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Prevalence of School Nurses in Kentucky and Student Outcomes

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ABSTRACT

Objective: The purpose of this study was to identify whether the presence of a nurse in the public high school setting was associated with improved graduation rates, better attendance rates, and higher ACT scores. There is also a long-term goal associated with the study. Data gleaned from the study will be used to enact a new legislative policy mandating the presence of a nurse in all public schools in the state of Kentucky.

Background: Nurses employed in the school setting support both the educational mission of the institution, as well as the health and well-being of students. Studies have explored the relationships between school nurse presence and student health. It has been suggested that when children experience poor health, their academic performance declines. There is a lack of scientifically driven data in the literature connecting school nurse presence and student academic outcomes.

Methods: This was a cross-sectional study that included cohort data from public high schools ($n=230$) in Kentucky. Data were collected during a telephone survey. Respondents answered three multiple choice questions to assess the presence of a daily nurse, length of employment, and typical daily functions. Outcomes from public high schools that had access to a full-time nurse from 2009-2013 were compared to those that did not have access to a nurse.

Results: When compared to schools without access to a full time nurse, those with a daily nurse had a lower absence rate (6.3 vs. 6.8, $p < 0.05$) and higher graduation rates (83% vs. 78%, $p = 0.0002$). After controlling for gender, ethnicity, and economic variables, ACT scores were also found to be higher among students with a full-time nurse ($p = 0.04$) and part-time nurse ($p = 0.002$) when compared to students with no nurse.

Key words: Unlicensed assistive personnel (UAP); public high school; school nurse; part-time, full time, and no nurse status; social determinants of health; public education laws; Medicaid; incarceration; American College Testing (ACT) scores; chronic absenteeism, productivity model.

Prevalence of School Nurses in Kentucky and Student Outcomes

Purpose Statement

The purpose of this study was to identify whether the presence of a nurse in the public high school setting was associated with improved graduation rates, better attendance rates, and higher ACT scores. Ultimately, the long-term goals are to provide a platform for legislating school nurses in all Kentucky public schools, to offer methods for funding the school nurses, and to supply budgeting data that demonstrates the fiscal benefit of school nurses. There is a great deal of empirical data in the literature supporting the need for school nurses and their impact on children's health. Studies have demonstrated the significant contribution of school nurses on specific health conditions such as asthma, diabetes, and food allergies (Engelke, Swanson, Guttu, Warren, & Lovern, 2011; Gupta et al., 2011; Nguyen, Mason, Sanders, Yazdani, & Heptulla, 2008; Taras, Wright, Brennan, Campana, & Lofgren, 2004). What is not adequately represented in the literature is how nurses contribute to students' educational outcomes.

Background and Significance of the Population

In the United States, there are more than 73,000 school nurses working in kindergarten through grade twelve schools (Health Resources and Services Administration [HRSA], 2010). The National Association of School Nurses (NASN) reported that 45% of the nation's schools had a full-time nurse, 30% had a part-time nurse and 25% did not have a nurse (National Association of School Nurses, 2015; Wang et al., 2014). In 2013, it was estimated that 50 million children attended some 98,817 public schools every day in the United States (National Center for Education Statistics, 2013). In Kentucky 2012 data, 675,530 students attended 1,233 public schools (Kentucky Department of Education [KDOE]). Students spent approximately 180

days in school each year, which translates to more than 1,000 clock hours (KDOE, 2012; Taras, 2014). Apart from home, the school environment represents the next most influential setting in the life of a child (Council on School Health, 2008). School years bring about much change for children. During this time, they not only learn to read and write but establish behaviors that will potentially impact the remainder of their life. Frequently, an unhealthy behavior can become well entrenched before the recognition of its significance (Daniels, 2006; Gordon, Larsen, Nelson, & Popkin 2004).

In Kentucky, a state wide survey of school nurses found that only 44% of the schools employed full time registered nurses (RNs); when licensed practical nurses (LPNs) were included, the rate increased to 48% (Eva Stone, personal communication, July 1, 2014) . As of 2008, Delaware and Massachusetts were the only two states in the nation that required a nurse to be present in every school (National Association of State Boards of Education, 2010). In the absences of a nurse, unlicensed school personnel without professional training provide health services to children (Canham, 2007). Unlicensed assistive personnel (UAPs) are individuals who are employees of the school and have been delegated the task of administering medications in the absences of the nurse (Fleming, 2011). Medication for diabetes, asthma, seizure disorders, and anaphylactic allergies may be required; in schools with no access to a nurse, the administration of the medications may be delegated to a UAP. While it may be feasible for UAPs to acquire the skill of administering a medication, it is nursing assessment and judgement that is necessary to monitor for potentially disastrous side effects (Fleming, 2011).

