HEALTH CLINIC ENVIRONMENTS IN GEORGIA ELEMENTARY SCHOOLS

by

SUSAN ROGERS SIMPSON

(Under the Direction of C. KENNETH TANNER)

ABSTRACT

Schools seem to be the logical place to serve the health needs of students, since children spend a majority of their time there. Design standards were not available for health clinics in Georgia elementary schools; therefore, this study examined key characteristics of an elementary school clinic in order to determine the importance of each design element. Eleven design classifications and 12 specific design elements were determined through a review of related literature. Characteristics included: components (rooms), space, and size; general design elements; location; accessibility; the waiting area; the nurse's office; the treatment room; the isolation area; the restroom (toilet); security, storage, and safety elements; and furnishings/treatments. Specific design elements included: lighting; windows; integrating nature elements into design; promoting a sense of well-being for users; security and privacy/confidentiality elements; electrical/plumbing elements; doors and wayfinding (signage); walls and ceilings; acoustics; use of color; heating/ventilation/air conditioning; and flooring elements. This information was incorporated in a survey of 12 experts involved with designing, building, and managing school facilities and 104 school nurses. An item analysis was completed on each design statement. Descriptive statistics and ANOVAs were completed on

characteristics and specific design elements. Statistical significance between the groups was found for design characteristics: components (rooms), space and size; the waiting area; the nurse's office; and the treatment room. School nurses perceived these characteristics to be more important to clinic design than the advisory panel did. In addition, statistical significance between groups was found for these specific design elements: integrating nature elements; promoting a sense of well-being; security and privacy/confidentiality; and heating/ventilation/air conditioning. Again, school nurses perceived these specific design elements to be more important to clinic design than the advisory panel of architects, builders, consultants, and facility planners did. School nurses commented that the survey statements presented an ideal clinic design. The advisory panel commented that many of the survey statements were not cost effective. Establishing design guidelines for health clinics in Georgia elementary schools were recommended, and the guidelines should be written using the professional judgment of school nurses, representatives of users of the clinic, and the findings of this study.

INDEX WORDS: School Facilities, School Design, Health Clinic, Design Elements, Elementary School, School Nurse

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DEDICATION

This dissertation is dedicated to my parents. My father, James Franklin Rogers, (deceased) was a gentle man who helped me with various school projects, threatened to sell “scrap iron” to pay for my many music lessons, supported me financially through my first college degree, and always offered encouragement for me to seek additional degrees. My mother, Frankie Lee Rogers, (deceased) spent many afternoon hours listening to me recount my day at school while drinking homemade limeaid and eating Ritz crackers with peanut butter at the kitchen table. She was available to drive me to music lessons, school and church activities, and she was always willing to be a chaperone or room-mother when needed. My parents did not have the opportunity to go to college but wanted the best for me. They were alive when I began this journey, but I lost them both during this quest. I will always remember and cherish growing up in a loving home and being on the receiving end of their smiles, hugs, and loving words. They were wonderful parents, and even though they are not physically present, I feel their love and know they are smiling now.

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CHAPTER 1

NATURE OF THE STUDY

Health and learning have intertwined throughout history (The Center for Health and Healthcare in Schools, n.d.a; Symons, Cinelli, James, & Groff, 1997). Therefore, schools seem to be the logical place to serve the health needs of students since children spend a majority of their time, about 14,000 hours, in schools (Barnett, Niebuhr, & Baldwin, 1998; Bradley, 1997; Carlson, Paavola, & Talley, 1995; Gump, 1978; Koenning et al., 1995; Pena, 2000). As a result, the school became the link between education, health, social services, and other support services that children and families needed (Bush, 1997; Dryfoos, 1994).

Controversy surrounds the issue of offering health care services in schools (Francis, Hemmat, Treloar, & Yarandi, 1996; Institute of Medicine, 1997). A number of developments have weakened the argument against health care delivery in schools. The literature suggests that the physical and psychological health of children has a direct impact on their academic and social development in school (Bush, 1997; Dryfoos, 1997; Hacker & Wessel, 1998; Jang, 1994; Morgan, 1987; Ouellette, 2001; Passerelli, 1994; Symons, et al., 1997; Tyson, 1999; Zepeda & Langenbach, 1999). Pena (2000) stated:

> Conditions of poverty, emotional and psychological distress, child abuse, poor nutrition, disease, inadequate preventive and health maintenance practices …weaken and imperil the academic and future lives of students. Hence, health care…in public schools probably starts with administrators and school personnel becoming aware of the health status of students and continues with their

> recognizing that health care assistance is not charity. It is a right that students are entitled to by law. (p. 200)

The concept and practice of inclusion are putting significant numbers of students with disabilities in the regular classroom (Bartlett, Parette, & Holder-Brown, 1994). Existing federal legislation mandates that health services be provided for children with disabilities and health problems (Americans with Disabilities Act, 1990; Individuals with Disabilities Education Act, 1990 & 1997; Section 504 of the Rehabilitation Act, 1973).

School nurses are key players in the delivery of health services in the school setting (Passarelli, 1994). Some school nurses are itinerant staff members, some nurses are full-time sole staff members of the school health clinic, and some nurses are integral staff members of full-service health centers located in a school setting. The past and current roles of the professional school nurse are described throughout the professional literature (Brindis et al., 1998; Clemen-Stone, Eigsti & McGuire, 1991; Costante & Smith, 1997; Cromwell, 1946, 1963; Dryfoos, 1998; Edwards, 1987; Fryer & Igoe, 1996; Hacker & Wessel, 1998; Nelson, 1997; Oda, 1979; Passarelli, 1995; Small et al., 1995; Smiley, 1958; Wold & Dagg, 1978; Woodfill & Beyrer, 1991). School nurses provide “health counseling, health instruction, and health services on an individual or small group basis” (Woodfill & Beyrer, 1991, p. 57).

Often, health-related procedures are performed in inadequate conditions and facilities in public schools. School settings for the health clinic vary from clinics operating from hallways and closets (Woodfill & Beyrer, 1991) to full-service clinics supported by a hospital or other medical organization (Dryfoos, 1997). Public schools need additional funding to hire school nurses and, in some instances, to remodel existing or build new facilities to accommodate the needs of medically fragile children

and the increasing health needs of students. The American Federation of Teachers (AFT) manual (1992) states:

> The placement of…medically fragile children in public schools and the responsibilities for care these placements require have given rise to…the need for adequate funding, availability of appropriate facilities, new roles and responsibilities for school personnel, appropriate training, and legal and liability issues. (p. 9)

Statement of the Problem

Since the introduction of the first school nurse in 1902, schools have provided some access to health education and care for students (Kellogg Foundation, 2000). Barnett, et al. (1998) stated that schools were "a natural setting for the co-location of integrated community health and social services" (p. 99). Other researchers reported that providing health services to students in schools affected student achievement (Bush, 1997; Igoe, 1998; Jang, 1994; Koenning et al., 1995; Passerelli, 1994).

Planners for new schools and for renovations of existing school buildings have explored designs that encouraged and stimulated learning. Planners may explore adding clinics to school designs to assist students in learning. While design standards are necessary for each component of the school building, clinic design standards and characteristics are not available for Georgia schools. According to R. Nance (personal communication, July 1, 2002), an architect with the Georgia Department of Education, "There are no DOE standards for clinics at this time. The design decisions are left to the local system and their architect." J. Allers (personal communication, July 23, 2001), the manager for the School Health Department of Children's Healthcare of Atlanta, wrote:

> We are happy right now when nurses get running water, soap, paper towels, a private toilet for sick children, and a place to lock up meds, i.e. a locking file cabinet. We have nurses in GA without a health room of any kind. Phones and computers are nice.

Literature about successful classroom and school design existed and literature about successful designs for hospital and ambulatory care facilities was available; however, research and literature on design for school clinics and health clinics in elementary schools was very limited. Sanoff (1994) wrote that the people who actually used the school building rarely assisted in the design process. Instead, architects, builders and others who did not use the building designed schools. This study offered professional school nurses, as well as architects, builders, consultants, and planners of school facilities, an opportunity to express their perceptions about design characteristics for an elementary school health care clinic.

Purpose of the Study

The purpose of this study was to compare perceptions of school nurses, architects, builders, consultants, and planners for school facilities regarding design characteristics of an elementary school health care clinic. To accomplish this purpose, this study included a review of the major literature on the relationship between health and learning, on factors that affect the health of students, on using schools as a healthcare delivery system, on the status of school facilities, on the history of school nurses, and on the design characteristics of an elementary health care clinic. Based on the responses, key clinic design elements items were identified and were utilized to develop recommendations for facility guidelines for an elementary school health care clinic.

Research Questions

The research question that guided this study was: What were the perceptions of architects, builders, consultants, planners of school facilities and school nurses concerning the key design elements for an elementary school health clinic?

1. Is there a statistically significant difference between the perspectives of practicing school nurses (practitioners) and the advisory panel regarding the 11 design classifications?
    a) Components, space, and size elements
    b) General design elements
    c) Location of the clinic
    d) Accessibility to the clinic
    e) Waiting area
    f) Nurse's station/office
    g) Examination/treatment room
    h) Rest/isolation area
    i) Restroom
    j) Security, storage and safety for the clinic
    k) Furnishings and treatments of the clinic
2. Is there a statistically significant difference between the perspectives of practicing school nurses (practitioners) and the advisory panel regarding the 12 specific design clusters?
    a) Lighting/daylighting elements
    b) Windows elements

c) Integration of nature elements into the design

d) Promotion of a sense of well-being for users

e) Use of color

f) Privacy, space and confidentiality issues

g) Heating, venting and air conditioning elements

h) Electrical and plumbing elements

i) Acoustics

j) Wall/ceiling elements

k) Flooring

l) Door/wayfinding (signage) elements

The research question and its components guided the review of the literature. A comprehensive survey including spaces for comments or concerns for each design element was developed based on the findings of the literature review. A small group of school nurses responded to the survey for readability and clarity. The survey was sent to the advisory panel and was administered to a larger group of school nurses to gather statistical data for this study.

Definition of Terms

For the purposes of this study, terms were defined as follows:

1. Advisory Panel—professional architects, builders, consultants, and planners of facilities having expertise and certification in specialized areas of school construction and design.
2. Professional School Nurse—a person who acquired Georgia

certification in nursing and who was currently working as a nurse in a public school.

3. Design Elements—sets of principles by which facilities were planned and built.
4. Elementary School—a school composed of grades pre-K through fifth.

Importance of the Study

This study will make needed contributions to the existing small research base and to the identification process of key design elements and characteristics for elementary school health care clinics. The contributions were based upon the perceptions of school nurses, architects, builders, consultants, and facility planners for elementary school facilities. The more effective and efficient clinics may improve the school nurse's impact on the health of students and staff members of the school.

Limitations of the Study

This study was limited by several factors. The survey instrument was limited to the knowledge and ideas found in the researcher's review of the literature. Open-ended comments/concerns sections were added to the survey to obtain ideas not found in the literature review. The use of a selected advisory panel and the school nurses attending a Georgia Association of School Nurses conference to complete the survey instrument prevented random selection of participants. Results were limited to the areas of their expertise. The study was limited geographically since all survey participants resided in the state of Georgia.

Assumptions

This study assumed that the staff of a clinic had expertise to offer regarding facility needs; hence, it offered professional school nurses, as well as architects, builders, consultants, and planners for school facilities, an opportunity to express their perceptions about elementary health clinic design needs. The researcher assumed that the responses of the survey and open-ended comments/concerns sections were an accurate reflection of the true perceptions of the participants.

Organization of the Remainder of the Study

This study was organized into five chapters. Chapter 1 included the introduction to the study, the statement of the problem, the purpose of the study, the research questions, and the definition of terms.

Chapter 2 presented a review of the related literature including the relationships between health and learning and health and socioeconomic status, access to health, schools as a healthcare delivery system, facilities, the history of school nurses, specific design elements of a health care clinic, and design classifications for an elementary health care clinic. A table listing research regarding design elements was included in Appendix A.

Chapter 3 described the design of the study. This chapter included the research questions that guided the study, descriptions of the participants, the instrumentation used to gather data, the method for gathering the data, and the planned statistical treatment of the data.

In Chapter 4, all findings related to the research questions were reported, and in Chapter 5, a summary of the research study was provided along with recommendations

and implications for further research for design needs for elementary school health care clinics.

CHAPTER 2

REVIEW OF THE LITERATURE

The Center for Health and Health Care in Schools (n.d.a) stated that the relationship between health and learning intertwined throughout history. Socrates recognized the relationship: the word *doctor* meant *teacher* from the early Greek.

Zanga and Oda (1987) reported the following:

> Students cannot learn unless they are healthy. Nor can they become productive members of society unless they are educated about health maintenance in the same way that they are taught to integrate the "basics" of the curriculum into their lives. (p. 413)

The issue of providing health services in schools is complicated. Francis, Hemmat, Treloar, and Yarandi (1996) reported that the questions of what services were offered and who performed the services were not easily answered. The authors stated that "principals and administrators view health services as a necessary evil, siphoning off funds they see as necessary to carry out their primary mission: to educate children" (p. 358). The authors commented that parents of special needs students saw health services as vital to their children's success in schools. The Institute of Medicine (1997) stated that often the general public and even professionals in the healthcare industry were unaware of what nursing services were or were not available to youth.

McKibben and DiPaolo (1997) wrote:

> At present, there are populations of students with health conditions necessitating privacy, skilled nursing procedures, technological literacy, improved building architectural design and more elaborate educational and health equipment. Unfortunately, the nurse's facilities have not advanced with these demands. School districts must address these deficits by providing offices with better

> technology, state of the art equipment and improved floor plans enabling school nurses to enhance their skills thereby facilitating increased effectiveness and efficiency in the provision of nursing services. (p. 22)

Bradley (1998) reported on a group effort between the American School Health Association (ASHA) and the National Association of School Nurses (NASN) to establish a research agenda for school nursing services. Several research questions were formulated: (a)"How did administrators determine budgetary allotments for school nurses regarding equipment? Facilities?" (p. 57); and (b) "What minimum standards governed physical facilities used by school nurses?" (p. 60).

Reicher (2000) reported, "Approximately 6,000 new K-12 schools will be built and tens of thousands of existing schools will be retrofitted" (p. 1). National standards for basic health services or facilities needed to perform health services in schools did not exist, and the Committee on Comprehensive School Health Programs in Grades K-12 from the Institute of Medicine determined that school environment was a critical area that should be considered when designing a comprehensive school health program. The school environment included the physical environment, "involving building design, lighting, ventilation, safety, cleanliness, freedom from environmental hazards that foster infections and handicaps" (Institute of Medicine, 1997, p. 2).

The purpose of this study was to compare perceptions of school nurses, architects, builders, consultants, and planners for school facilities regarding design characteristics of an elementary school health care clinic. The review of the literature established the link between health and learning, reviewed the history of the school nurse and health care services in the schools, explored the role and responsibilities of

the school nurse, defined the current need for a nurse, and identified key design elements of a clinic in an elementary school environment.

Health and Learning

The World Health Organization (1946) defined health as "a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity" (p.1). The health of children is basic to their well-being and optimal development. Family income, behavior and social environment, and education affect a child's well-being.

A 1988 joint statement prepared by the American Nurses Association (ANA), the American School Health Association (ASHA), the National Association of Pediatric Nurse Associates and Practitioners (NAPNAP), and the National Association of State School Nurse Consultants (NASSNC), stated:

> Education requires undivided attention—possible only when children are free from discomforts caused by physical and emotional conditions that can be prevented, diagnosed, treated, or minimized through the provision of comprehensive primary health services. (as cited in Lovota, Allensworth, & Chan, 1989, p. 16)

Cohen (1992) stated that members of the American Medical Association (AMA) reported that "for the first time in the history of this country, young people are less healthy than…their parents" (p. 126). In the 1999 Report to Congress on Mental Health Services for Children, the Department of Health and Human Services (DHHS) estimated that 4.5 to 6.3 million children in the United States had a serious emotional disturbance and were typically found to be underserved or served inappropriately by a fragmented mental health services system.

Bush (1997) reported that child abuse increased to more than 850,000 substantiated cases a year, that teen suicides nearly doubled since 1970 and that, since 1980 alone, teen homicides also nearly doubled. In addition, researchers found that school-aged youth were experiencing some disorders at higher rates than ever before (Allensworth, 1993; Hacker, Fried, Bablouzian, & Roeber, 1994; Jang, 1994; Lavin, Shapiro, & Weill, 1992). Rates of respiratory problems, at-risk behaviors, and fatal accidents increased every year during the 1990s (Bush, 1997).

This crisis in children's health held serious implications for the wellness of America's schools. Pena (1998) stated:

> Health care delivery is critically important as principals and school personnel are experiencing an increase in pressure to provide high quality inclusive, and nondiscriminatory instruction to children with health related problems. (p. 88)

Current research suggested that teachers were unsure how to adapt their classroom environments to accommodate students experiencing health problems (Bartlett, Parette, & Holder-Brown, 1994). In addition, research results suggested that practitioners were uncertain how to teach students with disorders that limited their participation in school (Bryck, Lee, & Sithy, 1990; Igoe & Giordano, 1992; Lehr & McDaid, 1993; Starfield, 1992; U.S. Department of Health and Human Services [DHHS], 1996). Koenning et al. (1995) reported that health and education were "inextricably linked for students with special health care needs…from the myriad of health and health-related difficulties which affected their educational performance and participation" (p. 119), and that schools were viewed as "highly desirable vehicles" through which health status gains were made for children (p. 138). Pena (2000) stated that "taken together, crises in the health status of school-aged youth and uncertainty in terms of how educators were to

respond gave cause to examine how education and health care coexisted in public school settings" (p. 187).

Hacker and Wessel (1998) reported that the "growth of single-parent families, new waves of immigration, the growth of uninsured and underinsured populations, and increasing financial pressures on families influenced what children needed from the educational and health care systems" (p. 409). Tyson (1999) stated that teachers and students were "awash in a toxic sea of problems," especially in neighborhoods in which a high percentage of the students were "poor, recent immigrants, unsupervised after school, lacking medication, and exposed to mayhem in the neighborhoods" (p.1). Ouellette (2001) reported students were not prepared to learn when they arrived at school and that physical and mental health conditions were barriers for many students. Dryfoos (1993b) acknowledged that school personnel could not continue to be "surrogate parents"…for students …"with overwhelming health, social, and psychological problems" (p. 543).

Symons, Cinelli, James, and Groff (1997) reported education and health were interdependent systems. Committee members for Comprehensive School Health Programs in Grades K-12 from the Institute of Medicine (1997) defined a comprehensive school health program as follows:

> A comprehensive school health program is an integrated set of planned, sequential, school-affiliated strategies, activities, and services designed to promote the optimal physical, emotional, social, and educational development of students. The program involves and is supportive of families and is determined by the local community, based on community needs, resources, standards, and requirements. It is coordinated by a multidisciplinary team and accountable to the community for program quality and effectiveness. (p. 1)

Representatives from over 40 national health, education, and social services organizations who contributed to the National Action Plan for Comprehensive School

Health Education concluded that “healthy children learn better” and that “no curriculum can compensate for deficiencies in student health status” (Symons et al., p. 220).

Although traditional diseases of childhood had nearly disappeared, new morbidities evolved (Dryfoos, 1993a). These new morbidities—poor nutrition, lack of exercise, smoking, early sexual activity, drinking, drug abuse, violence, depression, and stress—had “psychological and social origins” but had “medical, educational, and criminal consequences” for children according to Tyson (1999, p. 2). Igoe (1998) reported substance abuse, alcohol, and drugs (as early as elementary school) were factors that affected health and the ability to learn.

Symons et al. (1997) reviewed literature from 25 key reports (1989 -1991) linking selected student behaviors—intentional injuries (abuse, homicide, and suicide); substance abuse (tobacco, alcohol, and other drugs); dietary behaviors (poor nutrition, obesity, school lunch and breakfast programs); physical activity behaviors; and sexual behaviors—to educational outcomes. The literature confirmed a strong relationship between student involvement in the health risk behaviors and negative outcomes on school performance—e.g., graduation rates, performance on standardized tests, student attendance, dropout rates, behavioral problems, completion of homework, self-esteem, and self-control.

The Centers for Disease Control and Prevention conducted the Youth Risk Behavior Survey (YRBS), a biennial, national, school-based survey used to monitor health-risk behaviors among youth. Ouellette (2001) reported that the state of Vermont included questions about student achievement in the YRBS 1997 and 1998 surveys. A negative correlation was shown between risk behaviors and academic performance.

With the passage of the No Child Left Behind (NCLB) Act of 2001, all states focused on developing and implementing state standards, assessments and accountability measures to improve students' academic performance, and on meeting new accountability requirements. Tyson (1999) stated "education reform may require creative interventions that lower the barriers to learning and reduce risky behavior" (p.1). Ouellete (2001) asserted that performance for some students may be lower than expected because physical and mental health conditions became barriers and that students were not prepared to learn when they arrived at school.

Involvement in these new morbidities was linked to aggressive and disruptive behavior in children in early grades (Dryfoos, 1993a; Tyson, 1999). Dryfoos (1997) identified six significant risk factors that commonly precede high-risk behaviors: (a) poor quality of parenting skills; (b) poor quality of schooling experiences; (c) peer influences; (d) psychological or mental health problems; (e) low socioeconomic status; and (f) race/ethnicity. Dryfoos reported:

> Very young children who acted out aggressively often experienced school problems in the early grades. Early school failure predicted later substance use, unprotected sexual intercourse, serious delinquency, and lifetime negative consequences. (p. 11)

Mental and Physical Health Barriers

The aggressive and disruptive behavior—e.g., attention-deficient disorder (ADD), depression, conduct disorder, uncontrolled anger, and "self destructive impulses"—were classified as mental health barriers for students (Dryfoos, 1997; Ouellette, 2001). According to the U.S. Department of Health and Human Services (1999), about 21% of all children across the nation were diagnosed with a mental disorder, and 5% to 11% of

these children displayed a decreased ability to meet the challenges presented by day-to-day social interactions in the school, the home, and the community.

Physical health barriers interfered with educational performance. Jang (1994) reported that the nutritional and physical well-being of children was a primary concern for educators because “hungry, weak and ill” children could not “learn to their fullest potential” (p.10). Researchers stated that undernourished children frequently displayed irritability, apathy, lethargy, and/or inattentiveness (Tyson, 1999).

Newacheck and Halfon (2000) reported asthma as the leading chronic illness cause of school absenteeism with direct medical expenditures estimated at $500 million for children under age 17. Lara et al. (2002) stated that asthma was recognized as an important public health concern for children in the United States, and the authors recommended school-based initiatives to improve effective management of the disease. An earlier survey of 790 school nurses in Maryland and Washington, D. C. reported nurses’ concerns about “the criteria and follow-up for delegating medication administration within the school setting”(p. 233) and recommended that “children be allowed to carry and self-administer medication” for asthma (Calabrese, et al., 1999, p. 237).

Child Health, a report prepared by the National Center for Health Statistics (NCHS) in 2003, cited increased levels of asthma for children and reported that nine million U.S. children under 18 years of age (13%) were diagnosed with asthma. Boys were more likely than girls to have ever been diagnosed with asthma (15% versus 11%), and children in poor families (16%) were more likely to have ever been diagnosed with asthma than children in families that were not poor (12%).

Obesity and prevalence of childhood overweight doubled in the past two decades in the United States (American Academy of Pediatrics, 2003). The National Center for Health Statistics (2001) reported that 15.3% of children ages 6-11 were overweight and rates were higher among subpopulations of minority and economically disadvantaged children. The American Academy of Pediatrics (2003) stated that obesity was linked directly to a lack of physical activity as well as poor nutritional habits, and to cardiovascular disease, diabetes, high blood pressure, depression, and low self-esteem. A fact sheet prepared by the Centers for Disease Control and Prevention (2002) reported that Type 1 diabetes was diagnosed in one in every 400 to 500 children, and children of American Indians, African Americans, and Hispanic/Latinos exhibited increasing numbers of Type 2 diabetes. Nabors, Lehmkuhl, Christos, and Andreone (2003) stated that "improved management of diabetes in childhood improved academic performance and reduced physical complications related to diabetes as children grew older" (p. 216). Management of diabetes during school hours was a concern of parents, especially if school nurses were not present and students experienced hypoglycemic episodes without immediate proper care.

Recent research linked serious health problems, such as heart disease and stunted growth, to poor oral health. Peterson, Niessen, and Lopez (1999) reported that children experiencing pain from dental problems suffered poor mental and social well-being as well as poor school attendance. Tobler (2000) reported that federal law entitled all children enrolled in Medicaid to comprehensive dental services; however, a shortage of dentists participating in the Medicaid program prevented eligible children from receiving services. Dentists cited low reimbursement rates, broken appointments, and

"bureaucratic red tape" as reasons for not participating in the Medicaid program (Tobler, p. 32).

The 2000 Oral Health in America: A Report of the Surgeon General (DHHS, 2000) listed tooth decay as the single most common chronic childhood disease. The report stated dental caries were five times more common than asthma and that 25% of children living in poverty had not seen a dentist before entering school. The report concluded that more than 51 million school hours were lost each year to dental-related illness. Amschler (2003) reported pain from dental caries resulted in disrupted sleep patterns and in the inability to eat or drink comfortably, and decayed or missing teeth caused embarrassment.

Moon, Farmer, Tilford, and Kelleher (2003) reported on a four-year study of children in grades K - 12 in two isolated, rural Mississippi Delta communities. The students were insured for $400 per year in dental benefits with the premiums for the insurance completely funded by United States Housing and Urban Development (HUD) agency. The findings illustrated the unmet oral health needs of the students involved in the study. The authors stated, "Little question remained that the most marginalized children in our society—poor, non-White, and rural—experienced more dental health problems than those more fortunate" (p. 243-244). The authors recommended that school health personnel advocate for fluoridation of drinking water and for dentists in the community to accept SCHIP (State Children's Health Insurance Program) and Medicaid patients.

Physical and mental barriers prevented students from attending school and from concentrating and staying focused when in school. Morgan (1987) concluded that the

health status of a student was an important factor in his or her ability to learn, in the development of classroom behaviors that enhanced learning, and in the development of good social relationships with peers. Ouellette (2001) concluded that “students’ health and its impact on their ability to perform well academically was receiving more attention” (p. 1).

Children’s abilities to succeed academically and socially were linked to their physical and mental health. Allensworth and Kolbe (1987) described eight components of a comprehensive school health program: health education, physical education, health services, mental health services, social services, food services, school environment and community involvement. Brener et al. (2001) stated that the School Health Policies and Programs Study (SHPPS) of 2000 showed wide recognition of the importance of providing health services to students. The authors linked the provision of school health services to the educational mission of the school.

