\_\_\_\_ number of children
7. What grade levels do you cover?  
\_\_\_\_\_ Lowest grade  
\_\_\_\_\_ Highest grade

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8. What the percentage of your school's student body is eligible for free and reduced lunches. Please slide the bar to the appropriate percentage  
\_\_\_\_\_ % of students
9. In order to determine the community type (rural, suburban, urban), please list the zip code of your school(s).  
\_\_\_\_\_ zip code
10. Is (Are) your school(s) designated as Essential School Health Services (ESHS)?
  - ☐ Yes
  - ☐ No
11. Does your school/district have written policies and/or procedures in place regarding collaboration with other agencies?
  - ☐ Yes
  - ☐ Unsure
  - ☐ No
12. Does your school/district have a manager who oversees policies and procedures when dealing with outside agencies?
  - ☐ Yes
  - ☐ Unsure
  - ☐ No

**The following group of questions describes your attitude toward collaboration with physicians.**

13. Please indicate the extent of your agreement with each of the following statements by checking a single circle. For the purposes of this study a nurse is defined as "a registered nurse who is engaged in providing or directly supervising the care of patients."

JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION				
	Strongly Agree	Tend to Agree	Tend to Disagree	Strongly Disagree
a. A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant				
b. Nurses are qualified to assess and respond to psychological aspects of patients' needs				
c. During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles				
d. Nurses should be involved in making policy decisions affecting their working conditions				
e. Nurses should be accountable to patients for the nursing care they provide				
f. There are many overlapping areas of responsibility between physicians and nurses				
g. Nurses have special expertise in patient education and psychological counseling				
h. Doctors should be the dominant authority in all health care matters				
i. <i>Imagine yourself in a situation where you work at a hospital, what do you then think about the following statement;</i> Physicians and nurses should contribute to decisions regarding the hospital discharge of patient.				
j. The primary function of the nurse is to carry out the physician's orders				
k. Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends				

JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION				
	Strongly Agree	Tend to Agree	Tend to Disagree	Strongly Disagree
l. Nurses should also have responsibility for monitoring the effects of medical treatment				
m. Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient				
n. Physicians should be educated to establish collaborative relationships with nurses				
o. Interprofessional relationships between physicians and nurses should be included in their educational programs				

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**The next group of questions describes your connection to local pediatric Primary Care Providers.**

14. Does your district have a school physician? A designation from the Council on School Health Services (COSH): a physician who oversees the health services in a district and with whom school nurses may confer.
  - ☐ Yes
  - ☐ No
15. Do you know your local pediatric Primary Care Providers (PCPs)?
  - ☐ Yes, all of the local PCPs
  - ☐ Yes, Some of the local PCPs
  - ☐ No
16. Do you know how to contact your local pediatric Primary Care Providers (PCPs)?
  - ☐ Yes, all of the local PCPs
  - ☐ Yes, some the local PCPs
  - ☐ No

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

17. Please indicate your level of agreement with the following statement: I trust the local physician to listen to, and include my concerns about health management of students.

- ☐ Strongly agree
- ☐ Tend to agree
- ☐ Tend to disagree
- ☐ Strongly disagree

18. Have you worked with your local p-PCP(s) on any of the following joint efforts? (please check all that apply)

- ☐ Continuing education programs for health professional
- ☐ Health education for students/parents/staff/general public
- ☐ Research or publications
- ☐ Other, please explain \_\_\_\_\_

19. How often do you communicate with your local pediatric Primary Care Providers on any health care issues?

- ☐ Several times a week
- ☐ Once a week
- ☐ Several times a month
- ☐ Once a month
- ☐ More than once a year but less than monthly
- ☐ Once a year
- ☐ Never

20. Over the past school year, approximately how many referrals did you SEND to families for follow-up with pediatric Primary Care Providers?

	None	1-10	10-25	>25
a. hearing				
b. vision				
c. BMI 85% - 94%				
d. BMI > 95%				
e. scoliosis				
f. asthma/allergies				
g. mental health concerns				
h. injury				
i. communicable illness				
j. hypertension				

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

21. Over the past school year, approximately how many RESPONSES did you receive from pediatric Primary Care Providers regarding individual referrals?

	None	1-10	10-25	>25
a. hearing				
b. vision				
c. BMI 85-94%				
d. BMI > 95%				
e. scoliosis				
f. asthma/allergies				
g. mental health concerns				
h. injury				
i. communicable illness				
j. hypertension				

22. What was the most common format of response you received from pediatric-Primary Care Providers about school referrals? (Please choose one)

- ☐ Verbal information by parent/student from pediatric Primary Car Provider
- ☐ Completed referral form, handed from parent/student
- ☐ Phone call from pediatric-Primary Care Provider
- ☐ Letter by mail from pediatric Primary Care Provider
- ☐ Other, please give example (action plan, visit note)

\_\_\_\_\_

23. What do you feel is the MOST reasonable method of collaboration between a School Nurse and a pediatric Primary Care Provider for ROUTINE HEALTH INFORMATION? (Please limit your response to one choice)

- ☐ Written communication
- ☐ Telephone communication
- ☐ Face-to-face meetings
- ☐ Other, please list \_\_\_\_\_

24. What do you feel is the MOST reasonable method of collaboration between a school Nurse and a pediatric primary Care Provider for management of STUDENTS WITH COMPLEX OR CHRONIC HEALTH ISSUES?