Review of Literature

Chronic Conditions

The prevalence of chronic conditions among U.S. children is on the rise. Over the last thirty years, there have been significant increases in the rate of asthma, food allergies, learning disabilities and obesity (Adams et al., 2008; Gupta et al., 2011; Jackson, Howle, & Akinbami, 2013; May, Kuklina, & Yoon, 2012; Perrin, Bloom, & Gortmaker, 2007; Ogden, Carroll, Kit, & Flegal, 2014). The rate of chronic health conditions among America's youth has increased from 12.8% in 1994 to 26.6% in 2006 (Van Cleave, Gortmaker, & Perin, 2010). Bethell et al. (2011) estimates that 43% of the children in the U.S. have at least one chronic health condition.

Many health conditions require day-to-day monitoring and care management. Chronic health disorders such as asthma, diabetes, epilepsy, and various types of allergies can precipitate an acute life threatening event without warning. Cancer has joined the chronic disease ranks as a potentially disabling condition. While a cancer diagnosis was once considered to be a death sentence for an individual, significant improvements in cancer treatment have had profound effects on survivors, allowing them to live longer but with long term health consequences (Brault, 2011; Carlson, Hobbie, Brogna, & Ginsberg, 2008). After cancer therapy, adults and children alike require ongoing follow up care to detect potentially late onset complications (Bhatia, Blatt, & Meadows, 2006).

Children with Chronic Disease

Mortality rates of preterm infants have improved significantly as a result of advances in medical technology (de Kieviet, Piek, Aarnoudse-Moens, & Oosterlaan, 2009). Preterm infants born at twenty six weeks have an 80% chance of survival (Allen, Cristofalo, and Kim, 2011).

These advancements are not withstanding any long term consequences for health. Premature infants pose a special set of challenges for educational systems as they age and enter school. Over 90% of infants born after twenty-seven weeks survive and many experience impairments due to immature organs, learning disabilities, sensory deficiencies requiring ongoing and continuous support (Allen, Cristofalo, & Kim 2011; Hutchinson, Luca, Doyle, Roberts, & Anderson, 2013).

Hutchinson et al. (2014) compared extremely low birth weight (<1000 grams) and extremely preterm survivors (<28 Weeks) at age eight and found that 71% of children had a neurobehavioral impairment with 47% having multiple impairments. Johnson et al. (2009) assessed the academic achievement of extremely preterm children and found that over 50% of the survivors required additional educational and health resources that extended into middle childhood.

Health and Chronic Disease Outcomes

Student health and academic performance are often viewed as two separate entities. Taras (2014) suggested that students who exhibit overt behavioral problems or demonstrate poor classroom performance may actually be experiencing underlying health conditions. In a national study of U.S. adolescents (n=10,123), Merikangas et al. (2010) found that one out of every five youths met the criteria for a mental disorder. The most common conditions were anxiety (31.9%), behavioral disorders (19.1%), mood disorders (14.3%) and substance use disorders (11.4%). The median age of onset for these conditions is six years for anxiety disorders, eleven years for behavioral disorders, thirteen years for mood disorders, and fifteen years for substance

disorders. The realization that most mental disorders are present before adulthood suggests the importance of both early screening and intervention.

In addition to the increasing prevalence of chronic health conditions among America's youth, there is also evidence of growing disparities (Perrin, Bloom, & Gortmaker, 2007). Children of varying ethnic groups experience a disproportionate burden of disease. When compared to Caucasian children with asthma, African American children experience asthma rates 60% higher, Native American children rates 25% higher, and Puerto Rican children rates 120% higher (Gold & Wright, 2005; Perrin et al., 2007).

Healthy People 2020 and School Nurses

In a healthy student population, a ratio of one nurse to 750 students has been the standard as recommended by several organizations, including the American Academy of Pediatrics (AAP), U.S. Department of Health and Human Services (USDHHS) and National Association of School Nurses (AAP, 2008; NASN, 2015; USDHHS, 2010). Different ratios exist, depending on the health care needs of the students enrolled in the school. A ratio of 1:225 is suggested for student populations who have health needs that require daily services, whereas a ratio of 1:125 is advised for students who have complex health needs. A ratio of 1:1 is expected for students who require daily, continuous care services (NASN, 2015). Many school nurses oversee the needs of several schools despite the nationally recommended ratio of one nurse to 750 students (NASN, 2011; U.S. Department of Health and Human Services [USDHHS], 2010).

The Healthy People 2020 framework is a guide to help the efforts of state and local agencies in meeting or surpassing the established target and in doing so, achieve a better level of health (Fielding, Kumanyika, & Manderscheid, 2013). One of the measurable objectives of Healthy

People 2020 is to increase the proportion of elementary, middle, and senior high schools that have a nurse-to-student ratio of at least 1:750. In 2006, Healthy People 2020 identified that 40.6 % of elementary, middle, and senior high schools had a nurse-to-student ratio of at least 1:750.