Farrior, Engelke, Keehner, Shoup, and Cox (2000) reported on a pilot project in 1996 to establish baseline data for evaluation of a coordinated school health program in an underserved rural area of North Carolina. Funds for the school health program were eliminated from the health department budget. The authors described a partnership among a hospital, a university, private practitioners, a local school system and health department to provide school health services. The program included annual evaluation and was successful in building partnerships to provide health care services to schoolchildren. Findings reported were a need to determine what services the school nurse provided and the impact of the services on student health, client outcomes when students received services, and the need for continuing services. Implications for other

school systems struggling to fund health services in schools were discussed. “School health programs played a critical role in reducing health-risk behavior and in promoting healthy behavior among young people” (Brener, Jones, Kann, & McManus, 2003, p. 143).

Health and Socioeconomic Status

In 2001, the majority of children in the United States enjoyed excellent health (40 million or 56%), and another 20 million children (28%) had very good health (DHHS, National Health Interview Survey [NHIS], 2001). Poverty status was associated with children’s health. According to Proctor and Dalaker (2003), the number of children living in poverty in the United States increased to 12.1 million in 2002, up from 11.7 million in 2001. In 2002, 7.2 million families (9.6 percent) were living in poverty in the United States. This number increased from 6.8 million (9.2 percent) in 2001. Only 4 out of 10 children in poor families were in excellent health compared with 6 out of 10 children in families that were not poor.

Researchers identified low socioeconomic status as a major barrier for students receiving health care. Needy and low-income students and families often seek care only after a health crisis arises (Lavin, Shapiro, & Weill, 1992; Newacheck, Jameson, & Halfon, 1994; Starfield, 1992). According to NHIS (DHHS, 2001):

> Children in poor and near poor families were more likely to be uninsured, to have an unmet medical need, delayed medical care, no usual place of health care, and high use of emergency room service than children in families that were not poor. (p. 11)

The report, *America’s Children: Key National Indicators of Well-Being* (DHHS, 2001), asserted “the well-being of children depends greatly on the material well-being of the family.” Parental employment enhanced the possibility that children had access to

health care and improved the well-being of the children. However, even if children living in poverty had a working parent or parents, the income provided inadequate housing and food insecurity—reduced quality of diets, anxiety about food supply, and/or hunger. The report stated “the diet quality of children was of concern because poor eating patterns established in childhood usually transferred to adulthood” (DHHS,2001, Part II, p. 7). Doll and Lyon (1998) presented results from a large number of studies that showed children’s futures were considerably dimmer when they were reared under conditions of poverty, family dysfunction, abuse and other adverse living circumstances (p.1).

Newacheck and Halfon (1988) reported results from a study of children receiving preventive care (including physical, vision, and dental examinations). “The results indicated that children in families with incomes below the poverty level, especially those without Medicaid insurance, were much less likely to receive routine preventive care on a timely basis” (p. 466).

In a later study, Newacheck, et al. (1994) stated that children from lower income families had more eardrum abnormalities, greater risk of tooth decay, more skin conditions, higher lead levels, more school absences, and more behavioral problems than children from higher income families. The survey findings concluded “health problems affect poor children more severely” (p. 232). According to the U. S. Department of Health and Human Services (2000), children living in poverty suffered twice as much tooth decay as their more affluent peers, and their disease was more likely to be untreated.

Access to Health Care

Healthy People 2010 identified the major health concerns in the United States at the beginning of the 21st century. The 10 leading indicators were physical inactivity, overweight and obesity, tobacco use, substance abuse, irresponsible sexual behavior, poor mental health, injury and violence, poor environmental quality, missing immunizations, and lack of access to health care.

Children that had access to health care usually obtained medical care needed to maintain their physical and mental well-being (Coles, 2003). Some families faced obstacles to access health care.

> These obstacles included distance and transportation problems, language and cultural barriers, discrimination, the inability of a parent to take time off work to take a child for care during the provider's office hours, and unsafe streets to travel when seeking care. (Kellogg Foundation, 2000, p. 2)

Access to care involved availability of health care and the ability to pay for the care. Many American children lacked regular health care needed to prevent disease, disability, and unnecessary hospitalization. Children with health insurance were more likely to have regular health care (Anderson, Rice, & Kominski, 2001; Coles, 2003).

Kenney, Haley, and Tebay (2003) reported between 1999 and 2002 "the number and percentage of children without health insurance declined dramatically…the number by 1.8 million and the percentage by 2.6 percentage points" (p.1). The authors reported "nearly one in five children living in poverty lacked insurance coverage in 2002" (p.2).

Government health insurance—Medicaid, Medicare, SCHIP (State Children's Health Insurance Programs), and CHAMPUS/Tricare— was available for children. The SCHIP legislation, enacted in 1997 as Title XXI of the Social Security Act, assisted states in providing insurance coverage for children from low-income families and helped

bridge the gap between Medicaid and private insurance (Andersen et al., 2001). SCHIP helped children without health insurance, “many of whom come from working families with incomes too high to qualify for Medicaid, but too low to afford private health insurance” (Cohen, Ni, & Hao, 2003, p. 1). SCHIP gave states a higher federal contribution for every dollar of state funds spent on the program. States used the assistance in various ways—e.g., expanding coverage through Medicaid, using the assistance as a separate state program, or a combination. SCHIP’s federal contribution was capped (as a block grant) at $40 billion over 10 years, 1998 through 2007. States were given three years to spend each year’s allotment.

Benefits of SCHIP were regular checkups, immunizations, eyeglasses, doctor’s visits, prescription drug coverage and hospital coverage. Kenney, et al. (2003) reported that well-child care visits, regular office visits, and dental care visits increased between 1999 and 2002. Hispanic and black children showed more gains in insurance coverage. SCHIP had significantly reduced the number of uninsured children since its inception (Cohen, et al., 2003). Coles (2003) reported that 70 percent of uninsured children were eligible for low-cost or free health care coverage through SCHIP and Medicaid. This coverage was available in all 50 states and the District of Columbia. Dubay, Hill, and Kenney (2002) reported that SCHIP reduced the number of uninsured low-income children; however, 25 percent of poor children remained uninsured.

Kempe et al. (2003) reported a study in Colorado comparing low-income children who enrolled early in SCHIP with uninsured children. The study compared socio-demographic factors, health status, and previous health care access. Through telephone surveys the authors found that enrollment in the state insurance program was

lower than expected, and this lower enrollment mirrored a trend seen nationally. The data supported the fact that voluntary health insurance first attracted and successfully enrolled families who were more likely to have been insured previously and who were receiving medical care already. The authors stated that the SCHIP programs were not reaching the children who were most in need. The authors suggested that the SCHIP programs be evaluated two ways: (a) by measuring the outcomes of the families that enrolled early and who were easily reached, and (b) by assessing the number of families who enrolled that had not received health care previously.

Kohn, Hasty, and Henderson (2002) asserted that almost 5 million children of working poor families were eligible for government-funded health insurance but remained uninsured. The authors reported, “Some parents do not like the stigma of Medicaid, which for many years went hand-in-hand with welfare” (p. 10). The authors stated that some parents were unaware of the programs and that re-enrollment procedures complicated the process. Dubay, Hill, and Kenney (2002) cited “documentation requirements, transportation, or language barriers” as complications for enrollment and re-enrollment procedures (p. 6).

Taras, Zuniga de Nuncio, and Pizzola (2002) wrote that some states established offices and programs to reach uninsured children. Schools were used in almost every state to help reach children. The authors conducted a study that assessed the cost and effectiveness of using schools to contact parents and to assist parents in enrolling children in the insurance programs. The school-based outreach programs located large numbers of uninsured children, assisted the parents with education about the program, and improved access to care and services for children. The investigators stated,

"Improvements in school absenteeism rates did not occur in the course of one year" and "increased use of health insurance and the effects of preventive health interventions will take years to change absenteeism rates of large populations" (Taras, et al., p. 276).

Schools as a Healthcare Delivery System

The average student spends about 14,000 hours in school from kindergarten through twelfth grade (Gump, 1978). Carlson, Paavola, and Talley (1995) reported a significant consensus in policy at the state and national level that called for the "integration of social, psychological and health services in school-based sites" (p. 184). Schools were viewed as optimal settings for the delivery of these services (Barnett, Niebuhr, & Baldwin, 1998; Bradley, 1997; Carlson, et al.).

Dryfoos (1993a) used the phrase *full-service schools* for this type of delivery of health care for students. Dryfoos (1993a) reported that the phrase originated in the state of Florida and was used to describe the integration of services—education, medical, social, and/or human service—on school grounds or nearby (p. 29). Twenty-five major reports, published between 1989 and 1991, established the interrelatedness of children's health status and their educational experience, and the need for customer-oriented, accessible services for children and their families (Dryfoos, 1993b).

"Schools…can…help people access health education and services, improve their communities, and increase their possibilities for being healthy" (Kellogg Foundation, 2000, p.3). Simons-Morton, Greene, and Gottlieb (1995) stated schools were one of the few stable institutions serving the entire community, and schools were underutilized facilities. Barnett, et al. (1998) stated schools were "a natural setting for the co-location of integrated community health and social services" (p.99). Schools removed two

barriers—a parent's inability to leave work and a lack of transportation—to access to health care.

Dryfoos (1994) gave the historical perspectives of incorporating pupil personnel services into schools. Guidance counselors, social workers, and psychologists were added after World War II. The driving force behind the movement at that time was "middle class families who wanted assurance that their children would do well and get into college" (p. 151).

The passage of legislation—Public Law 94-142, the Education for All Handicapped Children Act (EHA) of 1975—made schools responsible for providing services to students with physical or mental disabilities. In order to receive federal funds, states developed and implemented policies that assured a free appropriate public education (FAPE) in the least restrictive environment to all children with disabilities. Zanga and Oda (1987) reported that these mandates required "nurse-physician coordination…and coordination between the nurse and other members of the comprehensive school health team, including social workers, speech pathologists, school psychologists, and guidance counselors" (p. 415).

Section 504 of the Rehabilitation Act of 1973 protects the rights of persons with disabilities in programs and activities that receive federal funding. Section 504 defines a person with a disability as an individual who has a physical or mental impairment which substantially limits major life activities—including functions such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning, and working. Examples of possible handicaps under Section 504 include Attention Deficit Disorder (ADD), hemophilia, asthma, drug or alcohol dependency, allergies, obesity,

etc. In most instances, appropriate interventions for individuals found handicapped only under Section 504 occur within the regular education setting.

In 1990, the EHA was renamed the Individuals with Disabilities Education Act (IDEA). IDEA reflected a change in approach to special education with a change in terminology from *handicaps* to *disabilities*. Disability law was largely regulated by the Americans with Disabilities Act (ADA) of 1990. This Act prohibits discrimination against individuals with disabilities in employment, housing, education, and access to public services. The ADA defines a disability as any of the following: (a) "a physical or mental impairment that substantially limits one or more of the major life activities of the individual"; (b) "a record of such impairment"; or (c) "being regarded as having such an impairment" (Sec. 3 Definitions. 42 USC 12102).

The practices of mainstreaming and inclusion were introduced with the 1990 amendments to IDEA. Mainstreaming was the placement of disabled students in regular classes with non-disabled peers. Students with various intellectual, behavioral, learning or physical disabilities were mixed in classes with their non-disabled peers. Inclusive education meant that all students in a school, regardless of their strengths or weaknesses in any area, became part of the school community. They were included in the feeling of belonging among other students, teachers, and support staff. Those who support the idea of mainstreaming believe that a child with disabilities first belongs in the special education environment and that the child earns his/her way into the regular education environment. In contrast, those who support inclusion believe that the child always begins in the regular environment and was removed only when appropriate services cannot be provided in the regular classroom.

Congress amended IDEA in 1997 as P.L. 105-17, referred to hereafter as IDEA ’97. The amendments stated that schools had a duty to educate children with disabilities in general education classrooms. IDEA ’97 strengthened academic expectations and accountability for the nation's children with disabilities and bridged the gap that had too often existed between what children with disabilities learned and what was required in regular curriculum. According to *Healthy People 2010*, 12% of children 18 and under had a disability, and 10.6% of children age 5 - 17 had a limitation of learning disabilities.

IDEA ‘97 required schools to provide appropriate special education, related services, aids, and supports in the regular classroom to children with disabilities. The term *related services* was defined as follows:

> Transportation, and such developmental, corrective, and other supportive services (including speech-language pathology and audiology services, psychological services, physical and occupational therapy, recreation, including therapeutic recreation, social work services, counseling services, including rehabilitation counseling, orientation and mobility services, and medical services, except that such medical services shall be for diagnostic and evaluation purposes only) as may be required to assist a child with a disability to benefit from special education, and includes the early identification and assessment of disabling conditions in children. [Section 300.24(a)]

Two landmark cases cleared the way for disabled students to attend regular schools with nursing assistance. Nader (1993) reported that the United States Supreme Court case, *Irving Independent School System v. Tatro* (hereinafter known as *Tatro*) (1984), indicated that P.L. 94-142 removed all barriers to education for handicapped children and that procedures required to assist a child with a disability to benefit from special education must be provided by the school system. The Tatro ruling stated that medical services were services provided by a physician.

The second landmark case was the 1999 United States Supreme Court ruling in *Cedar Rapids Community School District v. Garret F.* (hereinafter known as *Garret F.*). Medical services were not provided under IDEA '97. In the Garret F. case, the Court affirmed the ruling under Tatro that medical services were those that must be provided by a physician. The Court also ruled that school health services provided by non-physicians, when these services were needed for a child to attend school, were required as related services under IDEA '97. This ruling held that IDEA '97 required school districts to be financially responsible for providing nursing services when such supportive services were necessary for students to access and benefit from their educational program. This case did not prohibit school districts from accessing other sources of funding, such as a family's medical insurance or Medicaid reimbursement (NASN Issue Brief, 2001).

Large numbers of students with complex medical needs, who previously had been underserved or not served at all by the public schools, benefited tremendously. Advances in health care technology made it possible for children to leave hospitals and attend schools when previously they could not. Survival rates for children with chronic illnesses and congenital abnormalities, as well as for victims of trauma, increased (AFT, 1992; Koenning, et al., 1995; Zepeda & Langenbach, 1999). Severely disabled students entered public schools in unprecedented numbers. Children with chronic health care needs placed a strain on school resources. The American Academy of Pediatrics (AAP) Committee on School Health (2000) stated that access to services became more important as increasing numbers of disabled and chronically ill students, as well as

“students with special health care needs (SSHCN),” attended classes in their neighborhood schools (p.876).

These SSHCN had health-related disabilities that affected their educational performance and participation (Koenning et al., 1995). The authors reported that a statewide survey of 1,574 public school nurses identified the most prevalent health conditions of SSHCN and the procedures delivered to SSHCN. In the survey, an estimated 6% of the total enrollment of students (106,650) were identified as SSHCN. The most prevalent conditions reported in elementary schools were asthma, attention deficit disorder, and seizure disorders. Other identified health problems were heart conditions, cerebral palsy, diabetes, arthritis, kidney diseases, hydrocephalus, cancer, AIDS or HIV, cystic fibrosis, hemophilia, metabolic disorders, muscular dystrophy, sickle cell anemia, spina bifida, and trauma.

According to the survey findings (Koenning et al., 1995), the most common procedures performed daily by elementary school personnel were medication administration, diapering, and inhalation respiratory treatments. Other procedures included bowel and bladder training, mouth care, seizure management, blood glucose monitoring, ostomy care, central line care, tube feeding, tracheostomy suctioning, ventilator monitoring, catheterization, and shunt monitoring. The survey information identified “legal, financial, and liability issues surrounding the inclusion of SSHCN in educational settings” (p. 122).

Often, the facilities and conditions under which health-related procedures were performed in public schools were inadequate. Public schools needed additional funding to hire school nurses and, in some instances, to remodel existing or build new facilities

to accommodate the needs of medically fragile children and the increasing health needs of students. The American Federation of Teachers (AFT) manual (1992) stated:

> The placement of …medically fragile children in public schools and the responsibilities for care these placements require have given rise to ... the need for adequate funding, availability of appropriate facilities, new roles and responsibilities for school personnel, appropriate training, and legal and liability issues. (p. 9)

Facilities

Abramson (2003) reported that the events of September 11, 2001, affected the building boom for school construction in the United States. From 1983, school construction increased each year until it went past the $20 billion mark in 2001. Since 2001, the economic downturn and the increased spending in security for the nation kept ”the spending level for new school construction below $20 billion” (p. 3). While the demand for new space continues, “the trend for the last few years has been renovating existing space and adding technological updates” (p. 5).

Reicher (2000) reported, “Over the next 10 years, approximately 6,000 new K-12 schools will be built and tens of thousands of existing schools will be retrofitted” (p. 1). In 2002, Region 5—Florida, Georgia, Alabama, and Mississippi—spent the highest amount of money in new buildings (close to $2 billion). Schools in Region 5 spent “59% of construction funding for new schools that housed at least 800 students in elementary schools” (Abramson, 2003, p. 10).

A “regular feature” of all school buildings—new or renovated— was the addition or plans for a clinic or infirmary (Abramson, 2003, p.9). According to Abramson’s 2003 Construction Report, “95.4% of new elementary schools, 98.4% of new middle schools, and 98.2% of new high schools” provided a clinic or infirmary; however, in renovated

schools, an infirmary or clinic was planned for “0.7% elementary schools, 6.0% middle schools, and 0.9% high schools.” (p. 9).

History of School Nurses

Nurses in school settings began over a century ago in response to immigration, urbanization, and industrialization (Dryfoos, 1993a; Passarelli, 1994; Regan, 1976; Zepeda & Langenbach, 1999). Massive numbers of immigrants, poor living conditions, and poverty spread communicable diseases like diphtheria, whooping cough, and tuberculosis (Passarelli, 1994).

Lillian Wald presented the idea of putting a nurse into the New York City schools in 1902 to alleviate absenteeism among immigrant children (Woodfill & Beyer, 1991; Zepeda & Langenbach, 1999). In a month long experiment, nurse Lina Rogers visited four schools daily. Her supplies were donated and her offices in the schools were improvised—e.g., an unused stair closet or a room in the basement. The results of the experiment were successful, and the New York City Health Department appointed Rogers as the first school nurse. Funds for 27 nurses were appropriated.

The success of the New York program spread to other cities—e.g., Atlanta, Baltimore, Chicago—and within a decade, school nursing became a viable practice in the public health movement. A powerful coalition between the American Medical Association and the National Education Association began in 1911 with the formation of a joint committee on health problems (Center for Health and Health Care in School, n.d.a). The National Organization for Public Health Nursing (NOPHN) was founded in 1912, and school nurses were assimilated into the nursing organization.

By the 1920s all states had laws regulating ”health and education interfaces in schools, including safety, nutrition, and health screenings,” and the medical professions of doctors and dentists moved away from the school setting, fearing “socialized medicine” (Dryfoos, 1993b, p. 541). During the 1920s, 1930s, and 1940s, professional child health associations began to notice the variations in quantity and quality of school health programs across the nation (Center for Health and Health Care in Schools, n.d.a). A separation began between school nurses and providers of health care in the community.

Regan (1976) reported that teachers, administrators, students, and even families became dependent on school nurses for direct access to health care and referrals to community health resources; however, facilities for school nurses presented an obstacle to services. Nurses operated under stairs, in closets, and in basements. Access to water and needed supplies were limited.

According to Woodfill and Beyer (1991), school nurses became employees of school systems and were tasked with checking immunization records, reducing absenteeism, conducting school building inspections, testing vision and hearing, and teaching good health practices. The community was tasked with meeting the students’ health care needs.

The outbreak of World War II caused changes in school nursing practices. Nurses were moved from school settings to armed forces settings. The health needs of students suffered. Regan (1976) reported that classroom teachers assumed the practice of delivering health education, and when 25% of 18 and 19-year-old draftees

were deemed unfit for military service because of physical defects, interest in the school nurse program was revived.

Woodfill and Beyer (1991) stated “philosophically, the fifties were ’good times’ for school nursing” (p. 28). Nurses extended their scope of practice and became valued members of the school staff. Professional medical organizations added school nursing to their agendas. In 1956, the American School Health Association Committee on School Nurse Policies and Practices published 10 general responsibilities for school nurses. These responsibilities added new dimensions to the school nurse’s role. The school nurse became a consultant for health needs of children, an assistant for planning and implementing school health programs, and a participant and leader in school building meetings on school health programs and policies. The number of school nurses grew. Regan (1976) stated from 1950 to 1969 cooperation existed between community agencies and school nurses. The community recognized that the problems identified by the school nurse provided an overall view of the community’s health status.

In the 1960s and early 1970s, substance abuse, increased sexual activity, and recognition of mental health problems expanded the school nurse’s role. Poor economic conditions and reduced school budgets caused reductions in nursing positions. Funding for nurses and health services continued to be the important issue that school systems, communities and states faced.

As a part of the War on Poverty and Great Society programs, the U.S. Office of Education’s Health and Nutrition Projects attempted an integration of school programs in the 1970s. A few early demonstration projects funded by the Robert Wood Johnson Foundation focused on linking families to primary care services via school health

programs. School nurses had expanded roles in some of these projects (Center for Health and Health Care in Schools, n. d. a).

In the 1970s school-based health centers (SBHCs) were promoted and supported by the Bureau of Primary Health Care. The first three school-based health centers opened in Dallas, Texas, and St. Paul, Minnesota (The Center for Health and Health Care in Schools, 2004a). Lavin, et al. (1992) reviewed 25 reports published between 1989 and 1991 that addressed the need for school-based health services. The Clinton Administration pledged $3 billion for school health reform, including SBHCs (Center for Health and Health Care in Schools, 2004a). Salmon (1994) reported that the concept of SBHCs had "caught on" and "had expanded the notion that schools should provide only those health services either mandated to assure equity in educational participation or necessary for basic child safety" (p.138).

In 1994, the Bureau of Primary Health Care (BPHC) established Healthy Schools, Healthy Communities (HSHC) as the first federal program to serve high-risk children in medically underserved communities. Lear, Eichner, and Koppelman (1999) documented growth in the number of SBHCs and reported SBHCs received funding support from Medicaid, SCHIP funds, private institutions, and third party payments.

Baquiran, Webber, and Appel (2002) studied elementary school students who used three SBHCs in New York City. Comparisons were made between frequent users (five or more visits/year) and average users (one to four visits/year). Findings were that "frequent users visited the clinic for mental health and chronic medical conditions", and "average users visited the clinic for preventive care, acute medical care, and injuries/emergencies" (p. 133). To protect clinic resources, the authors recommended

use of group interventions for students with on-going health care needs, and they recognized the role that the clinic played in providing access to care for underserved students. Also, the authors recognized that the high numbers of children receiving medication for Attention Deficit Hyperactivity Disorder (ADHD) was a challenge for clinics.

Brindis et al. (2003) reported that hospitals, local health departments, and community health centers represented 73% of the sponsors for SBHCs, and these centers provided care for 2% of children enrolled in U.S. schools. The Center for Health and Health Care in Schools (n. d. b), using data from the 2002 survey, reported that: (a) There were 1498 SBHCs in 43 states and the District of Columbia; (b) elementary schools and urban areas saw the largest growth in SBHCs; and, (c) most funding for SBHCs came from state grants, Maternal and Child Health Block Grants (federal funds), and tobacco settlement monies.

Dryfoos (1998) advocated “full service community schools” (p. 408), but not in every school (1993a, p. 35). This model integrated quality education with effective community-based agencies—health, social, mental health, and recreational services—in “one stop” school centers (p.404). The Bureau of Primary Health Care (2003) listed several models for SBHCs. Some of the model programs were the Colorado Association for School Based Health Care, the School-Based Health Clinic Program of the Angelo State University/Department of Nursing, and the Harrison Healthy Kids Center in Kentucky. Staffing requirements for SBHCs varied with funding. Licensed practical nurses, registered nurses, nurse practitioners, dentists, and various specialized physicians made up SBHCs’ staffs.

Research studies for SBHCs were in the infancy stage. Several studies, suggested that a SBHC reduced Medicaid costs by providing services at school and lowering the number of emergency room visits (Adams & Johnson, 2000; Young, D'Angelo, & Davis, 2001). Webber, et al. (2003) collected data on the effects of SBHCs on inner-city elementary school children. The researchers concluded that access to a SBHC reduced the rate of hospitalization and reduced absenteeism by three days for students with asthma.

Florida School Health Services provided services to students in Pre-K through 12th grade by 67 local county health departments and school districts. Funds from the Florida Department of Health paid for school health staff composed of advanced registered nurse practitioners, registered nurses, licensed practical nurses and health aides. Basic school services began in 1973 in all 67 Florida counties. Additionally, comprehensive School Health Services Projects in 47 counties began in 1990. Full Service Schools started in 1990 and served 328 public schools in the state based on 1999-2000 data (Florida Department of Health, n. d.).

Weiler, Pigg, and McDermott (2003) reported on the evaluation of a new program, Florida's Coordinated School Health Program Pilot Schools Project (PSP), in eight pilot schools. Florida's Department of Education received funding for the project through the Centers for Disease Control and Prevention (CDC). Each of the eight schools received $15,000 plus technical assistance for three years, 1997 to 2002. School teams included members from school health services. The schools collected baseline data. The general conclusions drawn from the project's goals were that first, a coordinated school health program was established and sustained, and second, that the

design of the pilot project offered insufficient evidence that the program helped improve school performance indicators. Recommendations suggested a more “robust design for measurement and evaluation,” additional funding, and involvement of administrators from the schools (p. 8).

Dryfoos (1999) pointed out the frustrations that school reformers and practitioners in SBHCs experienced. Academic achievement levels, despite educational reforms, were slow to change, and effects of SBHCs were difficult to demonstrate despite positive health and behavioral outcomes. Dryfoos (1999) reported that “the educational establishment knew that without attention to students’ basic needs, school reform would fail” (p. 65).

Since a school-based health center was not necessary in every school, schools needed to address the rising and continuing health care needs of their students. With the passage of P.L. 142-95 in 1975 and the increasing numbers of students with chronic health conditions attending school, the role of the school nurse expanded. Koenning et al. (1995) reported that “technological advances and reduction in mortality of the past few decades greatly increased the physical presence of students with health-related disabilities in the classroom” (p. 119).

Fowler, Johnson, and Atkinson (1985) reported that school absences for children with chronic health problems—arthritis, hemophilia, spina bifida, diabetes, or cystic fibrosis—were related to the illness. Also, children with low socioeconomic status and chronic health problems were “at risk for school dysfunction (e.g., repeating a grade, needing special services) and absenteeism” (p. 685). A special report in 2003, *Students with Chronic Illnesses*, stated that at least 10% to 15% of children in the United States

were affected by chronic conditions, such as asthma, allergies, diabetes, and epilepsy, in the school setting. When the health needs of these students were met, the students functioned to their maximum potential and benefited from “better attendance, improved alertness, fewer symptoms, fewer restrictions on participation in physical activities and special activities, and fewer medical emergencies” (p. 131).