Please limit your response to one choice.

- ☐ Written communication
- ☐ Telephone communication
- ☐ Face-to-face meetings
- ☐ Other, please list \_\_\_\_\_

**This section looks at issues surrounding childhood obesity.**

25. Approximately what percentage of your students is obese?

- ☐ 10%
- ☐ 25%
- ☐ 33%
- ☐ 50%
- ☐ 66%
- ☐ other \_\_\_\_\_%

26. Which of the following guidelines are you familiar with for the prevention and treatment of childhood obesity? (Please check all that apply)

- ☐ American Academy of Pediatrics 4 Step Approach
- ☐ Healthy Eating and Activity Together
- ☐ American Medical Association Guidelines
- ☐ Other, please list \_\_\_\_\_

27. Have you participated in and received continuing education credits for NASN's School Nurses' Child Obesity Prevention Education (SCOPE)?

- ☐ Yes
- ☐ No

28. Which of the following goals do you have for obese students? Please check all that apply.

- ☐ Decrease non-nutritive food and beverage intake
- ☐ Increase physical activity
- ☐ Decrease screen time (TV, video)
- ☐ Improve intake of fruits and vegetables
- ☐ Awareness of complications of overweight and obesity
- ☐ Other, please list \_\_\_\_\_

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

29. Please list potential BENEFIT(s) of collaboration between school nurses and pediatric primary care providers in addressing childhood obesity.

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30. Please list potential BARRIER(s) to collaboration between school nurses and pediatric primary care providers in addressing childhood obesity.

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**The following questions give you the opportunity to tell more about your experiences. Please answer truthfully.**

31. Please give your thoughts about collaborating with pediatric Primary Care Providers regarding childhood obesity.

Please accept my sincere gratitude for your assistance in completing a survey which may help us understand collaboration between primary care providers and school nurses, and ultimately, improve the health and wellbeing of children.

If you have questions, comments, or suggestions about the survey please contact M. Laurette Hughes in the Boston College Connell School of Nursing at [mary.hughes.8@bc.edu](mailto:mary.hughes.8@bc.edu).



## Appendix C

### JEFFERSON SCALE OF ATTITUDES TOWARD PHYSICIAN-NURSE COLLABORATION

**INSTRUCTIONS:** Please indicate the extent of your *agreement* or *disagreement* with each of the following statements by circling the appropriate number. For the purposes of this survey, a nurse is defined as “a registered nurse (RN) who is engaged in providing or directly supervising the care of hospitalized patients.”

**Gender:** [1] Male. [2] Female. **Age** (in years): \_\_\_\_\_

You are a: [1] **Nurse** (Please specify your degree: \_\_\_\_\_ Your specialization: \_\_\_\_\_).  
[2] **Physician** (Please specify your primary specialty: \_\_\_\_\_).

		Strongly Agree	Tend to Agree	Tend to Disagree	Strongly Disagree
1	A nurse should be viewed as a collaborator and colleague with a physician rather than his/her assistant....	4	3	2	1
2	Nurses are qualified to assess and respond to psychological aspects of patients' needs.....	4	3	2	1
3	During their education, medical and nursing students should be involved in teamwork in order to understand their respective roles.....	4	3	2	1
4	Nurses should be involved in making policy decisions affecting their working conditions.....	4	3	2	1
5	Nurses should be accountable to patients for the nursing care they provide.....	4	3	2	1
6	There are many overlapping areas of responsibility between physicians and nurses.....	4	3	2	1
7	Nurses have special expertise in patient education and psychological counseling.....	4	3	2	1
8	Doctors should be the dominant authority in all health care matters.....	4	3	2	1
9	Physicians and nurses should contribute to decisions regarding the hospital discharge of patients.....	4	3	2	1
10	The primary function of the nurse is to carry out the physician's orders.....	4	3	2	1

# Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

11. Nurses should be involved in making policy decisions concerning the hospital support services upon which their work depends.....	4	3	2	1
12. Nurses should also have responsibility for monitoring the effects of medical treatment.....	4	3	2	1
13. Nurses should clarify a physician's order when they feel that it might have the potential for detrimental effects on the patient.....	4	3	2	1
14. Physicians should be educated to establish collaborative relationships with nurses.....	4	3	2	1
15. Interprofessional relationships between physicians and nurses should be included in their educational programs.....	4	3	2	1

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## **Appendix D**

### **Consent Forms**

#### **Attitudes and Practices of School Nurses and Pediatric Primary Care Providers to Collaboration around Childhood Obesity Study**

##### **Email note:**

Dear School Nurses,

You are invited to participate in a survey funded by the National Association of School Nurses and developed by a Boston College doctoral student/school nurse to better understand current attitudes and practices to collaboration between school nurses and pediatric primary care providers around childhood obesity since school based BMI screening started in Massachusetts schools.