The additional duties of the nurse required by special needs students—assisting in identifying, assessing, developing Individual Education Plans (IEPs), implementing the IEPs, and annual reviews of the plans—caused role confusion for the school nursing profession. Each school, system, district, or state had different interpretations of “what a school nurse was and what a school nurse did” (Woodfill & Beyer, 1991, p. 32). Small et al (1995) reported that a “clear consensus on the role of health care professionals in the educational setting did not exist” (p. 325).

Since the first school nurse in 1902, changes in society had affected school nursing practices. Costante and Smith (1997) stated, ”Historically, school health nurses have played an important part in decreasing the occurrence of contagious childhood disease, and they continue to represent a cost-effective community resource for maintaining high levels of wellness among school-age youth” (p. 290). New legislation and government policies, rising numbers of immigrants, changing family structures, and reforms in education increased the need and demand for health services in schools. Increased numbers of medically fragile students, increased numbers of students receiving medication at school, and increased health care needs of students with new morbidities validated the role for nurses in the schools (Hacker & Wessel, 1998; Small et al., 1995). Healthcare and educational reform affected school nursing. School nursing

bridged the gap between education and health but was “peripheral to both domains” and “lacked support from either” (Hacker & Wessel, p. 410).

Role of the School Nurse

Clemen-Stone, Eigsti, and McGuire (1991) stated that the school nurse was seen initially as the person who provided first aid, gave injections, and inspected for communicable diseases (p. 599). At a school nurses’ conference, Cromwell (1946) urged nurses to work with principals, superintendents, and local community sources to improve the conditions of school buildings and to unify “efforts of several agencies to avoid duplication of services” (p. 390).

Smiley (1958) defined the function of the school nurse as “an integral part of the school staff” concerned with screening procedures, treating emergencies, maintaining optimum health among students and staff, and educating students and parents. Smiley advocated that the nurse should not wear a white uniform since “a white uniform was automatically categorized as a person concerned with illness rather than health” (p. 59).

Cromwell (1963) wrote that school nurses were in schools “to meet the health needs of children in relation to their academic progress” (preface p. vii). Regan (1976) reported that confusion and conflict over the school nurse role were caused by the relationship to an educational rather than a medical setting and that the performance of the nurses was planned and managed by school officials separating school nurses from their own profession. The traditional role of the nurse was in a clinical or hospital setting with ill patients. In the school setting, nurses assumed additional roles of health appraisal and health education. Wold (1981) stated the purpose of the school nurse was

"to enhance the educational process by the modification or removal of health-related barriers to learning and by promotion of an optimal level of wellness" (p. 30).

Hertel et al. (1982) reported that the school nurse was "best prepared to identify the health needs…or assist the school setting in adapting to the child's needs" (p. 478). Joachim (1989) stated that the school nurse was the "key person to successfully manage integration of chronically ill children into the public school system" (p. 406).

Reed-McKay (1989) proposed new roles for school nurses in the state of Washington. The Spokane Public Schools organized a Medical at Risk program for chronically ill students with medical problems that interfered with school attendance. School nurses managed the program and worked with teachers, private physicians and community agencies to provide in-school education to these students. Additional equipment was purchased to aid the nurses. An otoscope, opthalmoscope, new audiometers with tympanometric capabilities, pen lights, reflex hammers, stethoscopes, and a variety of blood pressure cuffs were provided. Nurses assisted students with tube feedings, catheterizations, tracheal suctioning, blood sugar monitoring, and emergency interventions for severe allergies and asthma. School staff was educated about Attention Deficit Disorder (ADD), diabetes, and Tourette Syndrome. Communicable diseases—cytomegalovirus, mononucleosis, and AIDS—were discussed.

Clemen-Stone et al. (1991) detailed the new roles for the school nurse as "an advocate, a health counselor, a health educator, an epidemiologist, a consultant, a community health planner, and a coordinator" (p. 599). The authors wrote that the school nursing profession enhanced the educational process by removing health barriers. Two nursing services were discussed—specialized and generalized services.

Nurses hired by the local Board of Education to work only in the school setting performed specialized services. Nurses employed by the community health service performed generalized services. These nurses served part-time in the school setting. Clemen-Stone et al. wrote that both types of nursing services were required "to obtain parental consent for services, to provide confidentiality of health records, to report child abuse or neglect, and to perform services mandated by legislation for children with special needs" (p. 586-587).

The AFT manual (1992) reported that school nurses working with medically fragile children were exposed to more blood-related diseases (Hepatitis and AIDS), communicable diseases (Impetigo, Ringworm, Tuberculosis, Bacterial Meningitis), Pediculosis (head lice), and Pneumococcal diseases (infections and pneumonia). Nurses who worked with medically fragile students needed facilities that supported the special needs of students and the support personnel that worked with these students.

Nader (1993) wrote that most students were healthy, and visits to the clinic were "generally due to minor trauma and self-limited illnesses" (p. 82). Nader also listed accidents, the effects of family violence and dysfunction, learning problems, school adjustment problems, unhealthful behaviors and habits as the "major morbidities of school-aged children" (p. 82). Critics stated that having a full-time nurse in each school was a waste of resources. Nader argued that low-achieving students and students with absenteeism problems needed interventions to reduce dropouts. Nader stated that for the average student, the "average number of visits to the clinic was three to five per school year" and that "girls visited more than boys" (p. 156). This two-year study revealed that "8% of the students accounted for the top 10% of all visits to a clinic," and

these 8% visited the nurse “between 13 and 66 times during the school year” (p. 157). Reasons for the visits from most to least were “trauma, headache, stomachache, dental problems, upper respiratory tract infections, ear complaints, social/family problems, and learning problems” (p. 158).

Passarelli (1994) reported that the school nurse was in a “unique position” with “skills and knowledge to improve children’s health and ability to learn” (p. 141). Passarelli described the following as roles of the school nurse: (a) assessing health status; (b) identifying health problems that influenced a student’s educational progress; (c) developing a health plan for managing problems in the school setting; (d) intervening in emergencies; (e) administering medications; (f) performing procedures (e.g., gastrostomy tube feedings); (g) acting as a health counselor for students and families; (i) teaching health education; and (j) acting as a liaison between students, families and community health agencies. Passarelli stated that the diversity in preparation of nurses caused an unclear role definition and role confusion for the nurse.

Salmon (1994) reported a “spectrum of school health nursing roles” (p. 137). Nursing services ranged from nurses that were limited to the clinic area to nurses that operated as public health professionals (p. 138). Passarelli (1995) stated that school nurses were the key to implementing the new paradigm in health care delivery—a shift from illness and cure to wellness and prevention with services delivered in the schools.

Fryer and Igoe (1996) reported results from a nationwide survey of a systematic random sample of school districts. This report contrasted the roles of schools nurses and health assistants in 482 participating districts from 45 states. Registered nurses employed by 428 districts were used for technically involved clinical services but health

assistants were employed to administer first aid and medications. The most significant health problems reported in elementary schools included high-risk social behaviors, chronic health problems, lack of access to health care, special health needs, self-esteem problems, accident/injury prevention, unhealthy lifestyle habits, poverty, communicable disease, and mental illness/emotional problems. The report listed 31 health services performed in schools. Some of the clinical procedures identified were formal cardiovascular screenings, tube feedings, irrigations, collection/testing of blood samples, performance of urinary catheterizations, and complex nursing care for special health needs students.

The National Association of School Nurses (NASN) Board of Directors meeting in June of 1999 adopted the following definition of school nursing:

> School nursing is a specialized practice of professional nursing that advances the well being, academic success, and life-long achievement of students. To that end, school nurses facilitate positive student responses to normal development; promote health and safety; intervene with actual and potential health problems; provide case management services; and actively collaborate with others to build student and family capacity for adaptation, self management, self advocacy, and learning. (p.1)

*School nurses and the Individuals with Disabilities Education Act (IDEA), a*n issue brief adopted in 1996 and revised in 2002 by the National Association of School Nurses, recommended that children served under IDEA had the right to receive specialized health services that were provided or supervised by a Registered Professional Nurse. Koenning et al. (1995) reported that the “American Nurses Association recommended that the nurse-to-student ratio be reduced significantly from 1:750 to 1:225 for mainstreamed populations” and “a ratio of 1:125 was recommended for severe and profound populations” (p. 121).

No federal law or regulation defined who must perform certain health care procedures; however, States' Nurse Practice Acts set forth requirements. NASN (2002) defined the role of the school nurse as a related services provider under IDEA. The school nurse was recognized as a vital member of the multidisciplinary team that ensured delivery of necessary services to eligible students with disabilities.

Francis, et al. (1996) reported that administration of medication during school hours had grown dramatically over the years. In a study involving administration of medication in Florida schools, the authors stated that students in public elementary schools received more medication than students in middle or high school. Boys were more likely to take medication at school than girls were. "Methylphenidate [medication for Attention Deficient Hyperactivity Disorder (ADHD)] accounted for 66% of all medication given to public elementary school students" (p. 357). Safer and Malever (2000) reported on a Maryland public school survey of medication for ADHD given to students during school hours. The authors concluded that a majority of public school students receiving medication for ADHD were receiving special education or Section 504 services.

McCarthy, Kelly, and Reed (2000) reported medication administration practices of 649 members of the National Association of School Nurses (NASN). Nearly half of the nurses surveyed reported medication errors in their schools. According to the study, school nurses estimated an average of 5.6% of students received medication on a typical school day, with the majority (3.3%) of the students receiving medication for attention deficient hyperactivity disorder (ADHD). Other common medications included analgesics, over-the-counter medications, asthma and anti-seizure medication. The

nurses reported errors in administering the medication with missed dosages being the most common error, and nurses commented on the wide range of medication being given especially for students with complex health needs like diabetes, asthma, cancer and AIDS. Storage of medication—secure containers for medication and secure storage for medication needing refrigeration, like insulin—and delegation of other school personnel to administer medication were identified as problems. The authors concluded that ways to appropriately store and dispense medications at schools needed to be developed.

Brindis et al. (1998) reported on a pilot study in Denver, Colorado from 1994 to 1996. The purpose of the study was to expand the role of the school nurse in the school clinic. The authors described the process of the role transition from school nurse to nurse-practitioner. The model program used existing school health staff more effectively rather than setting up new clinics. The authors found that school nurses needed to develop more knowledge and skill in working with complex health problems in the school setting. Since full-service schools with a full range of services were unlikely to be established in most American schools because of diminished financial resources, expanding the role of the school nurse in the school clinic was one "key avenue to shaping the field of school health for the 21st century" (p. 182).

Hacker and Wessel (1998) stated that school nurses "traditionally worked as isolated, independent and specialized professionals" (p. 411). Zepeda and Langenbach (1999) advocated that "the services provided by the school nurse should not be considered an add-on program of the school, but rather, an integral one" (p. 147). *Healthy People 2010's* objective 7-4 underscored the importance of school nurses by

proposing an increase in the number of elementary, middle, junior high, and senior high schools that had a nurse-to-student ratio of at least 1:750.

In a position statement about the role of the school nurse, the American Academy of Pediatrics (AAP) stated four goals for a school health program: (a) ensuring access to primary health care or a medical home; (b) promoting a system for dealing with crisis medical situations; (c) requiring mandated screening and immunization monitoring; and (d) providing a process for identification and resolution of students' health care needs that affect educational achievement (2001, School Nurse Activities, ¶ 3). The AAP recommended and supported the fact that the school nurse was in the position to be the school system leader in securing partnerships with community agencies.

Libbus et al. (2003) interviewed 25 school nurses selected by the Missouri State School Health Consultant. All interviewees were female, and 17 nurses served rural schools. The mean caseload was 777 students. The interviewers asked the nurses to discuss their perceptions about roles and responsibilities of school nurses. The participants perceived themselves as the "health anchor" or center of health care and services for their schools (p. 322). Child advocacy was another role of the nurse. The nurses functioned as the mediator between the school, child, family, and doctor. The interviewees expressed frustration at not being recognized as an equal to teachers. Nurses also expressed being overwhelmed with professional isolation. Many nurses received "deep satisfaction from working with children" (p. 324). The author recommended that school nurses receive training and "educational experiences that

enhance their potential for working as autonomous professionals in a community-based organization" (p. 324).

Need for Nurses

The argument against delivering health care in public schools was weakened by a number of powerful and related developments (Pena, 2000). First, inclusion and mainstreaming—the concepts and the practices—put significant numbers of students with disabilities in the regular classroom (Bartlett et al., 1994; IDEA, 1990; IDEA, 1997; Pena, 2000). Second, existing federal legislation mandated that health services be provided for children with disabilities and health problems (IDEA, 1997). Third, research suggested that the physical and mental health of children had a direct impact on their academic and social development in school (Bush, 1997; Jang, 1994; Koenning et al., 1995; Passerelli, 1994). Pena (2000) stated the following:

> Health care and institutional reform in public schools probably started with administrators and school personnel becoming aware of the health status of students and continued with their recognizing that health care was not charity. It was a right that students were entitled to by law. (p. 200)

Funding for Nurses

In November 1998, the attorneys general from 46 states, the District of Columbia, Puerto Rico, and three territories reached a settlement on their lawsuit against the nation's five largest cigarette manufacturers for the cost of treating smoking-related illnesses of Medicaid patients. The tobacco settlement, known as the *Master Settlement Agreement* (MSA), was worth $206 billion over the next 25 years, of which $195 billion was paid directly to the states. Prior to this agreement, Florida, Minnesota, Mississippi and Texas had individually settled their lawsuits with the tobacco industry for more than $40 billion. State officials originally promised to use the funds for projects to reduce

tobacco use, such as smoking cessation and prevention. Since that time, however, many states have decided to use all or a major portion of their settlement funds for other state projects. Most states decided how to allocate these funds through the legislative process.

A January 15, 2002, report, *Show Us the Money: An Update on the States' Allocation of the Tobacco Settlement Dollars*, was released by the Campaign for Tobacco-Free Kids, American Heart Association, American Cancer Society and American Lung Association. The report stated that most states were failing to fund tobacco prevention programs at the minimum levels recommended by the U.S. Centers for Disease Control and Prevention, and many states were using the monies to balance budgets and to handle budget shortfalls. Some states were using the monies to fund nurses and healthcare services in the schools.

The *No Child Left Behind Act of 2001* (NCLB) reauthorized the Elementary and Secondary Education Act. Formula grants authorized to states were sub-granted to districts. Title V of the NCLB Act of 2001, Promoting Informed Parental Choice and Innovative Programs, and Part A, Innovative Programs, were based on scientific research and evidence. The programs were evaluated annually to ensure that student academic achievement increased as a result of the programs. SEC. 5131, Local Uses of Funds, listed 27 innovative assistance programs. For the first time programs to hire and support school nurses were authorized to receive funding. These federal funds supplemented state and local resources.

Georgia Statistics

Statistics on Georgia's population and income status for children living in low income and poor households showed that Georgia had higher percentages than national percentages. The following information was retrieved from the National Center for Children in Poverty (2003):

- 1,097,096 families with 2,114,177 children
- 395,222 (36%) low income families with children (National: 33%)
- 164,209 (15%) poor families with children (National: 13%)
- 876,373 (42%) children in low-income families (National: 37%)
- 384,889 (18%) children in poor families (National: 16%)

The Georgia Department of Human Resources (2003b) reported that the total number of recipients that received Temporary Assistance for Needy Families (TANF) funds were 103,858 children and 33,421 adults. From January 1997 to August 2003 the number of Georgia families receiving cash assistance decreased by 49%.

Immunization in Georgia

In May 2003, the Georgia Registry of Immunization Transactions and Services (GRITS) was piloted in four health districts. This registry would help parents keep track of children's immunizations even with changes in addresses or doctors. In addition, public and private providers had access to the registry for adding information to a child's immunization record. GRITS was scheduled to be extended statewide in September 2003, according to the Georgia Department of Human Resources (2003a).

School Nurses in Georgia

For the 2002-2003 school year, the Georgia Association of School Nurses (GASN) (2004) reported that school nurses served 1.3 million students out of 1.5 million students in schools grades K-12. A total of 1143 school nurses were employed with the majority (795) being Registered Nurses and Licensed Practical Nurses representing the remainder (348). The ratio of students to nurse was 1287:1 compared to the recommended National Association of School Nurse's ratio of 750:1. The GASN report pointed out that Georgia ranked 44 out of 50 states on the overall child well-being index for 2002. There has been a correlation made between lower ratios of students to school nurses and a state's higher ranking on the index.

GASN (2004) reported the following for the school year 2002-2003:

- Total visits to the school nurse for medications were 2.5 million.
- Total visits to the school nurse for other than medications were 3.8 million (74% of students returned to class).
- Chronic diseases in Georgia's children were increasing at a rate of 16% to 25%. These illnesses included asthma, diabetes type 1 and 2, heart disease, epilepsy, cancer, transplants, cystic fibrosis, sickle cell disease, autism, developmental disabilities, and obesity.

Funding for School Nurses in Georgia

The Georgia Department of Education (2000) asserted that *HB 1187: The A Plus Education Reform Act of 2000* provided funding for nursing services in schools for the first time. The Act allocated one nurse per school system using a $20,000 salary, and additional funds allocated on an FTE (Full Time Equivalent) basis ($18.89 per FTE).

The local boards of education were tasked with establishing policies and procedures regarding the school health nurse program. Since the passage of this law, the majority of schools in Georgia have had a licensed school nurse on site during at least part of a school day.

In 2003, an inter-agency arrangement was brokered between the Georgia Hospital Association (GHA) and the Department of Education (DOE) for the $30 million of tobacco settlement funds. The Department of Community Health (DCH) accepted the tobacco funds, and on a quarterly basis, the DCH remitted payments to the DOE to fund the school nurse program. This money paid about a third of the actual cost of providing school nurses in Georgia (Georgia Association of School Nurses, 2004).

SCHIP in Georgia

Title XXI of the Social Security Act, The State Children's Health Insurance Program, provided health care for uninsured children. In Georgia, this program was PeachCare for Kids, and approximately 190,000 children in Georgia were eligible for coverage in 2003. The program began in 1999 and provided comprehensive health care to children through the age of 18 who did not qualify for Medicaid and who lived in households with incomes at or below 235% of the federal poverty level.

Health benefits for children enrolled in PeachCare included access to a doctor when ill, preventive checkups and immunizations, access to a specialist when needed, dental care, vision care including vision screenings and eyeglasses, hospitalization, emergency room services, prescription medications, and mental health care. Each child was assigned a Georgia Better Health Care primary care provider who coordinated the child's care.

There was no cost for children under the age of five, and starting at age six the premiums were $10 per child. The premium for two or more children was either $15 or $20, depending on household income. There were no co-payments or deductibles required for benefits covered by PeachCare. Eligibility was available to children who were citizens of the United States or who had resided legally in the United States for at least 5 years. Citizen children of non-citizen parents were eligible for PeachCare (PeachCare for Kids, 1999).

Specific Design Elements of an Elementary Health Care Clinic

There was little published literature to inform or guide designers, researchers, or architects about successful school clinic design. Literature about successful classroom and school design existed and literature about successful designs for hospital and ambulatory care facilities was available; however, specific research or literature on design for school clinics and health clinics in elementary schools was limited.

Johnston (1977) wrote:

> The design of a building is a compromise between limitations imposed by the site, functional requirements of the program, the exterior appearance desired by the community, and the limitations of the budget. Design has a major impact on the efficiency and effectiveness of the staff and the comfort and privacy of the patient. (p. 15)

Design standards were necessary for each component of the school building; however, clinic design standards were not available in Georgia schools. According to R. Nance (personal communication, July 1, 2002), an architect with the Georgia Department of Education, “There are no DOE standards for Clinics [*sic*] at this time. The design decisions area [sic] left to the local system and their architect.” J. Allers

(personal communication, July 23, 2001), the manager for the School Health Department of Children's Healthcare of Atlanta, wrote:

> We are happy right now when nurses get running water, soap, paper towels and a private toilet for sick children. A place to lock up meds, i.e. a locking file cabinet [*sic*]. We have nurses in GA without a health room of any kind. Phones and computers are nice.

Health care facilities in elementary schools must have a design with flexible, adaptable spaces and furnishings to meet the diverse and changing needs of the school population served and services provided. In actuality, school clinics "ranged from a cot and first-aid station to a comprehensive clinic offering physical, behavioral, and mental health services to students and their families" (Butin, 2000, p.1).

Chaney (1973) reported that prior to the 1960s designers of health care facilities and most institutions were concerned with costs of the building, an efficient layout, durable and sound construction, and a pleasing appearance. After that time, the impact of the environment on the inhabitants became important. Chaney stated that "environmental design is more complex and more important in hospitals than in any other kind of facility" (p. 62). Johnston (1977) suggested that the functional needs of the program be translated into space relationships.

Ulrich (1990) reported that his research linked poor design of healthcare facilities to negative consequences such as anxiety, delirium, elevated blood pressure, and increased intake of pain drugs. Ulrich recommended that health facility design should be "psychologically supportive" and should promote wellness (p. 88). Torrice (1988) stated the following:

> We build better zoos for animals than we do healthcare facilities for the sick. We give zoo animals fresh air; we give them water; and we give them a natural habitat. We don't even do that for our senior citizens. (p. 43)

Design of the health care room in a school is important to the staff and the students who will be using the spaces. Frasca-Bellieu (1999) stated, “Ultimately, the design of stress-reducing facilities may be identical to that of health-promoting facilities” (p. 68). Johnston (1977) suggested that the clinical staff should contribute and be allowed to participate in the design process. Williams (1991) stated that nurses “should be included in design teams, whether in the planning of new facilities or the redesign of older ones” (p. 113). The school nurse’s responsibilities and duties should determine the design needs of the school clinic.

Johnston (1977) stated:

> It is not practical to develop a prototype design for the ideal primary care center because functional requirements, staffing patterns, and site restrictions vary significantly from one to another. It is possible, however, to discuss key elements with the primary care center and point out design solutions that have evolved through experience. (pp. 15-16)

The literature review revealed design classifications that included suggestions for the necessary rooms and spaces required to perform needed services and how these design elements impact the efficiency and effectiveness of the services performed by the school nurse or delegated provider. Researchers identified the following specific design elements when planning ambulatory care facilities (ACFs): lighting and daylighting; windows; integration of nature elements into the design; promotion of a sense of well-being for users; use of color; privacy, space and confidentiality issues; heating, ventilation, and air conditioning; electrical and plumbing requirements; acoustics; walls, ceilings, and flooring.

Light and Daylighting Elements

Gappell (1991) stated that the quality and quantity of light in the design affected the ability to see and function efficiently. Gappell reported on findings in the field of photobiology:

> Light, coming into the pineal gland through the retina of the eye, influenced endocrine control, timing of our biological clocks, entrainment of circadian (sleep/wake) cycles, sexual growth and development, regulations of stress and fatigue, and suppression of melatonin—a central nervous system depressant used for the treatment of Seasonal Affective Disorder (SAD). (p. 116)

Bright, cool fluorescent lighting was considered institutional, while indirect, warm fluorescent or incandescent lighting was considered more home-like and comfortable (Alexander, 1972; Birren, 1979; Carpman, Grant, & Simmons, 1986; Rosenfield, 1972). Boyce (1981) cited a hospital study that ranked light sources. For making color judgments for illnesses, cultures, lesions, etc., the higher the color rendition index (CRI) the better the light source. The CRI scale ranged from zero to 100, with sunlight being 100. Boyce stated that a high CRI allowed people to see objects as they appear under natural sunlight; however, these lights were more expensive to buy and to operate. Schools usually chose tubular fluorescent lamps with a medium CRI that were moderately priced but less expensive to operate than incandescent lamps.

Torrice (1988) wrote that natural outdoor light provided an equal balance of the colors of the spectrum to the body, but fluorescent light distorted the balance of colors absorbed by the body. Torrice recommended full-spectrum lighting that comes close to natural sunlight. Mosher (2003) reported a “shift away from fluorescent to compact fluorescent or halogen lamps in task lighting” to provide a warmer, less artificial type of light (p. 114).

Rosenfeld (1971) stated overall lighting needed to emphasize the patient and the task and recommended indirect lighting in work areas and dimmers for control of lighting in medical settings. Malkin (1990) suggested that the optimal lighting system for a hospital was a “system of changing light levels and tints” (p. 433). Veitch and Newsham (1996) wrote that the “nonuniformity [of light] across a room appears to be preferable to uniformity because it creates interest and can highlight important information” (p. 35). The Center for Health and Health Care in Schools (2004b) reported that light in “each space of the clinic should be able to be controlled by the occupant of the space” (p. 13).

The American Institute of Architects (AIA) (1987) suggested reducing the amount of energy consumption “by developing a building configuration and envelope which maximizes the natural light to interior spaces” and recommended using “lightwells and atriums in conjunction with sidelighting from windows” to raise the level of natural light (p. 93). Hathaway (1994) showed that the use of natural light affected mental attitude, class attendance and performance of students.

Tanner (2000) revealed that natural light influenced student behavior and attitudes. The Heschong Malone Group (2001) expanded and validated previous research that found “a statistical correlation between the amount of daylight in elementary school classrooms and the performance of students on standardized math and reading tests” but found that “physical classroom characteristics (daylighting, operable windows, air conditioning, portable classrooms)” did not affect student absenteeism (p. 2).

Day (1980) reported that proper lighting and balanced lighting were necessary for “proper optical hygiene” (p. 4). Day stated that “overtaxed eyes” created “headaches,

nausea, dizziness, loss of appetite, vomiting and complete physical exhaustion" (p. 4). Day recommended "there should never be more light on the eye than on the task" (p. 5).

Grocoff (1995) stated that numerous studies from The National Institute of Mental Health indicated "illumination levels typically provided in schools and offices (i.e., 50-100 foot candles) can cause people to become lethargic, irritable, and depressed" (p. 4). Grocoff recommended the use of skylights (150-200 fc) which reversed these effects and helped to keep people alert. Use of electric lighting to produce this same amount of illumination would be cost prohibitive, according to Grocoff.

Payne (2000) reported on sunpipes (aluminum tubes with a silverized mirror internal lining) mounted on the roof of a hospital. The sunpipes carried daylight 12 to 15 meters into the building to windowless rooms. The light varied with cloud cover but produced as much as a 400-watt bulb in summer, over 250 watts in an overcast summer sky, and over 100 watts from a clear winter sky (p. 42). Payne stated that use of this type of lighting helped alleviate problems with deprivation of natural light. This condition is known as seasonal affective disorder (SAD).

Window Elements

Alexander (1972) reported that windows had three purposes: (a) to admit, shape and direct light; (b) to permit ventilation; and (c) to frame a view. Dorsey (1980) stated that "windows are good to let light in and to enable children to see out," but he cautioned that windows "can be very annoying and glaring" and "should have some form of brightness control" (p. 11).

Boyce (1981) detailed a study about people working in windowless offices. The subjects expressed a feeling of being "cooped up" and expressed dissatisfaction with

the lack of windows in their offices. Warm colors, bright lights and access to windows in a hallway did not change feelings of depression and tension. Hospital research involving windowless rooms and rooms with windows revealed increased incidence of depression and delirium in patients in the windowless intensive care rooms when compared to the patients in the intensive care rooms with windows (Ulrich, 1990; Wilson, 1972). Day (1980) suggested decorating windowless rooms "to become an asset rather than a negative factor" (p. 5).

Windows were associated with thermal, visual, and psychological aspects of comfort, and light and views from windows were associated with relaxation and faster healing (Carpman et al., 1986; Gappell, 1991; Ulrich, 1990). Scientific research reported by Ulrich suggested certain interior design approaches increased feelings of control, reduced stress, and promoted wellness. Views of nature reduced stress symptoms, such as headaches and digestive illness, and lowered systolic blood pressure levels 10-15 points.

Malkin (1990) stated that windows in a medical space were a significant issue. Malkin suggested that windows start at "42 inches off the floor so that cabinets can be put under them" (p. 14). Windows were recommended between the office area, rest area for ill students, and waiting area for the clinic to allow for supervision of students by the office staff when the nurse was not present. McKibben and DiPaolo (1997) suggested an outside window for natural lighting and ventilation or an operable skylight.

Integration of Nature Elements into the Design

Pinto (1996) reported that nature played an important part in the healing process and that designers for healthcare facilities were integrating the outdoors into facilities.

The new designs looked “more like country clubs than medical clinics” (p. 39). Renzi (2001) reported that winning designers for healthcare facilities were incorporating nature into the designs “with a lack of heavy detailing….Everything is quite subtle and informal” (p. 204). Ulrich (1990) stated that positive distractions—pictures of happy and caring faces, pets or unthreatening animals, and nature elements like trees, plants, and water—were important to humans, reduced stress and promoted recovery.

Promotion of a Sense of Well-Being for Users

Frasca-Bellieu (1999) wrote, “Our physical and social surroundings are an important influence on health” (p. 68). According to health care reports, a relaxing or soothing atmosphere promoted quicker recovery and healing (Croswell, 2000). School health care facilities encompassed this research by using soft colors, natural light and noise control that enhanced the sense of well-being. Day (1980) stated that soft lighting environments were best for mental tasks and “exacting visual activities” (p. 5). Researchers at Old Dominion University in Norfolk, Virginia, examined *hard* and *soft* rooms. The findings indicated that indirect lighting, upholstered furniture, magazines and access to nature through windows or artwork softened the room and relaxed the patient (Carpman et al., 1986).

Renzi (2001) reported the use of feng shui by designers in the placement of rooms within healthcare facilities. Exam rooms faced the north side of the building, the direction of healing, and east, symbolizing new beginnings; and, administration offices were on the south side of the building to foster communication and insight. Designers focused on “all facets of a patient’s well-being: mind, body, and spirit” (p. 204).

Kantrowitz and Associates (1993) wrote that designers for successful primary care facilities were rejecting the old sterile image of medical setting and were providing comfortable light, welcoming spaces that enhanced patient and staff experiences. These successful designers paid careful attention to privacy and abundant natural light. Simeonova (2003) stated that a "healthy environment is created in the thoughtful integration between lighting and an array of auditory, fragrance, and other sensory experiences" (p. 1). Croswell (2000) reported the use of aquariums, interactive water fountains, light hardwood paneling, outdoor views, and original artwork in winning designs for healthcare facilities. Gappell (1991) recommended floral arrangements and bowls of sachet that added pleasant fragrances in healthcare facilities.

Use of Color

Frasca-Beaulieu (1999) concluded that "there are no specific guidelines to color selections for an ACF [Ambulatory Care Facility], but there is an abundance of literature on the psychological, biologic, and physiological research regarding color" (p. 69). Color and light were interrelated, colors of a room were influenced by lighting, and color was not seen without the aid of light (Dorsey, 1980; Malkin, 1990; Rosenfield, 1972).

Color influenced human emotions and physiology (Alexander, 1972; Chaney, 1973; Day, 1980; Dorsey, 1980; Malkin, 1990). Red, orange and pink colors stimulated the sympathetic nervous system, increased brain wave activity, and sent blood to the muscles, accelerating heart rate, blood pressure, and respiration, and blue and green colors triggered the parasympathetic nervous system and had a tranquilizing effect (Alexander, 1972; Birren, 1979; Burr & Sullivan, 2000; Chaney, 1973; Dorsey, 1980; Malkin, 1990; Rosenfield, 1972). Colors affected perception—warm colors seemed to

advance and cool colors seemed to recede (Chaney, 1973; Rouk, 1997). Cool colors caused participants to underestimate time, weight, and size, and warm colors produced the opposite (Chaney, 1973; Day, 1980; Malkin, 1990). Gappell (1991) and Rouk (1997) stated that participants reported feeling cooler in cool-toned rooms and warmer in warm-toned rooms even when the temperature remained the same.

Birren (1979) reported in the early 1900s “hospitals had white walls, white bedsteads, white linens, white metal cabinets, and hard surface terrazzo floors” (p. 93). The use of white for everything in hospitals was for sanitation reasons: dirt showed easily and could be removed immediately (Birren, 1979; Rosenfield, 1972). Birren stated, “White walls and bright lights produces distressing glare, hampers vision, can cause headaches and nausea, and may even damage the retina” (p. 95).

Birren (1979) wrote that in the 1930s, “Flagg proposed one of the first strictly functional colors of blue-green for the operating suite” because the all white environment of the operating room and the use of artificial light caused “intolerable glare” for the hospital staff (p. 94). Blue-green, the complementary color to red from blood and human tissue, offered relief from eye fatigue, and the color became associated with the color of walls, floors, linens, and uniforms in operating and emergency rooms (Birren; Rosenfield, 1972).

Birren (1979) stated that in the 1930s and 1940s interior colors in hospitals changed to bold colors and high levels of illumination. Rosenfield (1972) reported that hospital interiors changed from all white to “straw-tan walls” with slightly darker woodwork and brown linoleum floors, to a “rash” look—many different colors and

patterns, to “well-meaning but untrained ladies” who decorated, to interior designers, to finally a team effort of architects and designers (p. 160 -161).

The choice of color depended upon the source of light, the size, location and shape of the space, the number of occupants, and the use of the space (Birren, 1979; Gappell, 1991; Rice, 1953; Smith, 1980). Day (1980) stated that lighter colors had higher reflective values. Carpman et al. (1986) suggested the use of contrasting color values especially in flooring, baseboards, and walls to help visually impaired persons distinguish among walls, floors, and handrails. Rouk (1997) reported that research indicated painting one wall a different color reduced monotony and relaxed the eyes.

A visual environment that utilized a variety of colors and shades was one way to provide needed interest and stimulation that increased heart and breathing ratios and affected the cortex of the brain (Birren, 1979; Gappell, 1991). Rouk (1997) and Smith (1980) suggested that elementary school designers use light salmon, warm yellow, pale yellow-orange, coral, and peach colors.

Privacy, Space, and Confidentiality Issues

Carpman et al. (1986) stated that healthcare “design must allow for visual privacy, acoustical privacy, social contact, and solitude” (p. 19). Patients in healthcare environments require ample space and added privacy to avoid tension and stress (Gappell, 1991). Frasca-Beaulieu (1999) stated that patients needed privacy to discuss medical problems away from other patients and unrelated staff members. Privacy for communication (phone conversations, fax transmissions, patient/nurse conversations) was increased by reducing noise, by spatially arranging furniture, and by locating phones, computers, faxes, and intercoms in areas with acoustic controls (Butin, 2000;

Carpman et al.). Exam rooms should have movable walls, cubicle curtains, or partitions; and areas for ill students should be physically separated from the rest of the nurse's office. These suggestions support the student's psychological and social need for privacy (Butin; Carpman et al.).

Heating, Ventilation, and Air Conditioning Elements

The Council of Educational Facility Planners International (CEFPI) (1978) stated that the "inappropriate use of windows can cause undesirable heat loss during the winter months as well as heat gain during the summer months, and in the process, wastes valuable and expensive fuel supplies" (p. 9). The American Institute of Architects (AIA) (1987) stated that the use of windows for ventilation and lighting reduced heat gain. Reicher (2000) reported that K-12 schools in the United States "spent more than $6 billion a year on energy" and that at least 25% of that money could have been saved through smarter energy management (p. 2). Gonchar (2002) completed a study on new schools in southern California that used daylighting and natural ventilation to produce a 43% savings in utility costs. The Center for Health and Health Care in Schools (2001) recommended that the system for the health room/clinic should have a separate control that can be operated outside of school hours if necessary.

Day (1980) reported that control of the thermal environment in a building was important to the occupants. Cold temperatures caused muscles to tighten and extreme heat encouraged poor posture and too much relaxation. Optimal temperatures as well as correct moisture, dryness, and movement of air were necessary for effective learning or performance of tasks. Day stated that thermal stress occurred and performance deteriorated rapidly when temperatures were too high or too low in a room. Gappell

(1991) reported “alertness and vitality were enhanced through tactile sensations” and that air quality and thermal comfort were perceived through the skin (p. 118).

Lyons (2002) reported that indoor irritants and indoor air pollution were adverse environmental conditions in schools that had a negative impact on children’s health and the ability to learn. He further stated that “schools have four times as many occupants per square foot as offices, and they contain a host of pollution sources, including lab chemicals, cleaning supplies, chalk dust, and mold” (p. 2). Lyons claimed that faulty room temperatures and poor air circulation were caused by poor design, inadequate maintenance, and inefficient and outdated heating, ventilation, and air-conditioning systems in schools. In addition, Lyons pointed out that school children were more vulnerable to these adverse environmental conditions because “they have higher breathing and metabolic rates than adults and less fully formed biological defense mechanisms” (p. 2).

Asthma, drowsiness, lethargy, and the inability to concentrate were linked to indoor air pollution and indoor irritants (U.S. Environmental Protection Agency, 2004; Lara, et al., 2002). Gappell (1991) stated that research indicated that ordinary houseplants were effective “in removing toxic pollutants—formaldehyde, benzene, and trichloroethylene— from air inside buildings” (p. 118).

Electrical and Plumbing Elements

The American Institute of Architects (AIA) (1987) stated that electrical outlets should be provided in all spaces as required by code, automatic emergency lighting must be provided for safe egress from the building in event of a power failure, and a fire alarm system must be installed. Dimmer switches should be placed on lights. The

Center for Health and Health Care in Schools (2004b) recommended that the electrical circuit for the refrigerator and the ice machine should be active at all times. In addition, any piece of furniture or equipment that needed electrical or plumbing connections should have its requirements specifically identified, and the school's intercom system should be available to clinic staff. Additional outlets, seating, and counter spaces should be provided for students to use personal nebulizers in the treatment of asthma. McKibben and DiPaolo (1997) recommended at least 12 accessible outlets throughout the nurse's office and the bathroom area.

Hawkins and Lilley (1998) stated that water was essential in the clinic. AIA (1987) suggested sinks in exam rooms or patient areas should be equipped with single lever blade handles that could be operated without hands. Leckie (1999) recommended enclosing plumbing pipes behind a false wall creating a smooth hard surface that was easier to clean. Pipe penetrations and joints should be tightly sealed to prevent or minimize entry of rodents or insects (AIA, 1987; Noskin & Peterson, 2001). Jelliffe and Schipp (2002) reported that some school districts required shower space in the clinic to accommodate students with special needs and two sinks—one in the treatment area and one in the restroom. McKibben and DiPaolo (1997) suggested an eye wash should be located on the sink in the treatment area.

Acoustics Recommendations

Day (1980) reported that numerous studies documented that noise caused physiological effects of "nausea, fatigue, headaches, and loss of muscular coordination" (p. 6). Day recommended draperies, shades, bulletin boards, and carpeting as effective materials to soften sound in a school.

Gappell (1991) and Rouk (1997) stated that noise in a healthcare facility produced a generalized stress reaction, physiological changes in the blood capillary structure—impeded flow of red blood cells and constricted vascular channels—which caused high blood pressure, heart disease or ulcers. Both authors wrote that noise also caused decreased productivity, increased absenteeism, and adverse visual perception. As a stressor, noise caused irritation, frustration, and anger in healthcare staff and patients. Rhythmic and soothing music in the healthcare environment controlled heart rate and lowered blood pressure and masked normal conversation (Frasca-Beaulieu, 1999; Malkin, 1990,). According to Frasca-Beaulieu, the sound of bubbling water in a fish tank provided distractions from noise and reduced restlessness in children.

Malkin (1990) stated that sound control especially in examination rooms was important. Malkin suggested the following to reduce sound transmission between rooms: (a) use of carpet, wall coverings, draperies and acoustic ceiling tiles; (b) use of solid-core doors; (c) Fiberglas batting inside walls; (d) avoidance of acoustical holes created by pocket doors, electrical outlets, plumbing pipes, and heating ducts; (e) a separate ceiling for each room; and (f) special attention for rooms for hearing tests.

Hard walls and floors in schools created poor acoustics with sounds being amplified and reflected, causing noise. Day (1980) and Lyons (2002) reported that noise in schools interfered with learning and contributed to hearing problems. Lyons reported that students with hearing problems were more likely to repeat a grade, and noise affected elementary students more because children did not discriminate sounds from background noise until the teen years.

Johnson (2001) recommended installation of acoustic liners in ductwork for HVAC systems to eliminate noise. The liners made from melamine foam did not contribute to indoor air pollution and did resist fungal and microbial growth. Noskin and Peterson (2001) advocated that false ceilings be avoided in high-risk areas because this type of ceiling might harbor dust and pests that could contaminate the health care environment if the ceiling were disturbed in any way.

Wall/Ceiling Recommendations

Alexander (1972) stated that the specific function of walls affected the types of materials used to construct the wall. Walls provide privacy, absorb or reflect sound, and provide insulation against noise, heat, and cold. Johnson (2001) recommended high-density vinyl barriers inside walls and vinyl barriers above suspended ceilings, as well as foam sound-absorbing panels on walls and ceilings to stop noise and aid in acoustical control.

Alexander (1972) recommended light paint colors on walls and ceilings to make rooms look larger and gloss or semi gloss paint that withstands washing with modern cleaning products. Jelliffe and Schipp (2002) recommended epoxy paint for concrete block walls. Epoxy was durable, easy to clean, and could be used on drywall. Walls and ceilings should have a smooth and moisture resistant surface that is easy to clean with minimal likelihood of dust accumulation (AIA, 1987; Noskin & Peterson, 2001).

Malkin (1990) suggested vinyl or woven wall coverings that were mildew resistant and could be cleaned with bleach in a medical facility. Stucco and sand-finished textured walls were not recommended because these finishes collect dirt and were

difficult to clean. Malkin stated that paneling and fabric wall coverings were suitable for waiting areas.

AIA (1987) stated that the minimum ceiling height should be “7 feet 10 inches or 2.38 meters” (p. 69). Malkin (1990) recommended a suspended acoustic tile ceiling that allowed access to electrical and mechanical equipment. Noskin and Peterson (2001) stated that acoustical tiles should be avoided in high-risk areas because these tiles support microbial growth when wet. Plastic or vinyl-coated acoustic ceiling tiles were recommended for areas where sanitation was important since this type of tile was easy to clean and minimized bacterial growth (Jelliffe & Schipp, 2002). Iin winning designs for healthcare facilities, Croswell (2000) reported the use of staggered ceiling planes and indirect lighting to give the illusion of natural light.

Flooring Recommendations

Rosenfield (1972) detailed the following changes in flooring in hospitals since the 1900s: from white flooring, to brown battleship linoleum, to mottled linoleum called *jaspe*, to colorful rubber, to asphalt tile, to vinyl, and to carpeting. Alexander (1972) stated that carpeting suitable for use in schools added calmness, ease, and comfort to the environment, plus carpet eliminated noise problems. Day (1980) wrote that temperature in a building was easier to control and less costly to maintain when carpet was used on floor surfaces. Simmons, Reizenstein, and Grant (1982) reported that researchers found that a low-pile carpet without a pad was functional in a healthcare facility if it did not impede handicapped users, and carpeting accentuated noise control. Carpman et al. (1986) recommended carpeting for hallways and suggested that

carpeting was a way to “humanize the health care environment” (p. 83). McKibben and DiPaolo (1997) suggested that carpeting could be used in the nurse’s private office.

Malkin (1990) recommended four types of flooring for medical facilities: carpet, vinyl composition tile (VCT), sheet vinyl, and ceramic tile. Fogarty (1998) stated that floor coverings for medical facilities must meet stringent healthcare codes such as infection control and fireproofing. “Carpets that were 100% solution-dyed nylon with a solid vinyl backing with mechanically welded seams form a moisture-tight, hygienic floor covering” (Fogarty, p. 4). Ceramic tile was recommended for wet areas; however, sheet vinyl was less expensive, had fewer seams, and provided a self-coved base (All in a Day’s Work, 1999; AIA, 1987; Malkin). Clinic areas should have flooring that has a nonslip surface, is durable, has antibacterial properties or is not affected by germicidal or cleaning solutions, is easy to clean and maintain, and has attractive patterns and colors (AIA, 1987; Designer Floors, 2000; Jelliffe & Schipp, 2002; McKibben & DiPaolo, 1997).

Burr and Sullivan (2000) suggested the use of natural materials or products that could be replenished and recycled. Renzi (2001) stated that winning designers of health care facilities “selected natural and recycled materials such as vegetable-dyed wool, cork, and wood fiber acoustical tiles to ensure minimal toxicity to the human body as well as Mother Nature” and that “concrete, limestone, and linoleum floors…optimize air quality” (p. 204).

Door Recommendations

Alexander (1972) reported that doors added privacy, safety, and security to the health care environment. Alexander suggested folding or pocket doors to provide

flexibility in school settings. Malkin (1990) discouraged use of pocket doors for privacy issues and recommended solid core doors. Kennedy (2002) stated that doors must be durable to withstand use by children, and Bar & Galluzzo (1999) reported that doors must meet federal accessibility guidelines and local fire and building codes. AIA (1987) recommended "a minimum door width of 2 feet 10 inches or 86 cm for patient use" and "flush threshold and expansion joints to facilitate use of wheelchairs, carts and stretchers in the clinic area" (p. 69).

Wayfinding

Wayfinding adds a sense of control and assists persons in finding their destination. Frasca-Bellieu (1999) stated that wayfinding elements in a health care facility include special lighting, use of different colors on walls, special artwork, signage, and even furniture. Patterning and designs in flooring added to the well-being of patients and were an aid in wayfinding (Burr & Sullivan, 2000; Designer Floors, 2000).

Design Classifications of an Elementary Health Care Clinic

Researchers suggested specific rooms in the design of the clinic. The recommended rooms were the waiting area, the nurse's office, the treatment room, the rest or isolation area, and the restroom. Identified design classifications included the following: size and space elements; general design elements; location in the school; accessibility to the clinic; security, storage, and safety elements; and furnishings or treatments for the clinic (AIA, 1987; Butin, 2000; *Floor Plan*, 2003; Frasca-Bellieu, 1999; Gappell, 1991; The Center for Health and Health Care in Schools, 2004a & b; Johnston, 1977; Malkin, 1990; Ulrich, 1990).

Components, Size and Space Requirements

Johnston (1977) stated that space requirements were determined by staffing requirements and the primary purpose and use of the space. Hubler (1996) recommended that a health center include an office for the nurse, storage space for student records, beds for ill students, a bathroom (toilet), and appropriate space for vision and hearing testing. Hawkins and Lilley (1998) stated that guidelines for an elementary school nurse's office varied from 200 to 500 square feet. Hawkins and Lilley (1998, p. 38), Perkins (2001, p. 30), and the Center for Health and Health Care in Schools (2004b, Appendix 1) recommended the following room and space requirements:

Room:	Hawkins & Lilley Square Footage	Perkins Square Footage	Maryland Clinics Square Footage
Nurse's office	150 - 175	150	60 - 120
Exam room	275 - 300	80	80 - 100
Waiting area	100 - 150	200	75 - 200
Rest area	100 - 150	150	100 - 200
Bathroom (toilet)	30 - 40	80	50 - 120

Jelliffe and Schipp (2002) stated that school health clinics should meet the specific requirements of each school and suggested an allocation of 300 to 500 square feet. The authors stated that the size of the clinic should be planned according to the school enrollment as well as "the specific approach that the district may take in treating and caring for students who are ill or have minor injuries" (p. 96).

McKibben and DiPaolo (1997) recommended a minimum of 650 square feet of office space and a bathroom with approximately 130 square feet. The authors suggested that the nurse's office be divided into four areas: (a) a waiting /rest area, (b)

a treatment area for injuries and medications, (c) a privacy/conference/isolation area, and (d) a bathroom area.

Location of the Clinic

The Center for Health and Healthcare in Schools (2004b) stated that the health center should be located with an adjacent public parking area with outdoor lighting, signage should be prominent to mark the way and entrance to the health center, and medical emergency vehicles should have access to the health center. The health center should be easily closed off from the remainder of the school without affecting restroom use or external access.

Researchers suggested that the nurse's office be located near the administrative offices (Butin, 2001; Castaldi, 1994; Hawkins & Lilley, 1998; Hubler, 1996; Jelliffe & Schipp, 2002; McKibben & DiPaolo, 1997; Perkins, 2001). Locating the clinic in the administrative area allowed administrative staff to monitor the clinic and to be near medications when the nurse was not on site and this location facilitated parent access when students were signed out for illness or injury (Jelliffe & Schipp). Placing the guidance suite next to the clinic provided effective use of a shared conference room (Jelliffe & Schipp; McKibben & DiPaolo).

In addition, Jelliffe and Schipp (2002) recommended that the locations of playgrounds and clinics be considered at the elementary school level since injuries on the playground required "quick access from outdoors to the clinic" (p.97). In a study involving school-based emergency medical services for children ages 5 to 18, the researchers concluded that school-based emergency incidents were more often attributable to injury—falls and other trauma—and other medical illness. The most

frequent type of injury was a fracture or dislocation in a lower extremity, and the chief medical illnesses were breathing difficulties and seizure (Knight, Vernon, Fines, & Dean, 1999).

Accessibility to the Clinic

Krent, Cairns, and Dodge (1993) stated that federal requirements for accessibility were required with renovation of existing buildings and with new buildings. The two design standards were (a) the Uniform Federal Accessibilities Standards (UFAS) (1984) and (b) the American with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG) (2002). Both standards had stringent requirements for making buildings accessible to persons with disabilities. All buildings had to meet very specific and extensive design standards that governed everything from the need for elevators and the number of accessible bathrooms to the type of installed drinking fountains. Architects for a school determined the more appropriate standard to use for a specific building. Johnston (1977) and Carpman, et al. (1986) recommended doors wide enough for a stretcher and ample spaces for wheelchairs and other emergency equipment.

Waiting Area for the Clinic

Waiting areas should be located away from general corridors (Butin, 2000). Johnston (1977) suggested that the waiting area should be large enough to separate patients, should be attractive, and should provide seating that is firm and stable. Chaney (1973) recommended gold, blue, and terra cotta colors in the waiting area.

Carpman, et al. (1986) reported a research study in 1984 that investigated seating in the waiting area of a hospital. The study found that seating needed individual armrests to assist patients in sitting down and rising and to provide a sense of

separation from the next person. In addition, “the difference in comfort was statistically related to the presence or absence of armrests” (p. 111).

AIA (1987) and Jelliffe and Schipp (2002) suggested two exits in the clinic space: from a main corridor for the student and parent and through the office. AIA stated that the “minimum width for the main corridor should be 5 feet or 1.52 meters” (p. 68). Malkin (1990) recommended wall-mounted lighting with 20 foot-candles of illumination. Malkin stated that using wall-mounted lighting reduced glare and gave better color rendition to interior finishes.

Nurse’s Station/Office in the Clinic

Davini (1952) advised use of light colors in cool or warm colors and bright accents in the nurse’s area. Chaney (1973) suggested a pumpkin color for the nurse’s station since this color was a “visual and psychological stimulus for employees” (p. 65).

AIA (1987) reported that the nurse’s station should have a work counter, communication system, provisions for charting patients, and a space for needed supplies. Butin (2000) recommended that the nurse’s office be equipped with access to an intercom; cable connections for a telephone, fax and computer; modem access to the Internet; and electrical connections to support a computer and other needed equipment.

Rosenfeld (1971) suggested built-in fluorescent lighting for the medicine cabinet at the nurse’s station. AIA (1987) stated that a drug distribution station should be a part of the nurse’s station. This station should be equipped with a work counter, sink, refrigerator, and “locked storage for biologicals and drugs” (p. 68).

Malkin (1990) recommended a maintained illumination of 100 foot-candles for the nurse's station. Grocoff (1995) reported that indirect lighting eliminated shadows and spaces appeared brighter and required less lighting. Mosher (2003) suggested "recessed 2 X 2 pendants" as indirect lighting around computers for the "right combination of direct and indirect lighting" (p. 114). Jellife and Schipp (2002) suggested a display space for the nurse to post health bulletins and emergency first aid procedures. Decorative accessories for the nurse's station should include "a perpetual calendar and a clock" (Malkin, 1990, p. 430).

McKibben and DiPaolo (1997) reported that office area for the nurse could be placed in the waiting area or privacy area. The waiting area would have a cot for every 300 students and would have chairs for students waiting for treatment. The privacy area, an enclosed multipurpose area that would have a cot for isolating a student, a chair, and a telephone or a telephone jack, should have a window that provides a view out of and into this room. A desk placed in either room could serve as the office area for the nurse. "The nurse's office should have its own set of controls for heating and air conditioning" (p. 27).

Examination/Treatment Room in the Clinic

The exam room should be located away from corridors and phone/work areas to minimize noise and to facilitate hearing tests (Butin, 2000). AIA (1987) recommended a minimum of 80 square feet for the exam room. If the exam room and office area were combined then the room should be at least 120 sq. ft. to provide adequate office and exam space (Johnston, 1977).

The examination room should be at least 22 feet long and should have artificial light with special attention given to the lighting and ballasts selected for the space that will be used for vision and hearing testing (Butin, 2000; The Center for Health and Health Care in Schools, 2004b). Malkin (1990) stated that a corridor at least 20 feet in length could serve for vision testing and a small 8x8 foot soundproofed space could serve as a hearing test room (p. 91).

Johnston (1977) advised painting the room in light tones, preferably blues or greens, for good light retention and avoiding bright yellows or oranges because “these colors could affect skin tones of patients” (p. 16). Boyce (1981) suggested that lighting for the exam room should have a high CRI to obtain correct skin tones and truer colors. Malkin (1990) recommended “two four-lamp (2 x 4 ft.) recessed or surface mounted lights for the exam room to maintain a light level of 100 foot-candles” (p. 436).