As school nurses we know that obesity is one of the most prevalent health issues facing school aged children and youth with significant impact regarding attendance in school, physical and psychosocial complications, and educational achievement.

This is an online survey utilizing “Qualtrics”. It consists of 33 questions about characteristics of you and your school practice as well as thoughts about collaboration with pediatric primary care providers. If you agree to participate you will be asked to complete both survey and scale, which should take about 20 minutes.

Your participation in this study is voluntary. There are no anticipated risks to participating in this study; however, as may be true of all things, there may be unknown risks. The benefits gained from this study will give us a better understanding of the capacity to collaborate between primary care and schools in the care of the obese child and youth. There will be no penalty if you choose not to be in the study. You may discontinue your participation in the study at any time. All replies are anonymous, and no respondent or school system will be identified in reports or data emanating from this study.

Attitudes and Practices of School Nurses and Pediatric Primary Care Providers toward Collaboration around Childhood Obesity

This Principal Investigator will exert all reasonable efforts to keep your responses and your identity confidential. The Qualtrics survey site is an encrypted program to which the principal investigator has the only access to the data collected on this site. Please note that regulatory agencies, the Boston College Institutional Review Board, and Boston College internal auditors may review research records from this study.

If you have questions or concerns concerning this research you may contact the Principal Investigator at 802-585-5460 or by email: [mary.hughes.8@bc.edu](mailto:mary.hughes.8@bc.edu). If you have questions about your rights as a research participant, you may contact the Office for Research Protections, Boston College, at 617-552-4778 or [irb@bc.edu](mailto:irb@bc.edu).

This study was reviewed by the Boston College Institutional Review Board and its approval was granted on [insert approval date].

An X in the box at the beginning of the survey acknowledges your informed consent as well as completion and return of the survey will indicate your consent to participate. The link for the survey is listed below.

To complete the survey, please go to: <https://www.bcnursing.qualtrics.com>

Please note that the survey will be open for you to respond for 3 weeks. I look forward to sharing the study results with school nurses, pediatric primary care providers, and others interested in school health.

M. Laurette Hughes, RN, MSN, PNP

**Attitudes and Practices of School Nurses and Pediatric Primary Care Providers to Collaboration around Childhood Obesity Study**

**Postal note:**

Dear Primary Care Providers,

You are invited to participate in a survey funded by the National Association of School Nurses and developed by a Boston College doctoral student/school nurse to better understand current attitudes and practices to collaboration between school nurses and pediatric primary care providers around childhood obesity, since school based BMI screening started in Massachusetts schools and towns.

As primary care providers we know that obesity is one of the most prevalent health issues facing school aged children and youth with significant impact regarding attendance in school, physical and psychosocial complications, and educational achievement.

In one week you will receive the survey in the mail. This same survey is also an online utilizing “Qualtrics”. You may access this survey typing this link into the URL line: \_\_\_\_\_. Please choose one method to complete the survey, either paper or online.

The survey, either in paper or online, consists of 33 questions about characteristics about you and your clinical practice as well as thoughts about collaboration with school nurses. If you agree to participate, you will be asked to complete both survey should take about 20 minutes.

Your participation in this study is voluntary. There are no anticipated risks to participating in this study; however, as may be true of all things, there may be unknown risks. The benefits gained from this study will give us a better understanding of the capacity to collaborate between primary care and schools in the care of the obese child and youth. There will be no penalty if you choose not to be in the study. You may discontinue your participation in the study at any time. All replies are anonymous, and no respondent or clinical practice will be identified in reports or data emanating from this study.

This Principal Investigator will exert all reasonable efforts to keep your responses and your identity confidential. The Qualtrics survey site is an encrypted program to which the principal investigator has the only access to the data collected on this site. Please note that regulatory agencies, the Boston College Institutional Review

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Board, and Boston College internal auditors may review research records from this study.

If you have questions or concerns concerning this research you may contact the Principal Investigator at 802-585-5460 or by email: [mary.hughes.8@bc.edu](mailto:mary.hughes.8@bc.edu). If you have questions about your rights as a research participant, you may contact the Office for Research Protections, Boston College, at 617-552-4778 or [irb@bc.edu](mailto:irb@bc.edu).

This study was reviewed by the Boston College Institutional Review Board and its approval was granted on [insert approval date].

A check in the box at the beginning of the survey acknowledges your informed consent to participate.

Please note that the survey will be open for you to respond for 6 weeks. I look forward to sharing the questionnaire results with pediatric primary care providers, school nurses, and all those interested in child and adolescent health.

M. Laurette Hughes, RN, MSN, PNP