Jelliffe and Schipp (2002) suggested that exam/treatment rooms should have vinyl composition tile or seamless resilient flooring. The exam room door should be “at least 2 ft. 10 inches to accommodate wheel chairs” (Johnston, 1977, p. 17). The exam room should be equipped with a sink with hot and cold water, a writing shelf, a mirror, movable partitions, and a bed (AIA, 1987; Butin, 2000; The Center for Health and Health Care in Schools, 2004b; Johnston, 1977). Castaldi (1994) and Noskin and Peterson (2001) recommended a sink large enough to prevent splashing. Castaldi suggested “a gooseneck faucet” (p. 275), while Malkin (1990) stated that “the sink should be equipped with a hands-free soap dispenser, blade handles, a paper towel holder, access to gloves, and a trash receptacle nearby” (p. 356).

Johnston (1977) stated that cabinetry should provide storage under the sink and to one side of the sink area. “The surface of the cabinetry would provide a writing surface” (p. 17). Malkin (1990) advised locating the sink and cabinetry on the wall with the door or on the wall initially seen as one walks into the room. This location provides “immediate access for the nurse to use the sink for washing hands” (p. 41). The sink cabinet should be a minimum of 48 inches long, 24 inches deep, and 36 inches high, and should have finish that is not painted. Malkin suggested “a wall hung writing shelf at the end of the sink cabinet with a rolling stool stored underneath the shelf” (p. 40).

Johnston (1977) and Malkin (1990) stated that windows were not necessary in the exam room. For dermatology use, Malkin (1990) advised putting windows 42 inches off the floor, creating privacy in the exam room, and glazing used on the window “should be gray, not bronze, because the latter tends to make skin look jaundiced” (p. 14). In addition, Malkin recommended that slatted metal window blinds or vertical blinds be used to provide privacy without sacrificing light or view. Fogarty (1998) suggested glass-block windows in exam rooms.

“The exam room door should open away from the wall so the patient is shielded from view; a pocket door could be used with pediatric patients” (Malkin, 1990, p.78). Doors with obscure glass were recommended in the treatment area to provide privacy (Jelliffe & Schipp, 2002). The Center for Health and Health Care in Schools (2004b) stated that exam rooms should have “acoustical treatments that provide privacy for conversations between patient and provider” (p. 13).

Malkin (1990) suggested that pediatric exam rooms have two electrical outlets—one over the sink cabinetry and one near the exam table or bed. Outlets should be

located out of reach of small children. The exam table should be placed against the wall for pediatric patients, and the specifications of the exam table are “27 inches wide and 54 inches long with a pullout footboard” (p. 44). In addition, Malkin advised that the exam room should be designed very functionally, and “the furnishings should relax the patient so vital signs are at normal levels” (p. 39). Patterned tile or sheet vinyl floors, use of colorful wall coverings, and “artwork appropriate for children should be placed in the exam room” (p. 82).

Rest Area in the Clinic

Castaldi (1994) stated that “a small room, separate but adjoining the examination room in the health suite, should be provided for children who become ill during the school day” (p. 275). Davini (1952) suggested colors in the rest area that provided “a build up in spirit”. Chaney (1973) recommended curtains around the bed that “create a snug, secure and self-contained environment which can be anxiety-reducing for patients” (p. 63). Jelliffe and Schipp (2002) advised that the rest area for ill students have “cots with vinyl-coated cubicle curtains and a dimmable light fixture for each cot” (p. 96). The Medical Center of Georgia (2000) recommended recliners rather than beds in the rest area.

Restroom (Toilet) in the Clinic

Hawkins and Lilley (1998) stated that restrooms or toilet areas were essential in the clinic. Davini (1952) recommended washable, semi-gloss paint in soft greens, blues, or pinks with darker accent colors for the lavatory area. Jelliffe and Schipp (2002) stated that ceramic mosaic tiles were resilient, easy to clean and maintain, and provided a safe floor option for restrooms in medical clinics.

McKibben and DiPaolo (1997) reported that the bathroom should be well lighted, ventilated. Bar and Galluzzo (1999) added that the toilet area should be wheelchair accessible with a grab bar next to toilet. Additional suggestions for the restroom included a changing table, a washer, a dryer, a shower area with a seat, and a storage area for equipment and supplies to meet the needs of special needs students (McKibben & DiPaolo).

Security, Storage and Safety for the Clinic

Johnston (1977) suggested that medical records be kept in a separate room if records were kept on open shelves. Locking file cabinets for records and locking storage cabinets for medications, supplies, and first aid materials were recommended (AIA, 1987; Butin, 2000; The Center for Health and Health Care in Schools, 2004 a & b; Hubler, 1996; and Jelliffe & Schipp, 2002). Rosenfeld (1971) suggested that “equipment and storage cabinets have fluorescent lights mounted in them” (p.78). Frasca-Beaulieu (1999) recommended “lockable areas for staff and student personal items” (p. 69). A refrigerator with locking compartments was suggested to store medicine requiring refrigeration (Jelliffe & Schipp). Provisions should be made for the disposal and removal of medical wastes, in accordance with the MOSHA law, and a separate security system should be available for the clinic area (*Floor Plan,* 2003; The Center for Health and Health Care in Schools, 2004b).

Safety glass, wired glass, or plastic glazing materials that resist breakage and create no cutting edges when broken were viewed as necessary for doors and sidelights. “Windows should be glazed to within 18 inches or 46 cm of the floor” (AIA, 1987, p. 69).

Furnishings and Treatments of the Clinic

Special adaptations were made in medical facilities to promote cleanliness and to prevent transmission of germs. Rosenfield (1972) credited Edward R. Stevens, *The American Hospital of the 20th Century,* with present day use of door hooks for opening and closing doors, flush door saddles, and blade faucet control.

Surface areas in a health care facility should be aesthetically appealing but easily cleanable and water resistant (Center for Health and Health Care in Schools, 2004a; Noskin & Peterson, 2001). Noskin and Peterson stated that medical facilities "modified their design to provide a safer environment for infection control" (p. 354). Modifications included wall coverings, walls and ceilings that were fluid resistant and easily cleanable in areas where contact with blood and body fluids may occur. "In general, microorganisms do not readily adhere to walls and ceilings unless the surface becomes moist, sticky or damaged" (p. 356).

Malkin (1990) recommended "changes in lighting, accent walls, and artwork" for clinics to stimulate the nervous system of patients and a "more interdisciplinary, holistic approach" to interior design of clinics, where each part of the design affected all the other parts (p. 421). Frasca-Beaulieu (1999) suggested that the interior design of a healthcare facility reflect an understanding of the specific population and cultures by using cultural artwork, artifacts and furnishings, and that ease of access, comfort, convenience, and efficiency were important issues for designers to consider. Frasca-Beaulieu recommended warm colors and residential type furnishings to bring an "inviting, homelike, user friendly, familiar and relaxing décor for the medical facility" (p. 70).

Grangaard (1993) and Rouk (1997) cautioned against “visual noise” or the use of too many wall decorations. Grangaard advocated for the return “to environments more empathetic with our caveman subconscious: sunlight; clean, fresh air; the colors of earth and sky“ (p. 109). Ulrich (1990) pointed out negative distractions that were difficult to ignore and became stressful for patients. In addition, Ulrich pointed out that televisions in waiting rooms, use of abstract art, and “close-up pictures of animals staring directly at the observer may be disturbing to anxious patients” (p. 100).

The healthcare space can be enriched by using a variety of fabrics and finishes and using differing scale in furnishings. Gappell (1991) stated that properly chosen furnishings with “rounded corners and ergonomically designed furniture” insured bodily comfort (p. 118). According to Gappell, an environment including furniture scaled for young children enhanced their sense of independence. Fogarty (1998) quoted L. Bradford Perkins, “Manufacturers are finally coming up with stylish--yet code-compliant products for healthcare…environments” (p. 4). Fogarty recommended “use of real photos of children of diversity, painted ceiling tiles, vinyl wall coverings, and sophisticated colors in medical facilities for children” (p. 70).

The Center for Health and Health Care in Schools (2004b) stated that movable furniture and equipment for each space of the clinic should be identified. Required items identified for clinics in Maryland were bulletin boards, desks, tables, chairs, bookcases, display cases, cots or beds, locked storage cabinets for medications, syringes, etc., file cabinets, magazine racks, display racks for brochures, marker boards/chalkboards, children's toy chest, computer terminals and printers, telephones, photocopier, wall clocks, refrigerator, freezer, and specialized medical/dental equipment.

The Medical Center of Georgia (personal communication, June 25, 2000) required the following equipment/supply list for the school clinic: scale, trays/mailbox holder for instruction sheets, logs, medications, oxygen tank with stand, xmas tree connector/O2 key, drinking cups, soap, arm boards, arm sling, Kleenex, bio-hazard container, gloves, syringes, bleach, heating pad, batteries, telephone, copier, computer, printer, fax, and calculator. Malkin (1990) stated that a "portable high-intensity light" may be needed for examinations (p. 436).

Additional office equipment recommended by The Center for Health and Health Care in Schools (2004a) was a desk, chairs, bookcase, locking file cabinet, answering machine, and supply cabinets with locks. Additional medical equipment was a wall mount blood pressure gauge or cuffs (adult/child), wall mount otoscope-opthamaloscope, wall mount sharps container, thermometer, peak flow meter, accucheck, scoliometer, tympanogram, hemocue, refrigerator/freezer, microscope, nebulizer, eye chart/eye cover, single container for crash cart supplies, and step-on garbage cans.

Ulrich (1990) suggested that healthcare designers be sensitive to the needs of the group being served in the facility and that the environmental design of the facility "fosters a sense of control, access to social support, and access to positive distractions for the patients" (p. 100). "Space for and use of a music system should be provided" (Malkin, 1990, p. 449).

Conclusion

The role and the responsibilities of the school nurse continue to be dependent on the needs of the students served and the availability of funding sources in the community. The school continues to be an efficient site for health care delivery; however, it is highly unlikely that funds will be available to implement fully staffed and equipped school-based clinics at each school. Communities and boards of education should make use of the school nurse—the professional who represents a host of dedicated professionals working in the field of school health care.

New school facilities will continue to be built and existing school facilities will be renovated as needed. This study offered professional school nurses, as well as architects, builders, consultants and planners of school facilities, an opportunity to express their perceptions about design characteristics for an elementary school health care clinic. These design characteristics may be used to write state facility guidelines for school clinics that could assist school nurses and delegated school personnel in meeting the health care needs of students more effectively.

CHAPTER 3

DESIGN OF THE STUDY

Design standards and elements are needed for each component or room in the school building. Literature about successful classroom and school design existed and literature about successful designs for hospital and ambulatory care facilities was available; however, research on design for school clinics in elementary schools was very limited. There was little published literature to inform or guide designers, facility planners, builders, architects, or researchers about successful school clinic design.

A review of the literature examined the relationship between health and learning, the factors that affected the health of students, the basis for using schools as a part of the healthcare delivery system, the history of school nurses, and the current roles and responsibilities of school nurses. The literature review provided the identification of design elements used in hospital and ambulatory care facilities and in successful school design. The purpose of this study was to compare perceptions of school nurses, architects, builders, consultants, and planners for school facilities regarding design characteristics of an elementary school health care clinic.

This study suggested that the staff of a clinic had expertise to offer regarding facility needs; hence, it offered professional school nurses, as well as architects, builders, consultants, and planners of school facilities, an opportunity to express their ideas about their facility needs. Specifically, this study compared the perceptions of

school nurses and the advisory panel concerning the design characteristics of an elementary school health clinic.

This chapter explained the specific steps taken to collect and analyze the data. The chapter was divided into the following sections: research questions, participants, instrumentation, method, and statistical treatment.

Research Questions

The research question that guided this study was: What were the perceptions of architects, builders, consultants, planners of school facilities, and school nurses concerning the key design elements for an elementary school health clinic?

1. Is there a statistically significant difference between the perspectives of practicing school nurses and the advisory panel regarding the 11 design classifications?
    a) Components (rooms), space, and size elements
    b) General design elements
    c) Location of the clinic
    d) Accessibility to the clinic
    e) Waiting area
    f) Nurse's station/office
    g) Examination/treatment room
    h) Rest/isolation area
    i) Restroom (toilet)
    j) Security, storage and safety for the clinic
    k) Furnishings and treatments of the clinic

2. Is there a statistically significant difference between the perspectives of practicing school nurses and the advisory panel regarding the 12 specific design clusters?
    a) Lighting/daylighting elements
    b) Windows elements
    c) Integration of nature elements into the design
    d) Promotion of a sense of well-being for users
    e) Use of color
    f) Privacy, space and confidentiality issues
    g) Heating, venting and air conditioning elements
    h) Electrical and plumbing elements
    i) Acoustics
    j) Wall/ceiling elements
    k) Flooring
    l) Door/wayfinding elements

Participants

The advisory panel included architects, builders, consultants, and facility planners of elementary schools. The second group of survey participants was a small group of four school nurses. The survey was administered to 100 school nurses attending the annual Georgia Association of School Nurses' conference.

Instrumentation

The researcher generated a demographics sheet for the survey. A comprehensive survey on 100 health clinic design elements was developed based on

the findings of the literature review. Spaces for comments or concerns for each design element were provided for the survey participants. A 10-point Likert Scale indicating the degree of importance for the design element, ranging from very low to very high, was used to rate each survey statement.

Method

A select group of four school nurses completed the survey for reliability, readability, and clarity. The survey was mailed to 12 selected members of the advisory panel to provide comparison data for the survey. Finally, the researcher attended the annual school nurses' conference in Savannah on July 25, 2004. One hundred school nurses attending the conference completed the survey.

Statistical Treatment

Descriptive procedures were used to produce means and standard deviations for the 11 design classifications and the 12 specific design elements. Likert scale questions were appropriate to print means for since the number that was coded for a question gave a direction for the average answer. A minimum and maximum value showed the range of answers given by the survey population. An item analysis was computed for each of the 100 design statements or variables.

According to SPSS, a Cronbach's alpha was computed to "measure how well a set of items (or variables) measure a single unidimensional latent construct. Cronbach's alpha is not a statistical test but is a coefficient of reliability (or consistency). In this study, identification of key design classifications for the health clinic was the latent construct. Cronbach's alpha was a function of the number of items and the average inter-correlation among these items. As the inter-item correlation increased, Cronbach's

alpha increased as well and there was evidence that the items were measuring the same underlying construct producing high reliability. The survey instrument provided a large number of statements for review. The high alpha for the 11 design classifications indicated consistency in measuring these classifications.

Tests for homogeneity of variances were computed for the 11 design classifications and the 12 specific design elements. To find out if there were significant differences between the means of the two groups—Group 1, practicing school nurses; and Group 2—architects, builders, consultants, and planners for school facilities— an analysis of variance (ANOVA) was computed for the 11 design classifications and for the 12 specific design elements.

CHAPTER 4

FINDINGS

This chapter presents the results of the surveys completed by seven members of the advisory panel and 104 practicing school nurses. The results, an analysis of the results, and a summary are included in this chapter.

Survey Results

Following the data collection procedures as described in Chapter 3, an analysis was conducted on the survey data. Data from 111 surveys were used. Respondents were divided into two groups—architects, builders, consultants, and planners for school facilities and school nurses. Demographic data were coded and entered as variables 1–31. Design element statements on the survey were considered individually, as design cluster variables, and as cluster variables for a specific design element.

A Likert scale of 1 to 10 was used to indicate the respondent's perception of the importance of the statement to the design of a health clinic in an elementary school. This analysis reported the degree of importance for each statement and for each cluster in the survey. Results for each cluster, for specific design elements clusters, and differences between groups are discussed and presented in tables in this chapter.

Design Cluster Variables

Eleven design cluster variables were identified and abbreviated for reporting purposes. These design cluster variables occurred naturally on the survey instrument with the first statement on the survey coded as variable 32. Assigned variable numbers

are in parentheses at the end of each statement on the survey in Appendix A. An item analysis in Appendix B was completed on each of the 100 variables.

The first design cluster for components, size and space requirements (CSSR), had five statements, variables 32--36. The general design elements (GDR) cluster had 13 statements, variables 37--49. Location of the health clinic (LOC) had 7 statements, variables 50--56. Accessibility (ACC) had three statements, variables 57--59. The waiting area (WAIT) had six statements, variables 60--65. The nurse's office (NOFF) had 16 statements, variables 66--81. The treatment room (TRRM) had 26 statements, variables 82--107. The rest/isolation area (ISOL) had five statements, variables 108--112. The restroom or toilet room (RESTR) had nine statements, variables 113--121. Security, storage and safety (SSS) had six statements, variables 122--127. Furnishings and treatments (FURN) had four statements, variables 128--131.

Reliability

The internal consistency of the survey statements was calculated with an alpha coefficient or Cronbach's alpha since the survey was administered only one time to the expert group and the group of practicing nurses; and a Likert scale was used to indicate preference rather than right versus wrong answers. Cronbach's alpha is a function of the number of items and the average inter-correlation among the items. The inter-item correlation produced a satisfactory alpha for each design cluster variable. Since the inter-item correlations were high, there was evidence that the items were measuring the same underlying construct. Table 1 reports the standardized alpha for each of the design cluster variables. The reliability coefficient of .65 or higher was accepted by the researcher

Design Cluster Variables

Table 1 displays the descriptive statistics for the 11 design cluster variables for all respondents. All design cluster variables were perceived as having at least a medium degree of importance to clinic design. The mean score for components (rooms), size and space requirements (CSSR) received the highest score of 8.86, and the isolation room (ISOL) score of 5.77 was the lowest mean score.

Analysis for Design Cluster Variables

The research question was stated as follows: Is there a statistically significant difference between the perspectives of practicing school nurses and the advisory panel regarding the 11 design classifications? The means and standard deviations for the perspectives of the two groups are given in Table 2. Group 1 identified school nurses, and Group 2 identified the advisory group— architects, builders, consultants, and planners of school facilities.

Table 2 also shows the variances for the tests of homogeneity. Since all significance levels were greater than .05, the variances were found to be homogeneous and the spread or variance of mean scores for the two groups, nurses and the advisory panel , was approximately equal

Table 3 displays the statistically significant differences between the two groups for the following variable clusters: CSSR, WAIT, NOFF, and TRRM. For example, regarding the cluster representing components (rooms), size and space (CSSR or statements 1 through 5) $F_{1,109} = 4.40$, $p \leq .04$. Further investigation revealed that the Nurses perceived these items to be significantly more important than did the advisory panel (Mean for Nurses = 8.93; Mean for Panel = 7.89).

Table 1

Descriptive Statistics for Design Cluster Variables

Cluster	Statement Number	Variable Number	Standardized Alpha	N Valid/ N Missing	Mean	Standard Deviation
Components or Rooms, Space, and Size Requirements (CSSR)	1 - 5	32 - 36	.74	111/0	8.87	1.30
General Design Elements (GDE)	6 - 18	37 - 49	.91	111/0	6.83	1.77
Location of the Health Clinic (LOC)	19 - 25	50 - 56	.77	111/0	6.82	1.64
Accessibility (ACC)	26 - 28	57 - 59	.69	111/0	7.05	1.94
Waiting Area (WAIT)	29 - 34	60 - 65	.84	110/1	6.22	1.96
Nurse's Office (NOFF)	35 - 50	66 - 81	.93	111/1	7.97	1.48
Treatment Room (TRRM)	51 - 76	82 - 107	.96	110/1	6.97	1.84
Rest/Isolation Area (ISOL)	77 - 81	108 - 112	.88	111/1	5.77	2.41
Restroom or Toilet (RESTRM)	82 - 90	113 - 121	.81	111/1	7.03	1.86
Security, Storage, and Safety (SSS)	91 - 96	122 - 127	.80	111/0	7.29	1.81
Furnishings and Treatments (FURN)	97 - 100	128 - 131	.85	110/1	6.60	2.24

Table 2

Group Statistics for Design Cluster Variables
Group 1 - Nurses; Group 2 –Advisory Panel of Architects, Builders, Consultants, Planners

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Components, Space, and Size (CSSR)	1	104	8.93	1.23	4.00	10.00	2.44	1,109	.12
	2	7	7.89	1.90	5.20	10.00			
	Total	111	8.86	1.30	4.00	10.00			
General Design Elements (GDE)	1	104	6.88	1.78	1.77	9.85	.63	1,109	.43
	2	7	6.01	1.53	2.85	7.46			
	Total	111	6.83	1.77	1.77	9.85			
Location of the Health Clinic (LOC)	1	104	6.88	1.62	2.14	10.00	.00	1,109	.96
	2	7	6.00	1.90	2.00	7.71			
	Total	111	6.82	1.64	2.00	10.00			
Accessibility (ACC)	1	104	7.06	1.93	1.67	10.00	.08	1,109	.78
	2	7	6.81	2.24	3.33	10.00			
	Total	111	7.05	1.95	1.67	10.00			

Table 2 Continued

Group Statistics for Design Cluster Variables:
Group 1 - Nurses; Group 2 – Advisory Panel of Architects, Builders, Consultants, Planners

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Waiting Area (WAIT)	1	103	6.34	1.92	1.67	10.00	.08	1,108	.76
	2	7	4.50	1.87	2.33	7.33			
	Total	110	6.22	1.96	1.67	10.00			
Nurse's Office (NOFF)	1	104	8.11	1.30	2.19	10.00	1.91	1,109	.17
	2	7	5.95	2.39	1.13	8.88			
	Total	111	7.97	1.48	1.13	10.00			
Treatment Room (TRRM)	1	103	7.09	1.81	1.58	10.00	1.04	1,108	.31
	2	7	5.33	1.38	3.46	7.46			
	Total	110	6.97	1.84	1.58	10.00			
Rest/Isolation Area (ISOL)	1	104	5.84	2.43	1.00	10.00	.62	1,109	.43
	2	7	4.66	1.92	2.00	7.20			
	Total	111	5.77	2.41	1.00	10.00			

Table 2 Continued

Group Statistics for Design Cluster Variables
Group 1 - Nurses; Group 2 – Advisory Panel of Architects, Builders, Consultants, Planners

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Restroom (RESTRM)	1	104	7.04	1.89	1.11	10.00	1.44	1,109	.23
	2	7	6.84	1.41	4.78	9.22			
	Total	111	7.03	1.86	1.11	10.00			
Security, Storage, and Safety (SSS)	1	104	7.35	1.83	1.33	10.00	2.29	1,109	.13
	2	7	6.36	1.13	4.67	7.67			
	Total	111	7.29	1.81	1.33	10.00			
Furnishings and Treatments (FURN)	1	103	6.70	2.26	1.00	10.00	2.70	1,108	.10
	2	7	5.21	1.27	3.25	6.75			
	Total	110	6.60	2.24	1.00	10.00			

*$p \leq .05$

Table 3

Analysis of Variance (ANOVA) for Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Components (rooms), Space, and Size Requirements	Between Groups	7.16	1	7.16	4.40	.04*
	Within Groups	177.57	109	1.63		
	Total	184.73	110			
General Design Elements	Between Groups	4.96	1	4.96	1.60	.21
	Within Groups	338.77	109	3.11		
	Total	343.73	110			
Location of the Health Clinic	Between Groups	5.04	1	5.04	1.88	.17
	Within Groups	292.29	109	2.68		
	Total	297.33	110			

Table 3 Continued

Analysis of Variance (ANOVA) for Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Accessibility	Between Groups	.41	1	.41	.11	.74
	Within Groups	415.69	109	3.81		
	Total	416.11	110			
Waiting Area	Between Groups	22.07	1	22.07	5.98	.02*
	Within Groups	398.31	108	3.69		
	Total	420.38	109			
Nurse's Office	Between Groups	30.60	1	30.60	15.92	.00**
	Within Groups	209.53	109	1.92		
	Total	240.13	110			

Table 3 Continued

Analysis of Variance (ANOVA) for Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Treatment Room	Between Groups	20.23	1	20.23	6.29	.01*
	Within Groups	347.19	108	3.22		
	Total	367.41	109			
Rest/Isolation Area	Between Groups	9.18	1	9.18	1.59	.21
	Within Groups	629.45	109	5.78		
	Total	638.63	110			
Restroom	Between Groups	.26	1	.26	.08	.79
	Within Groups	380.44	109	3.49		
	Total	380.70	110			

Table 3 Continued

Analysis of Variance (ANOVA) for Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean squared	F	p
Security, Storage, and Safety	Between Groups	6.46	1	6.46	1.99	.16
	Within Groups	354.22	109	3.25		
	Total	360.68	110			
Furnishings and Treatments	Between Groups	14.40	1	14.40	2.93	.09
	Within Groups	531.26	108	4.92		
	Total	545.66	109			

*$p < .05$ **$p < .01$

Regarding the cluster representing the waiting area (WAIT or statements 29 through 34) $F_{1,108} = 5.98$, $p \leq .02$. Nurses perceived these items to be significantly more important than did the advisory panel (Mean for Nurses = 6.34; Mean for Panel = 4.50). The cluster representing the nurse's office (NOFF or statements 35 through 50) $F_{1,109} = 15.92$, $p \leq .00$. Again, school nurses perceived these elements to be significantly more important than did the advisory panel (Mean for Nurses = 8.11; Mean for Panel = 5.95). Significance for the NOFF was at the $p < .01$ level. The cluster representing the treatment room (TRRM or statements 51 through 76) $F_{1,108} = 6.29$, $p \leq .01$. School nurses perceived these elements to be significantly more important than did the advisory panel (Mean for Nurses = 7.09; Mean for Panel = 5.33).

Analysis of Cluster Variables for a Specific Design Element

Statements for specific design elements were clustered and identified with abbreviations for reporting purposes. Twelve statements (variables 41, 42, 46, 62, 78, 80, 81, 85, 99, 103, 12, and 124) were clustered to represent lighting (LIGHTING) design elements. Window design (WINDOWS) contained four statements (variables 37, 38, 79, and 100). Three statements (variables 38, 79, and 80) represented integrating nature (NATURE) into the clinic design. Elements promoting a sense of well-being for users (WELLBE) had eight survey statements (variables 64, 65, 106, 108, 110, 128, 129, and 130). The cluster for use of color (COLOR) in a clinic design contained three statements (variables 43, 106, and 114). Privacy, space and confidentiality (PSC) elements in a clinic were the largest grouping of 11 statements (variables 63, 66, 68, 69, 82, 84, 97, 103, 108, and 110). Heating, venting and air conditioning (HVAC) had three statements (variables 38, 44, and 17). Electrical and plumbing elements

(ELEPLU)involved 10 statements (variables 69, 70, 72, 73, 74, 75, 88, 89 105, and 119). Acoustic elements (ACOUS) had six statements (variables 48, 49, 86, 103, 104, and 131). Wall/ceiling elements (WALCEI) involved five statements (variables 39, 40, 43, 48, and 114). Specific flooring elements (FLOOR) were presented in three statements (variables 49, 107, and 115). Doors and wayfinding (DOORWA) elements were given in seven statements (variables 47, 51, 57, 58, 59, 98, and 127).

Table 4 provides the descriptive statistical data used for determining the difference between groups regarding the 12 specific design elements. The means and standard deviations for the perspectives of the two groups are presented. Group 1 identified the practicing school nurses, and Group 2 identified the advisory panel of architects, builders, consultants, and planners for school facilities.

Table 4 also displays the test for homogeneity of variances. Significance ($p < .05$) for the cluster LIGHTING and the cluster ELEPLU (electrical/plumbing) was found. This significance indicated unequal variances between the mean scores for nurses and the advisory panel of architects, builders, consultants and planners for school facilities. Lighting and electrical/plumbing elements were not considered for further tests. The Levene's score for the remaining clusters was non-significant indicating that the spread or variance of mean scores for the two groups was approximately equal.

Table 5 shows statistically significant differences ($p < .05$, $p < .01$) between the advisory panel and nurses on the following specific design clusters: windows (WINDOWS); integrating nature into design (NATURE); promoting a sense of well-being for the user (WELLBE); privacy, confidentiality, and security elements (PCS); and, heating, ventilation, and air conditioning (HVAC). Regarding the cluster representing

Table 4

Descriptive Statistics for Specific Design Elements

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Lighting (LIGHTING)	1	64	6.52	1.83	1.75	10.00	4.44	1,67	.04
	2	5	4.62	.73	3.83	5.33			
	Total	69	6.38	1.84	1.75	10.00			
Windows (WINDOWS)	1	90	8.78	2.30	2.00	12.50	.08	1,95	.78
	2	7	6.32	1.95	3.50	8.50			
	Total	97	8.60	2.36	2.00	12.50			
Integrating Nature into Design (NATURE)	1	99	7.29	2.26	1.00	10.00	.09	1,104	.77
	2.	7	4.10	2.05	1.00	7.00			
	Total	106	7.08	2.37	1.00	10.00			

Table 4 Continued

Descriptive Statistics for Specific Design Elements

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Promotion of a Sense of Well-Being (WELLBE)	1	90	6.91	1.83	1.25	10.00	.01	1,95	.93
	2	7	5.16	1.85	2.38	7.63			
	Total	97	6.78	1.88	1.25	10.00			
Privacy, Security and Confidentiality (PSC)	1	91	7.27	1.73	2.00	10.00	.15	1,96	.70
	2	7	5.09	1.58	3.55	7.64			
	Total	98	7.11	1.80	2.00	10.00			
Electrical and Plumbing (ELEPLU)	1	99	8.44	1.36	1.60	10.00	5.31	1,104	.02
	2	7	6.51	2.32	2.60	9.40			
	Total	106	8.31	1.50	1.60	10.00			

Table 4 Continued

Descriptive Statistics for Specific Design Elements

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Doors and Wayfinding (DOORWA)	1	86	7.23	1.73	1.57	10.00	.10	1,91	.76
	2	7	6.51	1.58	4.00	8.57			
	Total	93	7.18	1.72	1.57	10.00			
Walls and Ceilings (WALLCEI)	1	84	7.03	1.87	2.40	10.00	3.27	1,88	.07
	2	6	7.77	1.05	6.20	9.20			
	Total	90	7.08	1.83	2.40	10.00			
Acoustics (ACOUS)	1	88	7.35	2.30	2.60	12.00	2.59	1,92	.11
	2	6	5.70	1.29	4.40	7.60			
	Total	94	7.25	2.28	2.60	12.00			

Table 4 Continued

Descriptive Statistics for Specific Design Elements

Cluster	Group	N	Mean	SD	Minimum	Maximum	Levene Statistic	Degrees of Freedom	Standardized Alpha
Color (COLOR)	1	94	6.88	1.99	1.67	10.00	.51	1,99	.48
	2	7	6.38	1.97	3.67	9.67			
	Total	101	6.84	1.99	1.67	10.00			
Heating, Ventilation and Air Conditioning (HVAC)	1	99	8.15	1.99	1.00	10.00	2.58	1,104	.11
	2	7	6.10	.79	4.67	6.67			
	Total	106	8.02	2.00	1.00	10.00			
Flooring (FLOOR)	1	94	6.27	1.87	1.33	10.00	1.53	1,99	.22
	2	7	5.57	1.34	3.67	7.67			
	Total	101	6.22	1.84	1.33	10.00			

Table 5

Analysis of Variance (ANOVA) for Specific Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	P
Windows (WINDOWS)	Between Groups	39.19	1	39.19	7.54	.01**
	Within Groups	493.52	95	5.20		
	Total	532.71	96			
Integrating Nature Elements into Design (NATURE)	Between Groups	66.85	1	66.85	13.23	.00**
	Within Groups	525.33	104	5.05		
	Total	592.18	105			

Table 5 Continued

Analysis of Variance (ANOVA) for Specific Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Promoting a Sense of Well-being (WELLBE)	Between Groups	19.81	1	19.81	5.91	.02*
	Within Groups	318.35	95	3.35		
	Total	338.16	96			
Privacy, Security and Confidentiality (PSC)	Between Groups	30.74	1	30.74	10.39	.00**
	Within Groups	284.02	96	2.96		
	Total	314.76	97			

Table 5 Continued

Analysis of Variance (ANOVA) for Specific Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Doors and Wayfinding (DOORWA)	Between Groups	3.38	1	3.38	1.14	29
	Within Groups	269.80	91	2.97		
	Total	273.17	92			
Walls and Ceilings (WALLCEI)	Between Groups	3.05	1	3.05	.91	.34
	Within Groups	295.17	88	3.35		
	Total	298.22	89			
Acoustics (ACOUS)	Between Groups	15.33	1	15.33	3.01	.09
	Within Groups	468.22	92	5.09		
	Total	483.56	93			

Table 5 Continued

Analysis of Variance (ANOVA) for Specific Design Cluster Variables Between Nurses and the Advisory Panel of Architects, Builders, Consultants, and Planners of School Facilities

Cluster		Sum of Squares	Degrees of Freedom	Mean Squared	F	p
Color (COLOR)	Between Groups	1.62	1	1.62	.41	.53
	Within Groups	394.51	99	3.99		
	Total	396.13	100			
Heating, Ventilation and Air Conditioning (HVAC)	Between Groups	27.64	1	27.64	7.28	.01**
	Within Groups	394.89	104	3.80		
	Total	422.53	105			
Flooring (FLOOR)	Between Groups	3.14	1	3.14	.93	.34
	Within Groups	336.29	99	3.40		
	Total	339.43	100			

**p< .05, **p < .01*

windows (WINDOWS) $F_{1,95} = 7.54$, $p \leq .01$. Nurses perceived this element to be significantly more important than did the advisory panel (Mean for Nurses = 8.78; Mean for Panel = 6.32). The cluster adding nature elements into clinic design (NATURE) $F_{1,104} = 13.23$, $p \leq .00$. Again, nurses perceived this design element significantly more important than the advisory panel did (Mean for Nurses = 7.29; Mean for Panel = 4.10). For the cluster of design items that promoted a sense of well-being for clinic users (WELLBE) $F_{1,95} = 5.91$, $p \leq .02$. Practicing school nurses perceived these items significantly more important than the advisory panel did (Mean for Nurses = 6.91; Mean for Panel = 5.16).

Privacy, security, and confidentiality (PSC) design elements had an $F_{1,96} = 10.39$, $p \leq .00$. Nurses perceived these item significantly more important that the advisory panel did (Mean for Nurses= 7.27; Mean for Panel = 5.09). The last design element that showed a statistically significant difference between the advisory panel and nurses was heating, ventilation, and air conditioning statements (HVAC) with an $F_{1,104} = 7.28$, $p \leq .01$. Practicing nurses perceived this design element significantly more important that the panel did (Mean for Nurses = 8.15; Mean for Panel = 6.10).

Demographics of Respondents

Twelve surveys were sent to the selected panel of experts. Seven surveys were returned. All respondents to the clinic design survey for the advisory panel group were males and included two architects, a builder, two facilities planners, and two Georgia Department of Education facilities consultants. All panel members were actively designing, constructing, or managing new construction or renovation of schools.

Surveys were given to 110 school nurses at the annual conference with 100 surveys completed and returned to the researcher. Four practicing school nurses completed the survey before the conference .All 104 respondents were females who were practicing nurses in schools.

A coded demographic sheet is shown in Appendix C. Demographic data for occupation, age, ethnicity, marital status, income, years as a nurse, years as a school nurse and educational degree are reported in Appendix D. Data for work setting, hours worked, size of school, and availability of clinic or nurse's office were inconsistent or not completed for all 104 respondents. For gathered data, the researcher for reporting purposes tabulated frequencies and percents.

Of the 104 school nurse surveys, 72 respondents (69%) worked in a school setting including an elementary school. Of these 72 respondents, 49 nurses (68%) worked in an elementary school only. The remaining 23 respondents (32%) worked in a combination setting of elementary/middle school, elementary/high school, or elementary/middle school/high school.

School setting choices were rural, suburban, or inner-city. For nurses (72) that worked in an elementary school, 32 respondents (44%) worked in a rural setting, 18 respondents (25%) worked in a suburban setting, 15 respondents (21%) worked in an inner-city setting, and seven nurses (10%) did not respond to the question.

The number of hours worked for all practitioners ranged from eight hours per week or part-time employment to 40 hours per week or full time employment. Data for the size of the school setting and the setting having a clinic or nurse's office were not tabulated due to lack of responses or incomplete responses.

CHAPTER 5

SUMMARY, RECOMMENDATIONS, AND IMPLICATIONS

This chapter presents a summary of the study and reviews the findings of the research. The chapter concludes with recommendations for enhancing or adding health clinics to elementary schools in the state of Georgia, and implications for further research.

Summary of the Study

Schools seem to be the logical place to serve the health care needs of students and to provide access to the health services, since students are located in schools for a majority of each day. The school becomes the link between education, health, social services, and other support services that children and families need. Existing federal legislation mandated that health services be provided for children with disabilities and health problems (American with Disabilities Act, 1990; Individuals with Disabilities Education Act, 1990, & Amendments, 1997; Section 504 of the Rehabilitation Act, 1973).

The literature suggested that the physical and psychological health of children had a direct impact on their academic and social development in school (Bush, 1997; Dryfoos, 1997; Hacker & Wessel, 1998; Jang, 1994; Morgan, 1987; Ouellette, 2001; Passerelli, 1994; Symons, et al., 1997; Tyson, 1999; Zepeda & Langenbach, 1999). School nurses were key players in the delivery of health services in the school setting, but inadequate conditions and facilities in public schools were problems for nurses.

Clinic design standards were not available for Georgia schools. This study suggested that the planners and users of a facility have expertise to offer regarding facility needs; hence, it provided professional school nurses, as well as architects, builders, consultants, and planners of school facilities an opportunity to express their ideas about their facility needs.

Clustered Design Elements

Based on the review of the literature and the perceptions indicated by a panel of experts and by practicing school nurses who participated in this study, clustered design elements and specific design elements were identified for the health clinic. All of the clustered design elements were perceived as having at least a medium degree of importance to clinic design.

An office for the nurse, a treatment room, a waiting area, a rest area, and a restroom were identified in the literature review as necessary components or rooms of the health clinic (Hawkins & Lilley, 1998; Hubler, 1996; McKibben & DiPaolo, 1997; Perkins, 2001). Size and space requirements varied in the literature, but the size of the clinic should be determined by the use and primary purpose of the clinic (Jelliffe & Schipp, 2002; Johnston, 1977). The components, size and space elements were viewed as the most important design element by all respondents to the survey; however, nurses perceived these elements to be more important than did the advisory panel of architects, builders, consultants, and planners of school facilities.

Practicing nurses, or practitioners, perceived three additional design elements more important than the advisory panel did: (a) the waiting area cluster, (b) the nurse's office cluster, and (c) the treatment room cluster. These three design elements directly

impact the performance of needed services by nurses for users of the clinic. The literature review revealed that the nurse's responsibilities and duties, the types of procedures to be performed, plus the needs and ages of the students who will be using the spaces should determine design needs (Butin, 2000; Frasca-Bellieu, 1999; Johnston, 1977; Ulrich, 1990).

Having an isolation room or separate rest area in the clinic received the lowest score from all respondents, but was rated as of medium importance overall. The advisory panel noted in the comment section for this design element on the survey that providing a separate rest/isolation area in an elementary clinic was not cost effective. Architects, builders, consultants, and planners perceived the rest/isolation area as a dedicated area in the nurse's office or treatment area rather than a separate room. This perception differed from the review of the literature which recommended a separate room (Castaldi, 1994; Chaney, 1973; Davini, 1952; Hawkins & Lilley, 1998; Jelliffe & Schipp, 2002; Medical Center of Georgia, 2000; Perkins, 2001).

As reported in the review of literature, consideration for the location and accessibility of the clinic must be given in relation to the location of the administrative offices, the playground, and access for medical emergency vehicles (Butin, 2001; Carpman, Grant, & Simmons, 1986; Castaldi, 1994; Hawkins & Lilley, 1998; Hubler, 1996; Krent, Cairns, & Dodge, 1993; Jelliffe & Schipp, 2002; McKibben & DiPaolo, 1997; Perkins, 2001). The advisory panel and the school nurses agreed with the literature's view on this design element.

The remaining design clusters received similar scores from nurse and advisory panel respondents: (a) the restroom (toilet); (b) security, storage, and safety features;

and (c) furnishing and treatments. Access to a restroom (toilet) was important to nurses as noted in comments for this section of the survey. Both groups commented that the restroom design with a shower and washer/dryer area were ideal but having access to a sink with hot and cold running water in the clinic was more important. The advisory panel and the school nurses agreed that having safe, secure storage for medical files and medications was important. All respondents gave a low degree of importance for the use of a music system as a necessary furnishing in the clinic.

Specific Design Elements

The specific design elements identified in the review of the literature were: (a) lighting and daylighting elements; (b) window elements; (c) integrating nature elements into design; (d) promoting a sense of well-being for the users; (e) privacy, space, and confidentiality elements; (f) electrical and plumbing elements; (g) doors and wayfinding elements; (h) walls and ceilings; (i) acoustics; (j) color; (k) heating, ventilation, and air conditioning elements; and (l) flooring elements (AIA, 1987; Butin, 2000; *Floor Plan,* 2003; Frasca-Bellieu, 1999; Gappell, 1991; Center for Health and Health Care in Schools, 2004a & b; Johnston, 1977; Malkin, 1990; Ulrich, 1990). Clusters of survey statements were grouped to provide data for analysis.

Automatic emergency lighting, use of indirect lighting close to natural sunlight, and use of a portable high intensity light received moderately high scores from all respondents in the item analysis. The use of light close to natural sunlight was supported by the review of literature (Boyce, 1981; Gappell, 1991; Hathaway, 1994; Tanner, 2000; Torrice, 1988). The remainder of the lighting statements were scored in the medium importance range except for the use of a light fixture with a dimmer over a

cot. While the literature supported the use of dimmers and controls for lighting in the clinic, the statement concerning the use of a dimmer in the rest area was rated moderately low for importance for all respondents.

The use of windows in the clinic was supported in the review of the literature (Carpman et al., 1986; Gappell, 1991; Malkin, 1990; McKibben & DiPaolo, 1997; Ulrich, 1990). Respondents in the item analysis scored windows used between rooms to provide supervision and to provide natural light and ventilation as a moderately high level of importance to clinic design. Practicing school nurses perceived the window element cluster more important to clinic design than the advisory panel did.

Lighting and window elements were used to represent elements that integrated nature into design. The literature supported design that brought the outdoors into facilities (Pinto, 1996; Renzi, 2001; Ulrich, 1990) to reduce stress and promote recovery. The use of windows to provide natural light and views of nature—trees, plants, water— as well as indirect lighting close to natural sunlight were rated medium to moderately high in importance to clinic design by all respondents in the item analysis. In the analysis between groups, the advisory panel did not perceive this element to be as important as practicing nurses did.

Promotion of a sense of well-being for users encompassed the use of furniture, wall coverings, artwork that reflected specific populations and cultures, and design that fosters a sense of control for users (Carpman et al., 1986; Kantrowitz & Associates, 1993; Simeonova, 2003). Again, practicing nurses perceived this cluster of statements to be more important to clinic design than the advisory panel did.

Color elements—light paint colors; washable, semi-gloss paint; and contrasting colors on walls and baseboards—were suggested in the literature review (Carpman et al., 1986; Day, 1980; Rouk, 1997; Smith, 1980). All respondents rated these elements in the medium to moderately high range of importance to clinic design in the item analysis. The difference in perceptions between the groups was not significant.

Nurses and the advisory panel perceived privacy, space and confidentiality elements differently. Nurses responded that having separate rooms, use of curtains to separate patients, use of movable partitions, and access to telephones, intercoms, and other communication equipment in the clinic were of moderately high importance to the design of the clinic. Architects, builders, consultants, and planners of school facilities rated these elements as of medium importance. The review of the literature revealed that ample space and added privacy reduced tension and stress for users (Butin, 2000; Carpman et al., 1986; Frasca-Beaulieu, 1999; Gappell, 1991).

In the area of heating, ventilation, and air conditioning the two groups responded differently on the importance of these elements. Nurses perceived windows for ventilation, having a set of controls for the clinic, and ventilation for the bathroom more important to clinic design that the advisory panel did. Again, the literature review reported that control of the thermal environment in a building was important to the occupants (Day, 1980; Center for Health and Health Care in Schools, 2001). Optimal temperatures as well as correct moisture, dryness, and movement of air were necessary for performance of tasks (Day, 1980).

Several statements concerning electrical and plumbing elements were scored very high for importance on the item analysis. Having a sink with hot and cold water,

having a refrigerator/freezer, and having connections for phones, fax, computers and modems were rated as very high in importance to clinic design. The review of the literature supported the item analysis scores (Hawkins & Lilley, 1998; Center for Health and Health Care in Schools, 2004b). However, the cluster of variables used for this design element was found to lack homogeneity so the design element was not used for further tests between groups.

Acoustic elements were revealed in the review of the literature. Noise in a healthcare facility produced stress and changes in blood flow in patients and staff, and decreased productivity of staff (Frasca-Beaulieu, 1999; Gappell, 1991; Rouk, 1997). Separate ceilings, carpeting, movable partitions, and other acoustical treatments were recommended (Day, 1980; Johnson, 2001; Lyons, 2002; Malkin, 1990). All respondents on the item analysis rated locating the treatment room away from phones moderately high. The difference in perceptions of the two groups for this cluster of variables was not significant.

The review of the literature reported that separate ceilings for rooms, light paint colors for walls, epoxy paint, and smooth, moisture resistant surfaces for walls and ceilings were recommended (AIA, 1987; Alexander, 1972; Malkin, 1990; Noskin & Peterson, 2001). Item analysis revealed that respondents agreed with the literature since all variables were rated medium to moderately high in importance to clinic design. Differences between groups of respondents were insignificant.

All respondents rated the use of carpeting in clinic design as moderately low in importance. The literature review showed that carpeting received mixed reviews from researchers (Carpman et al., 1986; Day, 1980; McKibben & DiPaolo, 1997; Simmons,

Reizenstein, and Grant, 1982). Vinyl composition tile, seamless resilient flooring and ceramic tiles received recommendations from the literature review (All in a Day's Work, 1999; AIA, 1987; Jelliffe & Schipp, 2002; Malkin, 1990; McKibben & DiPaolo, 1887). Both groups had similar ratings for this design cluster, so differences between groups were not significant.

In the area of doors and wayfinding elements for clinic design, all respondents scored doors wide enough for emergency equipment as very high in importance on the item analysis. Scores between groups were similar and not significant. The findings of the literature review were in agreement with the respondents' ratings for use of solid core doors, using signage to mark the way to the clinic, and using safety glass in doors (AIA, 1987; Frasca-Beaulieu, 1999; Kennedy, 2002b; Malkin, 1990).

Comment and concern sections on the survey reflected enumeration of the areas included in the survey. The most often occurring responses centered on issues that the survey statements reflected an ideal clinic in an elementary school. Architects, builders, consultants, and planners commented that many of the design statements were not cost effective. Nurse comments were that every statement on the survey was ideal, but many of the statements were necessary design elements or characteristics needed to perform their tasks. The findings reported in the data analysis were supported by the literature review.

Recommendations

The literature review shows that the school continues to be an efficient site for health care delivery for students with special needs and removes some barriers for students needing access to health care. The role and the responsibilities of the school

nurse continue to be dependent on the needs of the student served and the availability of funding sources of the community and local board of education. Clinics in elementary schools should be designed to support the school nurse in meeting the needs of the students being served. The following recommendations are presented for planning and designing health clinics in elementary schools:

1. The Department of Education in the state of Georgia should write facility guidelines for health clinics in elementary schools. The guidelines issued by the Department of Education in Maryland could be used as a starting point for those in Georgia.
2. The professional judgment of school nurses should be considered when establishing facility guidelines. Their perceptions in this study correlated with the concepts presented in the review of literature.
3. The school nurse and representatives of the students, parents, and school staff who will be using the health clinic should be involved in the planning and designing of the facility.
4. The finding in each of the areas of this study should be considered while establishing guidelines in the state of Georgia.

Implications for Further Research

While collecting data at the Georgia Association of School Nurses' conference, attendees expressed a strong interest in the survey and asked that the results of the survey be presented to their organization. It is recommended that similar studies be conducted concentrating on the middle school and high school level so that facility

guidelines can be established that address the individual uses of health clinics in different levels of educational facilities.

The unequal numbers in the groups of nurse respondents compared to the number of respondents for the advisory panel should be noted. Future researchers should attempt to achieve equity in the number of respondents for the selected groups.

In addition, the review of the literature revealed the growing trend of more medically fragile students attending schools, more medications being given at school, and more students coming to school needing medical attention. The literature suggested that the physical and psychological health of children had a direct impact on their academic and social development in school (Bush, 1997; Hacker & Wessel, 1998; Jang, 1994; Morgan, 1987; Ouellette, 2001; Passerelli, 1994; Symons, et al., 1997; Tyson, 1999; Zepeda & Langenbach, 1999). Guidelines are needed to aid in designing health clinics in elementary schools to meet the needs of the students being served.

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APPENDIX A: LITERATURE REVIEW TABLE

Design Element: **Lighting**	**Source:**
Lighting affected human ability to see and work effectively.	Day,1980; Gappell, 1991; Grocoff, 1995
Warm fluorescent or incandescent light provided more home-like atmosphere.	Alexander, 1972; Birren, 1979; Carpman, Grant, & Simmons, 1986; Rosenfield, 1972
High CRI lights needed to judge color correctly.	Boyce, 1981
Full-spectrum lighting that comes close to natural sunlight recommended.	Torrice, 1988
Compact fluorescent or halogen lamps needed for task lighting.	Moscher, 2003
Indirect lighting needed for work areas.	Rosenfeld, 1971
Dimmers for control of lighting in medical settings recommended.	Center for Health in Schools, 2004; Malkin, 1990; Rosenfeld,1971; Veitch & Newsham, 1996
Natural light from windows, skylights, suntubes, and atriums recommended.	American Institute of Architects (AIA), 1987; Grocoff ,1995; Hathaway, 1994; Heschong Malone Group, 2001; Payne, 2000;Tanner, 2000
Design Element: **Windows**	**Source:**
Windows admitted light, permitted ventilation, and framed a view.	Alexander,1972
Brightness control needed for windows.	Dorsey,1980
Windows associated with thermal, visual, and psychological aspects of comfort. Light and views from windows associated with relaxation and faster healing.	Carpman, Grant, & Simmons, 1986; Gappell, 1991; Ulrich, 1990
Windows started 42 inches off the floor so cabinets can be placed under them.	Malkin, 1990
Windows recommended between the office area, rest area for ill students, and waiting area for the clinic to allow for supervision of students by the office staff when the nurse was not present.	Carpman, Grant, & Simmons, 1986
Outside window or skylight needed for lighting and ventilation.	McKibben & DiPaolo, 1997

Design Element: **Nature**	**Source:**
Outdoors integrated into facilities.	Pinto, 1996
Designs lack heavy detailing. Everything is quite subtle and informal.	Renzi, 2001
Positive distractions—happy and caring faces, pets or unthreatening animals, and nature elements like trees, plants, and water—used.	Ulrich , 1990
Design Element: **Sense of Well-Being**	**Source:**
Physical and social surroundings influenced health.	Frasca-Bellieu, 1999
A relaxing or soothing atmosphere promoted quicker recovery and healing.	Croswell, 2000
Soft lighting environments were best for mental tasks.	Day, 1980
Indirect lighting, upholstered furniture, magazines and access to nature through windows or artwork softened the room and relaxed the patient.	Carpman, Grant, & Simmons, 1986
Feng shui principles used. Exam rooms faced the north side of the building, Administration offices were on the south side of the building.	Renzi, 2001
Spaces were comfortable, light, and welcoming.	Kantrowitz & Associates, 1993
Privacy and abundant natural light provided.	Kantrowitz & Associates, 1993
There was integration between lighting and an array of auditory, fragrance, and other sensory experiences.	Simeonova, 2003
Aquariums, interactive water fountains, light hardwood paneling, outdoor views, and original artwork used.	Croswell, 2000
Floral arrangements and bowls of sachet used.	Gappell, 1991
Design Element: **Color**	**Source:**
Lighting influenced colors of a room.	Dorsey, 1980; Malkin, 1990; Rosenfield, 1972
No specific guidelines to color selections existed for an ACF (Ambulatory Care Facility).	Frasca-Beaulieu, 1999
Color influenced human emotions and physiology.	Alexander, 1972; Chaney, 1973; Day, 1980; Dorsey, 1980; Malkin, 1990

Red, orange and pink colors stimulated the sympathetic nervous system, increased brain wave activity, and sent blood to the muscles, accelerating heart rate, blood pressure, and respiration.	Alexander, 1972; Birren, 1979; Burr, 2000; Chaney, 1973; Dorsey, 1980; Malkin, 1990; Rosenfield, 1972
Blue and green colors triggered the parasympathetic nervous system and had a tranquilizing effect.	Alexander, 1972; Birren, 1979
Warm colors seemed to advance. Cool colors seemed to recede.	Chaney, 1973; Rouk, 1997).
Cool colors caused participants to underestimate time, weight, and size. Warm colors produced the opposite effect.	Chaney, 1973; Day, 1980; Malkin, 1990
Choice of color depended upon the source of light, the size, location and shape of the space, the number of occupants, and the use of the space.	Birren, 1979; Gappell, 1991; Rice, 1953; Smith, 1980
Lighter colors had higher reflective values	Day, 1980
Contrasting color values used especially in flooring, baseboards, and walls.	Carpman, Grant, & Simmons, 1986
Painting one wall a different color reduced monotony and relaxed the eyes.	Rouk, 1997
A variety of colors and shades used to provide needed interest and stimulation, to increase heart and breathing ratios, and to affect the cortex of the brain.	Birren, 1979; Gappell, 1991
Light salmon, warm yellow, pale yellow or orange recommended in elementary schools.	Rouk, 1997; Smith, 1980
Design Element: **Privacy, Space, Confidentiality**	**Source:**
Visual privacy, acoustical privacy, social contact, and solitude provided by design. ”	Carpman, Grant, & Simmons, 1986
Ample space and added privacy provided to avoid tension and stress.	Gappell, 1991; Frasca-Beaulieu, 1999
Privacy for communication (phone conversations, fax transmissions, patient/nurse conversations) increased by reducing noise.	Butin, 2000; Carpman, Grant, & Simmons, 1986
Privacy for communication increased by spatially arranging furniture.	Butin, 2000; Carpman, Grant, & Simmons, 1986
Location of phones, computers, faxes, and intercoms in areas with acoustic controls provided.	Butin, 2000; Carpman, Grant, & Simmons, 1986
Exam rooms had movable walls, cubicle curtains, or partitions.	Butin, 2000; Carpman, Grant, & Simmons, 1986
Areas for ill students physically separated from the rest of the nurse’s office.	Butin, 2000; Carpman, Grant, & Simmons, 1986

Design Element: **Heating, Ventilation, Air Conditioning**	**Source:**
Use of windows for ventilation and lighting reduced heat gain.	American Institute of Architects, 1987
Health room/clinic had a separate control that was operated outside of school hours if necessary.	Health in Schools, 2001
Optimal temperatures as well as correct moisture, dryness, and movement of air were necessary for effective learning or performance of tasks.	Day, 1980
Air quality and thermal comfort were perceived through the skin.	Gappell, 1991
Indoor irritants and indoor air pollution were adverse environmental conditions in schools.	Lyons, 2002
Faulty room temperatures and poor air circulation caused by poor design, inadequate maintenance, and inefficient and outdated heating, ventilation, and air-conditioning systems in schools.	Lyons, 2002
Asthma, drowsiness, lethargy, and the inability to concentrate linked to indoor air pollution and indoor irritants	EPA, 2004; Lara, et al., 2002
Ordinary houseplants effective in removing toxic pollutants—formaldehyde, benzene, and trichloroethylene-- from air inside buildings.	Gappell, 1991
Design Element: **Electrical and Plumbing Needs**	**Source:**
Outlets provided in all spaces as required by code.	AIA, 1987
Automatic emergency lighting provided for safe egress from the building in event of a power failure.	AIA, 1987
A fire alarm system installed.	AIA, 1987
Dimmer switches placed on lights.	Center for Health in Schools, 2004b
Electrical circuit for the refrigerator and the ice machine active at all times.	Center for Health in Schools, 2004b
School's intercom system was available to clinic staff.	Center for Health in Schools, 2004b
Additional outlets, seating, and counter spaces provided for students to use personal nebulizers.	McKibben & DiPaolo, 1997
12 accessible outlets provided throughout the nurse's office and the bathroom area.	McKibben & DiPaolo, 1997
Sinks in exam rooms or patient areas equipped with single lever blade handles.	AIA, 1987
Enclosing plumbing pipes behind a false wall created a smooth hard surface easier to clean.	Leckie, 1999
Pipe penetrations and joints were tightly sealed to prevent or minimize entry of rodents or insects.	AIA, 1987; Noskin & Peterson, 2001

Shower space provided in the clinic to accommodate students with special needs. A sink provided in the treatment area and in the restroom.	Jelliffe & Schipp, 2002
Eye wash located on the sink in the treatment area.	McKibben & DiPaolo, 1997
Design Element: **Acoustics**	**Source:**
Noise in a healthcare facility produced a generalized stress reaction.	Gappell, 1991; Rouk, 1997
Rhythmic and soothing music in the healthcare environment controlled heart rate, lowered blood pressure, and masked normal conversation.	Frasca-Beaulieu, 1999; Malkin, 1990
Sound of bubbling water in a fish tank provided distractions from noise and reduced restlessness in children.	Frasca-Beaulieu, 1999
Sound control was important in examination room.	Malkin, 1990
Carpet, wall coverings, draperies and acoustic ceiling tiles used.	Malkin, 1990
Solid-core doors used.	Malkin, 1990
Fiberglas batting used inside walls.	Malkin, 1990
“Acoustical holes” created by pocket doors, electrical outlets, plumbing pipes, and heating ducts avoided.	Malkin, 1990
A separate ceiling for each room provided.	Malkin, 1990
Special attention provided for rooms for hearing tests.	Malkin, 1990
Noise affected elementary students more because children did not discriminate sounds from background noise until the teen years.	Lyons, 2002
Acoustic liners installed in ductwork for HVAC systems. Melamine foam liners preferred--did not contribute to indoor air pollution and did resist fungal and microbial growth.	Johnson, 2001
False ceilings avoided in high risk areas because this type of ceiling harbored dust and pests that contaminated the health care environment if the ceiling was disturbed.	Noskin & Peterson, 2001
Design Element: **Walls and Ceilings**	**Source:**
High-density vinyl barriers installed inside walls and vinyl barriers above suspended ceilings as well as foam sound absorbing panels on walls and on ceilings to stop noise and aid in acoustical control.	Johnson, 2001

Light paint colors used on walls and ceilings to make rooms look larger. Gloss or semi gloss paint that withstands washing with modern cleaning products used.	Alexander, 1972
Epoxy paint used for concrete block walls.	Jelliffe & Schipp, 2002
Walls and ceilings had smooth and moisture resistant surface that was easy to clean with minimal likelihood of dust accumulation.	AIA, 1987; Noskin & Peterson, 2001
Vinyl or woven wall coverings used that were mildew resistant and can be cleaned with bleach.	Malkin, 1990
Stucco and sand-finished textured walls not used because these finishes collected dirt and were difficult to clean.	Malkin, 1990
Paneling and fabric wall coverings used for waiting areas.	Malkin, 1990
Minimum ceiling heights of seven feet 10 inches or 2.38 meters were used.	AIA, 1987
Suspended acoustic tile ceiling installed to allow access to electrical and mechanical equipment.	Malkin, 1990
Acoustical tiles avoided in high risk areas because these tiles supported microbial growth when wet.	Noskin & Peterson, 2001
Plastic or vinyl-coated acoustic ceiling tiles recommended for areas where sanitation was important since this type of tile was easy to clean and minimized bacterial growth.	Jelliffe & Schipp, 2002
Staggered ceiling planes and indirect lighting used to give the illusion of natural light.	Croswell, 2000
Design Element: **Flooring**	**Source:**
Temperature in a building was easier to control and less costly to maintain when carpet used on floor surfaces.	Day, 1980
Low-pile carpet without a pad was functional in a healthcare facility if it did not impede handicapped users, and carpeting accentuated noise control.	Simmons, Reizenstein, & Grant, 1982
Carpeting installed for hallways.	Carpman, Grant & Simmons, 1986
Carpeting used in the nurse's private office.	McKibben & DiPaolo, 1997
Four types of flooring used for medical facilities: carpet, vinyl composition tile (VCT), sheet vinyl, and ceramic tile.	Malkin, 1990
Floor coverings for medical facilities met stringent healthcare codes such as infection control and fireproofing.	Fogarty, 1998
Carpets recommended were 100% solution-dyed	Fogarty, 1998

nylon with a solid vinyl backing and mechanically welded seams that formed a moisture-tight, hygienic floor covering.	
Ceramic tile recommended for wet areas. Sheet vinyl was less expensive, had fewer seams, and provided a self-coved base.	AIA, 1987; All in a Day's Work, 1999; Malkin, 1990
Clinic area flooring had a nonslip surface, was durable, had antibacterial properties or was not affected by germicidal or cleaning solutions, was easy to clean and maintain, and had attractive patterns and colors.	AIA, 1987; Designer Floors, 2000; Jelliffe & Schipp, 2002; McKibben & DiPaolo, 1997
Natural materials and replenished or recycled products (such as vegetable-dyed wool, cork, and wood fiber acoustical tiles or concrete, limestone, and linoleum floors) used in flooring.	Burr & Sullivan, 2000; Renzi, 2001
Design Element: **Doors**	**Source:**
Folding or pocket doors suggested to provide flexibility in school settings.	Alexander, 1972
Use of pocket doors discouraged for privacy issues. Solid core doors recommended.	Malkin, 1990
Doors were durable to withstand use by children, and doors met federal accessibility guidelines and local fire/building codes.	Kennedy, 2002b
Minimum door width of 2 feet 10 inches or 86 cm recommended for patient use, and flush threshold and expansion joints recommended facilitating use of wheelchairs, carts and stretchers in the clinic area.	AIA, 1987
Design Element: **Wayfinding**	**Source:**
Wayfinding elements included special lighting, use of different colors on walls, special artwork, signage, and/or furniture.	Frasca-Bellieu, 1999
Patterning and designs in flooring added to the well-being of patients and aided in wayfinding.	Burr & Sullivan, 2000; Designer Floors, 2000
Design Element: **Components, Size and Space Requirements**	**Source:**
Space requirements were determined by staffing requirements and the primary purpose and use of the space.	Johnston, 1977
Health center included an office for the nurse, storage space for student records, beds for ill students, a bathroom, and appropriate space for	Hubler, 1996

vision and hearing testing.	
Guidelines for an elementary school nurse's office varied from 200 to 500 square feet.	CEFPI, 1991; Jelliffe & Schipp, 2002
A minimum of 650 square feet of office space and a bathroom with approximately 130 square feet were recommended.	McKibben & DiPaolo, 1997
The nurse's office was divided into four areas: (a) a waiting /rest area; (b) a treatment area for injuries and medications; (c) a privacy/conference/isolation area; and (d) a bathroom area.	McKibben & DiPaolo, 1997
Design Element: **Location**	**Source:**
Health center located with an adjacent public parking area with outdoor lighting.	Center for Health in Schools, 2004a
Signage marked the way and entrance to the health center.	Center for Health in Schools, 2004a
Medical emergency vehicles had access to the health center.	Center for Health in Schools, 2004a
Health center easily closed off from the remainder of the school without affecting restroom use or external access.	Center for Health in Schools, 2004a
Nurse's office was located near the administrative offices.	Butin, 2001;Castaldi, 1994; Hawkins & Lilley, 1998; Hubler, 1996; Jelliffe & Schipp, 2002; McKibben & DiPaolo, 1997; Perkins, 2001
Placing the guidance suite next to the clinic provided effective use of a shared conference room.	Jelliffe & Schipp, 2002; McKibben & DiPaolo, 1997,
The locations of playgrounds and clinics were considered at the elementary school level.	Jelliffe & Schipp, 2002
Design Element: **Accessibility**	**Source:**
Federal requirements for accessibility required with renovation of existing buildings and with new buildings.	Bar & Galluzzo, 1999; Krent, Cairns, & Dodge, 1993
Stringent requirements for making buildings accessible to persons with disabilities applied. All buildings met very specific and extensive design standards.	Uniform Federal Accessibilities Standards (UFAS), 1984; American with Disabilities Act Accessibility Guidelines for Buildings and Facilities , 2002
Doors were wide enough for a stretcher and ample spaces for wheelchairs and other emergency equipment allocated.	Johnston, 1977; Carpman, Grant & Simmons, 1986

Design Element: **Waiting Area**	**Source:**
Waiting area located away from general corridors.	Butin, 2001
The waiting area was large enough to separate patients, was attractive, and provided seating that was firm and stable.	Johnston, 1977
Gold, blue, and terra cotta colors were recommended in the waiting area.	Chaney, 1973
Seating had individual armrests to assist patients in sitting down and rising and provided a sense of separation from the next person.	Carpman, Grant, & Simmons, 1986
Two exits provided in the clinic space: from a main corridor for the student and parent and through the office.	AIA, 1987; Jelliffe & Schipp, 2002
Minimum width for the main corridor was 5 feet or 1.52 meters.	AIA, 1987
Wall mounted lighting with 20 foot-candles of illumination was provided.	Malkin, 1990
Design Element; **Nurse's Office/Station**	**Source:**
Light colors in cool or warm colors and bright accents in the nurse's area provided.	Davini, 1952
Pumpkin color for the nurse's station suggested.	Chaney, 1973
A work counter, communication system, provisions for charting patients, and a space for needed supplies provided in the nurse's station.	AIA, 1987
The nurse's office was equipped with access to an intercom, cable connections for a telephone, fax and computer, modem access to the Internet, and electrical connections to support a computer and other needed equipment.	Butin, 2000
Built-in fluorescent lighting for the medicine cabinet at the nurse's station provided.	Rosenfeld, 1971
A drug distribution area was part of the nurse's station.	AIA, 1987
Nurse's station was equipped with a work counter, sink, refrigerator, and locked storage for biologicals and drugs.	AIA, 1987
A maintained illumination of 100 foot-candles for the nurse's station provided.	Malkin, 1990
Indirect lighting was used in the nurse's station.	Grocoff, 1995
Recessed 2 X 2 pendants recommended around computers.	Rouk, 1997; Mosher, 2003
Nurse's station had a cot for every 300 students and had chairs for students waiting for treatment.	McKibben & DiPaolo, 1997

The privacy area, an enclosed multipurpose area that had a cot for isolating a student, a chair, telephone or telephone jack, should have a window that provides a view out of and into this room.	McKibben & DiPaolo, 1997
A desk placed in either the waiting area or privacy area could serve as the office area for the nurse.	McKibben & DiPaolo, 1997
The nurse's office had its own set of controls for heating and air conditioning.	McKibben & DiPaolo, 1997
Design Element: **Examination/Treatment Room**	**Source:**
Exam room located away from corridors and phone/work areas to minimize noise and to facilitate hearing tests.	Butin, 2000
A minimum of 80 square feet for the exam room provided.	AIA, 1987
If the exam room and office area were combined then the room should be at least 120 sq. ft. to provide adequate office and exam space	Johnston, 1977
The examination room was at least 22 feet long.	Butin, 2000; Center for Health in Schools, 2004
Artificial light with special attention given to the lighting and ballasts was selected for the space used for vision and hearing testing.	Butin, 2000; Center for Health in Schools, 2004
A corridor at least 20 feet in length could serve for vision testing and a small 8x8 foot sound-proofed space could serve as a hearing test room.	Malkin, 1990
The exam room was painted in light tones, preferably blues or greens, and bright yellows or oranges were avoided.	Johnston, 1977
Lighting for the exam room had a high CRI to obtain correct skin tones and truer colors.	Boyce, 1981
Two four-lamp (2 x 4 ft.) recessed or surface mounted lights recommended for the exam room to maintain a light level of 100 foot-candles.	Malkin, 1990
Vinyl composition tile or seamless resilient flooring was used in the exam/treatment room.	All in a Day's Work, 1999 AIA, 1987; Johnston, 1977; Malkin, 1990
The exam room door was at least 2 ft. 10 inches to accommodate wheel chairs.	Johnston, 1977
The exam room was equipped with a sink with hot and cold water, a writing shelf, a mirror, movable partitions, and a bed.	AIA, 1987; Butin, 2000; Health in Schools, 2004; Johnston, 1977
A sink large enough to prevent splashing with lever handles was installed.	Castaldi, 1994; Noskin & Peterson, 2001
Cabinetry provided storage under the sink and to one side of the sink area.	Johnston, 1977

The surface of the cabinetry provided a writing surface.	Johnston, 1977
The sink and cabinetry were located on the wall with the door or on the wall initially seen as one walked into the room.	Malkin, 1990
Sink had a single lever faucet with a paper towel and soap dispenser mounted on the wall near the sink.	Malkin, 1990
The sink cabinet was a minimum of 48 inches long, 24 inches deep, and 36 inches high, and had a finish that was not painted.	Malkin, 1990
A wall hung writing shelf was provided at the end of the sink cabinet with a rolling stool stored underneath the shelf and a trash slot cut into the face of the sink cabinet.	Malkin, 1990
Windows were not necessary in the exam room.	Johnston, 1977; Malkin, 1990
(For dermatology use) Windows, 42 inches off the floor, created privacy in the exam room, and gray, not bronze, glazing was used on the windows.	Malkin, 1990
Slatted metal window blinds or vertical blinds provided privacy without sacrificing light or view.	Malkin, 1990
Glass-block windows were recommended in exam rooms.	Fogarty, 1998
The exam room door opened away from the wall.	Malkin, 1990
A pocket door was recommended with pediatric patients.	Malkin, 1990
Doors with obscure glass were recommended in the treatment area to provide privacy	Jelliffe & Schipp, 2002
Exam rooms had acoustical treatments that provided privacy for conversations between patient and provider.	Center for Health in Schools, 2004
Pediatric exam rooms required two electrical outlets—one over the sink cabinetry and one near the exam table or bed.	Malkin, 1990
Outlets were located out of reach of small children.	Malkin, 1990
Exam table placed against the wall for pediatric patients.	Malkin, 1990
The exam table was 27 inches wide and 54 inches long with a pullout footboard.	Malkin, 1990
Patterned tile or sheet vinyl floors, use of colorful wall coverings, and artwork appropriate for children were placed in the exam room.	Malkin, 1990
Design Element: **Rest Area**	**Source:**
Curtains around the bed created a snug, secure and self-contained environment.	Chaney, 1973

Rest area for ill students had cots with vinyl-coated cubicle curtains and a dimmable light fixture for each cot.	Jelliffe & Schipp, 2002
Recliners rather than beds in the rest area recommended.	Medical Center of Georgia, 2000
Design Element: **Restroom**	**Source:**
Restroom is essential.	Hawkins & Lilley, 1998
Washable, semi-gloss paint in soft greens, blues, or pinks with darker accent colors were recommended for the lavatory area.	Davini, 1952
Ceramic mosaic tiles which were resilient and easy to clean and maintain provided a safe floor option for restrooms.	All in a Day's Work, 1999; AIA, 1987; Malkin, 1990
The bathroom was well-lighted, ventilated and wheelchair accessible with grab bar next to toilet.	Bar & Galluzzo, 1999; McKibben & DiPaolo, 1997
A changing table, washer, dryer, and shower area with a seat were provided in the bathroom area along with equipment and a storage area for supplies for special needs students.	McKibben & DiPaolo, 1997
Design Element: **Security, Storage and Safety**	**Source:**
Medical records were kept in a separate room if records were kept on open shelves.	Johnston, 1977
Locking file cabinets for records and locking storage were provided.	AIA, 1987; Butin,2000; Center for Health in Schools, 2004 a & b; Hubler, 1996; Jelliffe & Schipp, 2002
Equipment and storage cabinets had fluorescent lights mounted in them.	
Lockable areas for staff and student personal items were provided.	Frasca-Beaulieu, 1999
A refrigerator with locking compartments was recommended to store medicine requiring refrigeration.	Jelliffe & Schipp, 2002
The disposal and removal of medical wastes, in accordance with the MOSHA law, and a separate security system were available for the clinic area.	*Floor Plan,* 2003; Health in Schools, 2004b

Safety glass, wired glass, or plastic glazing material that resisted breakage and created no cutting edges when broken were recommended for doors, sidelights, and windows glazed to within 18 inches or 46 cm of the floor.	AIA, 1987
Design Element: **Furnishings and Treatments**	**Source:**
Hooks for opening and closing doors, flush door saddles, and blade faucet controls were recommended.	Bar & Galluzzo, 1999; Rosenfield, 1972
Surface areas in a health care facility were aesthetically appealing but easily cleanable and water resistant.	Center for Health in Schools, 2004; Noskin & Peterson, 2001
Wall coverings, walls and ceilings were fluid resistant and easily cleanable in areas where contact with blood and body fluids occurred.	Noskin & Peterson, 2001
Changes in lighting, accent walls, and artwork were present.	Malkin, 1990
Healthcare facility reflected an understanding of the specific population and cultures by using cultural artwork, artifacts and furnishings, and ease of access, comfort, convenience, and efficiency were considered.	Frasca-Beaulieu, 1999
Warm colors and residential type furnishings brought an inviting, homelike, user friendly, familiar and relaxing décor for the medical facility.	Frasca-Beaulieu, 1999
“Visual noise” or the use of too many wall decorations was avoided.	Grangaard, 1993; Rouk, 1997
Sunlight, clean, fresh air, and the colors of earth and sky were present.	Grangaard, 1993
Televisions in waiting rooms, use of abstract art, and close-up pictures of animals staring directly at the observer were avoided.	Ulrich, 1990
A variety of fabrics and finishes and using differing scale in furnishings were present.	Gappell, 1991
Furnishings with rounded corners and ergonomically designed furniture insured bodily comfort, and an environment including furniture scaled for young children enhanced their sense of independence.	Gappell, 1991
Use of real photos of children of diversity, painted ceiling tiles, vinyl wall coverings, and sophisticated colors were recommended.	Fogarty, 1998

Recommended furnishings for a school based health center were: bulletin boards, desks, tables, chairs, bookcases, display cases, cots or beds, locked storage cabinets for medications, syringes, etc., file cabinets, magazine racks, display racks for brochures, marker boards/chalkboards, children's toy chest, computer terminals and printers, telephones, photocopier, wall clocks, refrigerator, freezer, and specialized medical/dental equipment.	Center for Health in Schools (2004b)
Additional recommended equipment was: medications, oxygen tank with stand, xmas tree connector/O2 key, drinking cups, soap, arm boards, arm sling, Kleenex, bio-hazard container, gloves, syringes, bleach, heating pad, batteries, telephone, copier, computer, printer, fax, and calculator.	Medical Center of Georgia, 2000
A portable high-intensity light was provided for examinations.	Malkin, 1990
Furnishings and equipment recommended in a clinic in Maryland were: a desk, chairs, bookcase, locking file cabinet, answering machine, and supply cabinets with locks. Additional medical equipment was a wall mount blood pressure gauge or cuffs (adult/child), wall mount otoscope-opthamaloscope, wall mount sharps container, thermometer, peak flow meter, accucheck, scoliometer, tympanogram, hemocue, refrigerator/freezer, microscope, nebulizer, eye chart & eye cover, single container for crash cart supplies, and step-on garbage cans.	Center for Health in Schools, 2004a
Environmental design of the facility fostered a sense of control, access to social support, and access to positive distractions for the patients.	Ulrich, 1990
Space and use of a music system were provided.	Malkin, 1990

APPENDIX B: HEALTH CLINIC DESIGN SURVEY

Directions: **(Variable numbers are in parentheses following each statement.)**

- The following survey statements address design elements for a health clinic in an elementary school. Your perception for each statement should be rated according to the degree of importance for the design element in the health clinic.
- For each statement, please circle a number from 1 to 10, with the number 1 being Very Low in degree of importance and the number 10 being Very High in degree of importance.
- For example, if you perceive that having a window for natural light and ventilation is very important in the design of an elementary school health clinic, then you may circle the number 9 or the number 10 for this design statement. Please circle only one number for each statement.
- Space is provided after each section to allow you to make comments or address concerns about the design elements.

Design Element: **Components, Size and Space Requirements**	**Degree of Importance**: Very Low / Moderately Low / Medium / Moderately High / Very High
1. The health clinic has a treatment area. **(32)**	1 2 3 4 5 6 7 8 9 10
2. The health clinic has an office for the nurse. **(33)**	1 2 3 4 5 6 7 8 9 10
3. The health clinic has a rest/isolation space for ill students. **(34)**	1 2 3 4 5 6 7 8 9 10
4. The health clinic has storage space. **(35)**	1 2 3 4 5 6 7 8 9 10
5. The health clinic has a bathroom. **(36)**	1 2 3 4 5 6 7 8 9 10
Comments/Concerns:	

Design Element: **General Design Elements**	**Degree of Importance**: Very Low / Moderately Low / Medium / Moderately High / Very High
6. For supervision purposes, windows are placed between the administrative office area, the rest area for ill students, and the waiting area for the health clinic. **(37)**	1 2 3 4 5 6 7 8 9 10
7. The health clinic has an outside window to provide natural light and ventilation. **(38)**	1 2 3 4 5 6 7 8 9 10

8.	Walls and ceilings have a smooth and moisture resistant surface that is easy to clean. **(39)**	1 2 3 4 5 6 7 8 9 10
9.	Epoxy paint is used for concrete block walls. **(40)**	1 2 3 4 5 6 7 8 9 10
10.	Indirect fluorescent lighting with dimmers is used. **(41)**	1 2 3 4 5 6 7 8 9 10
11.	Compact fluorescent or halogen lamps are used for task lighting. **(42)**	1 2 3 4 5 6 7 8 9 10
12.	Light paint colors for walls are used in the clinic. **(43)**	1 2 3 4 5 6 7 8 9 10
13.	The health clinic has its own set of controls for heating and air conditioning. **(44)**	1 2 3 4 5 6 7 8 9 10
14.	A fire alarm system is installed. **(45)**	1 2 3 4 5 6 7 8 9 10
15.	Automatic emergency lighting is provided. **(46)**	1 2 3 4 5 6 7 8 9 10
16.	Solid core doors are used. **(47)**	1 2 3 4 5 6 7 8 9 10
17.	A separate ceiling for each room in the clinic is provided for acoustical purposes. **(48)**	1 2 3 4 5 6 7 8 9 10
18.	Carpeting is installed in hallways. **(49)**	1 2 3 4 5 6 7 8 9 10
	Comments/concerns:	
Design Element: **Location of the Health Clinic**		**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
19.	The health clinic has an adjacent public parking area with outdoor lighting. **(50)**	1 2 3 4 5 6 7 8 9 10
20.	Signage marks the way and entrance to the health clinic. **(51)**	1 2 3 4 5 6 7 8 9 10
21.	Medical emergency vehicles have access to the health clinic. **(52)**	1 2 3 4 5 6 7 8 9 10
22.	The health clinic is easily closed off from the remainder of the school without affecting restroom use or external access. **(53)**	1 2 3 4 5 6 7 8 9 10
23.	The health clinic is located near the administrative offices. **(54)**	1 2 3 4 5 6 7 8 9 10
24.	Placing the health clinic next to the guidance area provides a shared conference room. **(55)**	1 2 3 4 5 6 7 8 9 10

25. The location of the health clinic is close to the playground area at the elementary school. **(56)**	1 2 3 4 5 6 7 8 9 10
Comments/concerns:	
Design Element: **Accessibility**	**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
26. Hook-type door handles are used for opening and closing doors. **(57)**	1 2 3 4 5 6 7 8 9 10
27. Flush door thresholds are used. **(58)**	1 2 3 4 5 6 7 8 9 10
28. Doors are wide enough for a stretcher, for a wheelchair, and other emergency equipment. **(59)**	1 2 3 4 5 6 7 8 9 10
Comments/concerns:	
Design Element: **Waiting Area**	**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
29. The waiting area for the clinic is located away from general corridors. **(60)**	1 2 3 4 5 6 7 8 9 10
30. Two exits are provided in the clinic space: from a main corridor for the student and parent and through the administrative office. **(61)**	1 2 3 4 5 6 7 8 9 10
31. Incandescent lighting is provided. **(62)**	1 2 3 4 5 6 7 8 9 10
32. The waiting area is large enough to separate patients. **(63)**	1 2 3 4 5 6 7 8 9 10
33. Seating has individual armrests. **(64)**	1 2 3 4 5 6 7 8 9 10
34. The furniture is scaled for children. **(65)**	1 2 3 4 5 6 7 8 9 10
Comments/concerns:	
Design Element: **Nurse's Office**	**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
35. The nurse's office is a separate room from the other areas of the health clinic. **(66)**	1 2 3 4 5 6 7 8 9 10

36.	Storage for supplies is provided. **(67)**	1 2 3 4 5 6 7 8 9 10
37.	Access to intercom is provided. **(68)**	1 2 3 4 5 6 7 8 9 10
38.	Electrical and cable connections for a telephone, fax and computer are available. **(69)**	1 2 3 4 5 6 7 8 9 10
39.	Modem access to the Internet is available. **(70)**	1 2 3 4 5 6 7 8 9 10
40.	A desk or work counter is provided. **(71)**	1 2 3 4 5 6 7 8 9 10
41.	A sink with hot and cold water is provided. **(72)**	1 2 3 4 5 6 7 8 9 10
42.	The sink has blade handles. **(73)**	1 2 3 4 5 6 7 8 9 10
43.	A refrigerator/freezer is provided. **(74)**	1 2 3 4 5 6 7 8 9 10
44.	An ice machine or ice maker is provided. **(75)**	1 2 3 4 5 6 7 8 9 10
45.	Locked storage for medicines and drugs is provided. **(76)**	1 2 3 4 5 6 7 8 9 10
46.	A drug distribution area is provided. **(77)**	1 2 3 4 5 6 7 8 9 10
47.	A lighted medicine cabinet is provided. **(78)**	1 2 3 4 5 6 7 8 9 10
48.	A window provides a view out of and into this room. **(79)**	1 2 3 4 5 6 7 8 9 10
49.	Indirect lighting close to natural sunlight is provided. **(80)**	1 2 3 4 5 6 7 8 9 10
50.	Recessed lights are used around the computer. **(81)**	1 2 3 4 5 6 7 8 9 10
	Comments/concerns:	
Design Element: **Treatment Room**		**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
51.	The treatment room and nurse's office are separate rooms. **(82)**	1 2 3 4 5 6 7 8 9 10
52.	A minimum of 80 square feet for the treatment room is provided. **(83)**	1 2 3 4 5 6 7 8 9 10
53.	The treatment room is at least 22 feet long for vision testing. **(84)**	1 2 3 4 5 6 7 8 9 10
54.	Special lighting is provided in the space used for vision testing. **(85)**	1 2 3 4 5 6 7 8 9 10
55.	The treatment room is located away from corridors and phone/work areas. **(86)**	1 2 3 4 5 6 7 8 9 10

56.	Chairs are provided for students waiting for treatment. **(87)**	1 2 3 4 5 6 7 8 9 10
57.	An eye wash is provided in the sink area. **(88)**	1 2 3 4 5 6 7 8 9 10
58.	The treatment room has a deep sink with hot/ cold water and single lever handles. **(89)**	1 2 3 4 5 6 7 8 9 10
59.	A paper towel holder and soap dispenser are mounted on the wall near the sink. **(90)**	1 2 3 4 5 6 7 8 9 10
60.	Cabinetry provides storage. **(91)**	1 2 3 4 5 6 7 8 9 10
61.	The sink and cabinetry are located on the wall initially seen as one walks into the room. **(92)**	1 2 3 4 5 6 7 8 9 10
62.	Writing space is provided at the end of the sink cabinet. **(93)**	1 2 3 4 5 6 7 8 9 10
63.	A rolling stool is provided for the writing space. **(94)**	1 2 3 4 5 6 7 8 9 10
64.	A trash slot is cut into the face of the sink cabinet. **(95)**	1 2 3 4 5 6 7 8 9 10
65.	Step-on garbage cans are provided. **(96)**	1 2 3 4 5 6 7 8 9 10
66.	The treatment room door opens away from the wall. **(97)**	1 2 3 4 5 6 7 8 9 10
67.	A door with obscure glass is used in the treatment area. **(98)**	1 2 3 4 5 6 7 8 9 10
68.	Two four-lamp recessed or surface mounted lights close to natural sunlight are used. **(99)**	1 2 3 4 5 6 7 8 9 10
69.	Glass-block windows are used in the exam rooms. **(100)**	1 2 3 4 5 6 7 8 9 10
70.	Blinds are used on windows. **(101)**	1 2 3 4 5 6 7 8 9 10
71.	A portable high-intensity light is provided. **(102)**	1 2 3 4 5 6 7 8 9 10
72.	Movable partitions are provided. **(103)**	1 2 3 4 5 6 7 8 9 10
73.	The treatment room has acoustical treatments for privacy. **(104)**	1 2 3 4 5 6 7 8 9 10
74.	Outlets, counter space, and seating are provided for patient use of nebulizers (a machine for breathing treatments) and glucose monitors. **(105)**	1 2 3 4 5 6 7 8 9 10
75.	Colorful wall coverings and artwork appropriate for children are used. **(106)**	1 2 3 4 5 6 7 8 9 10

76. Vinyl composition tile or seamless resilient flooring is used in the treatment room. **(107)**	1 2 3 4 5 6 7 8 9 10
Comments/concerns:	
Design Element: **Rest/Isolation Area**	**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
77. The rest/isolation area is separate from the treatment room. **(108)**	1 2 3 4 5 6 7 8 9 10
78. The rest area has a cot for every 300 students. **(109)**	1 2 3 4 5 6 7 8 9 10
79. Vinyl-coated cubicle curtains are provided for each cot. **(110)**	1 2 3 4 5 6 7 8 9 10
80. Recliner chairs are substituted for cots. **(111)**	1 2 3 4 5 6 7 8 9 10
81. Each cot has a light fixture with dimmer. **(112)**	1 2 3 4 5 6 7 8 9 10
Comments/concerns:	
Design Element: **Restroom**	**Degree of Importance:** Very Low / Moderately Low / Medium / Moderately High / Very High
82. The restroom is adjacent to the health clinic. **(113)**	1 2 3 4 5 6 7 8 9 10
83. Washable, semi-gloss paint with darker accent colors is used on walls and baseboards. **(114)**	1 2 3 4 5 6 7 8 9 10
84. Ceramic tiles are used on the floor. **(115)**	1 2 3 4 5 6 7 8 9 10
85. The bathroom is wheelchair accessible and has a grab bar next to the toilet. **(116)**	1 2 3 4 5 6 7 8 9 10
86. The bathroom is ventilated to the outside. **(117)**	1 2 3 4 5 6 7 8 9 10
87. A washer and dryer are provided. **(118)**	1 2 3 4 5 6 7 8 9 10
88. A shower area with a seat and hand-held showerhead is provided. **(119)**	1 2 3 4 5 6 7 8 9 10
89. A changing table is provided. **(120)**	1 2 3 4 5 6 7 8 9 10
90. Storage for supplies is provided. **(121)**	1 2 3 4 5 6 7 8 9 10

	Comments/concerns:																				
ign Element: **Security, Storage and Safety**		**Degree of Importance:** Very Low			Moderately Low			Medium			Moderately High			Very High							
91.	Medical records are kept in a locked separate room if records are kept on open shelves. **(122)**	1	2		3	4		5	6		7	8		9	10						
92.	Locking file cabinets for records are used. **(123)**	1	2		3	4		5	6		7	8		9	10						
93.	Equipment and storage cabinets have fluorescent lights mounted in them. **(124)**	1	2		3	4		5	6		7	8		9	10						
94.	Lockable areas for staff and student personal items are provided. **(125)**	1	2		3	4		5	6		7	8		9	10						
95.	A separate security system is available for the clinic area. **(126)**	1	2		3	4		5	6		7	8		9	10						
96.	Doors, sidelights, and windows have safety glass. **(127)**	1	2		3	4		5	6		7	8		9	10						
	Comments/concerns:																				
ign Element: **Furnishings and Treatments**		**Degree of Importance:** Very Low			Moderately Low			Medium			Moderately High			Very High							
97.	The environmental design of the clinic fosters a sense of control and access to positive distractions for the patients. **(128)**	1	2		3	4		5	6		7	8		9	10						
98.	The décor of the health clinic reflects an understanding of the specific population and cultures by using cultural artwork, artifacts and furnishings. **(129)**	1	2		3	4		5	6		7	8		9	10						
99.	"Visual noise" or the use of too many wall decorations is avoided. **(130)**	1	2		3	4		5	6		7	8		9	10						
100.	A music system is used in the health clinic. **(131)**	1	2		3	4		5	6		7	8		9	10						
	Comments/concerns:																				

APPENDIX C: ITEM ANALYSIS FOR SURVEY VARIABLES

	Survey Statements with Variable Numbers (in parentheses)	N	Range	Mean	Standard Deviation
1.	The health clinic has a treatment area. **(32)**	111	2 – 10	9.11	1.53
2.	The health clinic has an office for the nurse. **(33)**	110	1 – 10	8.04	2.54
3.	The health clinic has a rest/isolation space for ill students. **(34)**	111	2 – 10	8.93	1.80
4.	The health clinic has storage space. **(35)**	111	1 – 10	8.81	1.95
5.	The health clinic has a bathroom. **(36)**	111	1 – 10	9.52	1.37
6.	For supervision purposes, windows are placed between the administrative office area, the rest area for ill students, and the waiting area for the health clinic. **(37)**	109	1 – 10	7.06	2.83
7.	The health clinic has an outside window to provide natural light and ventilation. **(38)**	109	1 – 10	7.31	2.94
8.	Walls and ceilings have a smooth and moisture resistant surface that is easy to clean. **(39)**	110	2 – 10	8.09	2.20
9.	Epoxy paint is used for concrete block walls. **(40)**	104	1 – 10	7.36	2.31
10.	Indirect fluorescent lighting with dimmers is used. **(41)**	99	1 – 10	6.26	2.91
11.	Compact fluorescent or halogen lamps are used for task lighting. **(42)**	102	1 – 10	6.88	2.55
12.	Light paint colors for walls are used in the clinic. **(43)**	107	1 – 10	7.28	2.09
13.	The health clinic has its own set of controls for heating and air conditioning. **(44)**	110	1 – 10	7.88	2.64
14.	A fire alarm system is installed. **(45)**	107	1 – 10	8.44	2.47

	Survey Statements with Variable Numbers (in parentheses)	N	Range	Mean	Standard Deviation
15	Automatic emergency lighting is provided. **(46)**	106	1 – 10	8.25	2.52
16	Solid core doors are used. **(47)**	106	1 – 10	7.35	2.59
17	A separate ceiling for each room in the clinic is provided for acoustical purposes. **(48)**	103	1 – 10	6.09	2.78
18.	Carpeting is installed in hallways. **(49**	108	1 – 10	4.41	2.93
19.	The health clinic has an adjacent public parking area with outdoor lighting. **(50)**	108	1 – 10	4.88	2.70
20.	Signage marks the way and entrance to the health clinic. **(51)**	110	1 – 10	7.35	2.44
21.	Medical emergency vehicles have access to the health clinic. **(52)**	108	1 – 10	8.23	2.33
22.	The health clinic is easily closed off from the remainder of the school without affecting restroom use or external access. **(53)**	111	1 – 10	7.36	2.59
23.	The health clinic is located near the administrative offices. **(54)**	110	1 – 10	7.85	2.15
24.	Placing the health clinic next to the guidance area provides a shared conference room. **(55)**	110	1 – 10	6.19	2.75
25.	The location of the health clinic is close to the playground area at the elementary school. **(56)**	109	1 – 10	6.54	2.44
26.	Hook-type door handles are used for opening and closing doors. **(57)**	109	1 – 10	5.99	2.63
27.	Flush door thresholds are used. **(58)**	109	1 – 10	6.38	2.73
28.	Doors are wide enough for a stretcher, for a wheelchair, and other emergency equipment. **(59)**	107	2 – 10	9.33	1.14
29.	The waiting area for the clinic is located away from general corridors. **(60)**	108	1 – 10	7.36	2.09

	Survey Statements with Variable Numbers (in parentheses)	N	Range	Mean	Standard Deviation
30.	Two exits are provided in the clinic space: from a main corridor for the student and parent and through the administrative office. **(61)**	109	1 – 10	6.43	2.72
31.	Incandescent lighting is provided. **(62)**	98	1 – 10	6.21	2.37
32.	The waiting area is large enough to separate patients. **(63)**	108	1 – 10	6.82	2.70
33.	Seating has individual armrests. **(64)**	106	1 – 10	4.58	3.02
34.	The furniture is scaled for children. **(65)**	109	1 – 10	7.13	2.48
35.	The nurse's office is a separate room from the other areas of the health clinic. **(66)**	110	1 – 10	6.35	3.02
36.	Storage for supplies is provided. **(67)**	110	1 – 10	8.79	1.77
37.	Access to intercom is provided. **(68)**	109	1 – 10	8.88	1.90
38.	Electrical and cable connections for a telephone, fax and computer are available. **(69)**	111	1 – 10	9.39	1.45
39.	Modem access to the Internet is available. **(70)**	111	1 – 10	9.18	1.70
40.	A desk or work counter is provided. **(71)**	111	1 – 10	9.50	1.30
41.	A sink with hot and cold water is provided. **(72)**	111	1 – 10	9.54	1.48
42.	The sink has blade handles. **(73)**	111	1 – 10	7.86	2.75
43.	A refrigerator/freezer is provided. **(74)**	110	1 – 10	9.10	1.71
44.	An ice machine or ice maker is provided. **(75)**	110	1 – 10	7.40	2.69
45.	Locked storage for medicines and drugs is provided. **(76)**	110	1 – 10	9.71	1.17
46.	A drug distribution area is provided. **(77)**	109	1 – 10	8.36	2.36
47.	A lighted medicine cabinet is provided. **(78)**	105	1 – 10	6.29	3.06
48.	A window provides a view out of and into this room. **(79)**	109	1 – 10	6.89	2.80
49.	Indirect lighting close to natural sunlight is provided. **(80)**	108	1 – 10	7.17	2.60

	Survey Statements with Variable Numbers (in parentheses)	N	Range	Mean	Standard Deviation
50.	Recessed lights are used around the computer. **(81)**	98	1 – 10	5.06	2.79
51.	The treatment room and nurse's office are separate rooms. **(82)**	108	1 – 10	6.38	2.90
52.	A minimum of 80 square feet for the treatment room is provided. **(83)**	106	1 – 10	7.18	2.44
53.	The treatment room is at least 22 feet long for vision testing. **(84)**	107	1 – 10	7.13	2.88
54.	Special lighting is provided in the space used for vision testing. **(85)**	108	1 – 10	6.93	2.94
55.	The treatment room is located away from corridors and phone/work areas. **(86)**	107	1 – 10	7.20	2.43
56.	Chairs are provided for students waiting for treatment. **(87)**	106	3 – 10	8.44	1.85
57.	An eye wash is provided in the sink area. **(88)**	109	1 – 10	8.44	2.14
58.	The treatment room has a deep sink with hot/ cold water and single lever handles. **(89)**	107	1 – 10	8.75	1.86
59.	A paper towel holder and soap dispenser are mounted on the wall near the sink. **(90)**	109	1 – 10	9.20	1.52
60.	Cabinetry provides storage. **(91)**	107	1 – 10	9.02	1.71
61.	The sink and cabinetry are located on the wall initially seen as one walks into the room. **(92)**	106	1 – 10	6.75	2.93
62.	Writing space is provided at the end of the sink cabinet. **(93**	104	1 – 10	7.47	2.48
63.	A rolling stool is provided for the writing space. **(94)**	106	1 – 10	6.75	2.71
64.	A trash slot is cut into the face of the sink cabinet. **(95)**	106	1 – 10	5.20	3.01
65.	Step-on garbage cans are provided. **(96)**	108	1 – 10	7.38	3.00
66.	The treatment room door opens away from the wall. **(97)**	105	1 – 10	6.17	2.84

	Survey Statements with Variable Numbers (in parentheses)	N	Range	Mean	Standard Deviation
67.	A door with obscure glass is used in the treatment area. **(98)**	106	1 – 10	6.13	3.06
68.	Two four-lamp recessed or surface mounted lights close to natural sunlight are used. **(99)**	105	1 – 10	5.87	2.64
69.	Glass-block windows are used in the exam rooms. **(100)**	104	1 – 10	5.12	2.88
70.	Blinds are used on windows. **(101)**	106	1 – 10	7.69	2.66
71.	A portable high-intensity light is provided. **(102)**	105	1 – 10	7.10	2.81
72.	Movable partitions are provided. **(103)**	108	1 – 10	6.41	2.77
73.	The treatment room has acoustical treatments for privacy. **(104)**	106	1 – 10	6.77	2.75
74.	Outlets, counter space, and seating are provided for patient use of nebulizers (a machine for breathing treatments) and glucose monitors. **(105)**	110	1 – 10	8.45	2.14
75.	Colorful wall coverings and artwork appropriate for children are used. **(106)**	108	1 – 10	7.02	2.61
76.	Vinyl composition tile or seamless resilient flooring is used in the treatment room. **(107)**	107	1 – 10	7.82	2.55
77.	The rest/isolation area is separate from the treatment room. **(108)**	111	1 – 10	7.56	2.70
78.	The rest area has a cot for every 300 students. **(109)**	109	1 – 10	6.56	2.98
79.	Vinyl-coated cubicle curtains are provided for each cot. **(110)**	107	1 – 10	6.06	2.90
80.	Recliner chairs are substituted for cots. **(111)**	107	1 – 10	5.11	3.00
81.	Each cot has a light fixture with dimmer. **(112)**	108	1 – 10	4.18	2.80
82.	The restroom is adjacent to the health clinic. **(113)**	109	1 – 10	9.17	1.70
83.	Washable, semi-gloss paint with darker accent colors is				

	used on walls and baseboards. **(114)**	106	1 – 10	6.28	3.02
	Survey Statements with Variable Numbers (in parentheses)	**N**	**Range**	**Mean**	**Standard Deviation**
84.	Ceramic tiles are used on the floor. **(115)**	107	1 – 10	6.56	3.02
85.	The bathroom is wheelchair accessible and has a grab bar next to the toilet. **(116)**	109	2 – 10	9.34	1.52
86.	The bathroom is ventilated to the outside. **(117)**	108	1 – 10	8.78	2.12
87.	A washer and dryer are provided. **(118)**	109	1 – 10	5.46	3.25
88.	A shower area with a seat and hand-held showerhead is provided. **(119)**	109	1 – 10	5.35	3.24
89.	A changing table is provided. **(120)**	109	1 – 10	5.31	3.23
90.	Storage for supplies is provided. **(121)**	109	1 – 10	8.54	2.26
91.	Medical records are kept in a locked separate room if records are kept on open shelves. **(122)**	109	1 – 10	9.04	1.95
92.	Locking file cabinets for records are used. **(123)**	111	2 – 10	9.54	1.23
93.	Equipment and storage cabinets have fluorescent lights mounted in them. **(124)**	108	1 – 10	5.31	2.91
94.	Lockable areas for staff and student personal items are provided. **(125)**	107	1 – 10	7.38	2.75
95.	A separate security system is available for the clinic area. **(126)**	106	1 – 10	6.10	3.15
96.	Doors, sidelights, and windows have safety glass.**(127)**	108	1 – 10	7.39	2.72
97.	The environmental design of the clinic fosters a sense of control and access to positive distractions for the patients. **(128)**	107	1 – 10	7.51	2.46
98.	The décor of the health clinic reflects an understanding of the specific population and cultures by using cultural artwork, artifacts and furnishings. **(129)**	110	1 – 10	7.04	2.72
99.	“Visual noise” or the use of too many wall decorations is avoided. **(130)**	109	1 – 10	6.76	2.54
100.	A music system is used in the health clinic. **(131)**	108	1 – 10	5.46	2.97

APPENDIX D: DEMOGRAPHICS SHEET (CODED)

(Variable Numbers) **Code is in bold print.**

(1) Occupation:	School nurse **1**	Architect **2**		
	Builder **3**	Facilities Manager **4**		
	Other **5**			
(2) Gender:	Female	**1**	Male	**2**
(3) Age:	20 to 30	**1**	31 to 40	**2**
	41 to 50	**3**	51 to 60	**4**
	61+	**5**		
(4) Race:	African-American	**1**	Asian	**2**
	Hispanic	**3**	Native American	**4**
	White	**5**	Other	**6**
(5) Marital Status:	Single	**1**	Married	**2**
	Divorced	**3**		

(6)Children: (not coded)

(7) Household Income:

$0 --- 30,000	**1**	$30,001 --- 60,000	**2**
$60,001 --- 90,000	**3**	$90,001 --- 120,000	**4**
$120,001 --- 150,000	**5**	$150,001+	**6**

Experience: **(8)** Number of years as a nurse: _____

(9) Experience as a school nurse:
Less than 5 years experience **1**
5 to 10 years of experience **2**
0+ years of experience **3**

Working Environment: Please check all that apply:

(10) Elementary School:	**(17) Middle School:**	**(24) High School:**
Yes **1** No **2**	Yes **1** No **2**	Yes **1** No **2**
(11) Part-time **1**	**(18)** Part-time **1**	**(25)** Part-time **1**
Full-time **2**	Full-time **2**	Full-time **2**
(12)# of hours /week	**(19)#** of hours /week	**(26)#** of hours /week
Setting:**(13)**	Setting:**(20)**	Setting:**(27)**
rural **1**	rural **1**	rural **1**
suburban **2**	suburban **2**	suburban **2**
inner-city **3**	inner-city **3**	inner-city **3**
Size:**(14)**	Size:**(21)**	Size:**(28)**
250 to 500 students **1**	250 to 500 students **1**	250 to 500 students **1**
551 to 750 students **2**	551 to 750 students **2**	551 to 750 students **2**
751 to 1000 students **3**	751 to 1000 students **3**	751 to 1000 students **3**
(15)clinic Yes **1** No **2**	**(22)**clinic Yes **1** No **2**	**(29)**clinic Yes **1** No **2**
(16)nurse's office	**(23)**nurse's office	**(30)**nurse's office
Yes **1** No **2**	Yes **1** No **2**	Yes **1** No **2**

(31) Type of Education:

Bachelor's Degree **1** Master's Degree **2** Doctorate **3** Other **9**
LPN **4** Diploma RN **5** ADN RN **6** BSN RN **7** Master's RN **8**

APPENDIX E: DEMOGRAPHIC STATISTICS FOR SURVEY

Statistics for All Respondents

		Occupation	Age	Ethnicity	Marital Status	Income	Years as a nurse	Educational Degree
N	Valid	111	110	110	108	102	92	108
	Missing	0	1	1	3	9	19	3

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	104	93.7	93.7	93.7
	2	1	.9	.9	94.6
	3	1	.9	.9	95.5
	4	3	2.7	2.7	98.2
	5	2	1.8	1.8	100.0
	Total	111	100.0	100.0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	2	1.8	1.8	1.8
	2	22	19.8	20.0	21.8
	3	57	51.4	51.8	73.6
	4	21	18.9	19.1	92.7
	5	8	7.2	7.3	100.0
	Total	110	99.1	100.0	
Missing	System	1	.9		
Total		111	100.0		

Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	18	16.2	16.4	16.4
	2	1	.9	.9	17.3
	3	1	.9	.9	18.2
	5	87	78.4	79.1	97.3
	6	3	2.7	2.7	100.0
	Total	110	99.1	100.0	
Missing	System	1	.9		
Total		111	100.0		

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	11	9.9	10.2	10.2
	2	90	81.1	83.3	93.5
	3	7	6.3	6.5	100.0
	Total	108	97.3	100.0	
Missing	System	3	2.7		
Total		111	100.0		

Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	3.6	3.9	3.9
	2	31	27.9	30.4	34.3
	3	32	28.8	31.4	65.7
	4	20	18.0	19.6	85.3
	5	6	5.4	5.9	91.2
	6	9	8.1	8.8	100.0
	Total	102	91.9	100.0	
Missing	System	9	8.1		
Total		111	100.0		

Years as a nurse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1.00	7	6.3	7.6	7.6
	2.00	1	.9	1.1	8.7
	5.00	2	1.8	2.2	10.9
	7.00	1	.9	1.1	12.0
	8.00	3	2.7	3.3	15.2
	9.00	3	2.7	3.3	18.5
	10.00	5	4.5	5.4	23.9
	10.50	1	.9	1.1	25.0
	12.00	5	4.5	5.4	30.4
	13.00	3	2.7	3.3	33.7
	14.00	1	.9	1.1	34.8
	15.00	2	1.8	2.2	37.0
	16.00	6	5.4	6.5	43.5
	17.00	1	.9	1.1	44.6
	18.00	2	1.8	2.2	46.7
	19.00	1	.9	1.1	47.8
	20.00	8	7.2	8.7	56.5
	21.00	1	.9	1.1	57.6
	22.00	1	.9	1.1	58.7
	23.00	2	1.8	2.2	60.9
	24.00	4	3.6	4.3	65.2
	25.00	4	3.6	4.3	69.6
	26.00	5	4.5	5.4	75.0
	27.00	3	2.7	3.3	78.3
	28.00	2	1.8	2.2	80.4
	29.00	4	3.6	4.3	84.8
	30.00	6	5.4	6.5	91.3
	31.00	1	.9	1.1	92.4
	32.00	3	2.7	3.3	95.7
	33.00	3	2.7	3.3	98.9
	40.00	1	.9	1.1	100.0
	Total	92	82.9	100.0	
Missing	System	19	17.1		
Total		111	100.0		

Years as School Nurse

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	40	36.0	40.8	40.8
	2	29	26.1	29.6	70.4
	3	29	26.1	29.6	100.0
	Total	98	88.3	100.0	
Missing	System	13	11.7		
Total		111	100.0		

Educational Degree

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	16	14.4	14.8	14.8
	2	7	6.3	6.5	21.3
	3	2	1.8	1.9	23.1
	4	24	21.6	22.2	45.4
	5	4	3.6	3.7	49.1
	6	20	18.0	18.5	67.6
	7	30	27.0	27.8	95.4
	8	3	2.7	2.8	98.1
	9	2	1.8	1.9	100.0
	Total	108	97.3	100.0	
Missing	System	3	2.7		
Total		111	100.0		