Despite the target for the objective, in a breakdown of the three levels of education, 41.9% of elementary, 43.9% of middle schools, and 33.5% of high schools were found to have a 1:750 nurse-to-student ratio (USDHHS, 2010). While the baseline data reflects the nation's current practice of nurse-to-student ratios in the school setting, it clearly falls short of the target or benchmark set by the U.S. Department of Health and Human Services and communicated in Healthy People 2020. An overall benchmark is set at 44.7%.

Healthy People 2020 Objectives	Baseline	Target
Increase the proportion of elementary, middle, and senior high schools that have a full-time registered school nurse-to-student ratio of at least 1:750	40.6 %	44.7%
Increase the proportion of senior high schools that have a full-time registered school nurse-to-student ratio of at least 1:750	33.5 %	36.9 %
Increase the proportion of middle schools that have a full-time registered school nurse-to-student ratio of at least 1:750	43.9 %	48.3%
Increase the proportion of elementary schools that have a full-time registered school nurse-to-student ratio of at least 1:750	41.9 %	45.5%

Specific benchmarks (targets) have been established for elementary schools (45.5%), middle schools (48.3%) and high schools (36.9%). In Kentucky, there are no established benchmarks to guide nurse-to-student ratio. The Kentucky estimated nurse-to-student ratio is 1:1,254 (Kentucky Youth Advocates, 2011). According to the Prevalence of School Nurses in Kentucky and Student Outcomes study done in Kentucky, 128,041 students have no exposure to a nurse at

any time during the course of a school day throughout the school year (KDOE, 2013; USDHHS, 2010).

Guttu, Engelke, and Swanson (2004) assessed nurse-to-student ratios in eastern North Carolina public schools (n=21). Low nurse-to-student ratios indicate better staffing patterns; therefore, negative correlations suggest a positive relationship between increased presence of school nurse and services offered to students. More specifically, a significant correlation existed between increased presence of school nurse and services provided to children with diabetes ($r = -.52, p = .000$), asthma ($r = -.43, p = .002$), and counseling for psychosocial needs (Guttu, Engelke, & Swanson, 2004).

School Nurses

In 1902, school nurses were first introduced into public schools based on a thirty-day experiment in New York City. Lina Rogers, the first school nurse, was employed to work with students and families in an attempt to reduce absenteeism from infectious diseases (NASN, 2011). Rogers was successful in making a difference in the health of some 10,000 children (Vessey & McGowan, 2006). In 1902, the school nurse's role was realized and the relationship between health and academic performance was permanently etched in history (Wolfe, 2013). The problems that challenged schools over a hundred years ago were as critical in their time as are the problems of today.

School nursing is a specialized area of practice requiring the utilization of multiple roles by the nurse professional (NASN, 2015). Children come to school with an assortment of needs that are not always limited to physical health issues but may include social, psychological and emotional concerns (Bloom, Jones, & Freeman, 2011; Pettitt, 2014; Sprague-McRae &

Rosenblum, 2013; Van Cleave, Gortmaker, & Perrin, 2010; Woodrich & Cunningham, 2008). Chronic diseases are widespread in the United States, affecting all segments of the population. (Van Cleave, Gortmaker, & Perrin, 2010). Key health concerns include asthma, food allergies, diabetes, epilepsy, obesity, and learning disabilities (Boyle et al., 2014; Gupta et al., 2011; Van Cleave et al., 2010; Bloom et al., 2012). With roughly 80% of the deaths and 75% of health care costs in the U.S. attributed to chronic diseases, having a nurse in the school setting with the goals of prevention and control, would be an investment in public health (Freudenberg & Olden, 2011).

There are numerous challenges and opportunities in school nursing that could impact population health. No single factor fully addresses these issues in entirety. For instance, the Institute of Medicine (IOM) report, *The Future of Nursing: Leading Change, Advancing Health* suggest increasing the nurse's level of education as a strategy to better meet the health needs of the public (IOM, 2011). However, the title of a school nurse is not synonymous with registered nurse (RN) nor is it suggestive of a nurse who holds a bachelor's degree. In Kentucky, only 44% of public schools have a registered nurse. Licensed practical nurses (LPNs) and Associate Degree Registered Nurses make up a large percentage of school nurses.

It is suggested by Fleming (2011) that school nurses should have a minimum educational preparation of a bachelor of science in nursing (BSN) degree. Best practice is achieved when bachelor trained nurses work in every school, five days a week within the confines of a defined nurse-to-student ratio (Fleming, 2011). Evidence to support the 1:750 nurse-to-student ratio is lacking. In fact, it is unclear how the ratio was determined. The 1:750 nurse-to-student recommendation is the ratio suggested for a healthy population, and would not be expected to be

used as the minimum requirement for safe staffing of school nurses. With an estimated 43% of U.S. children having at least one chronic health condition, the 1:750 ratio may not only be unsupported in the literature but also invalid as a staffing standard (Bethel et al., 2011). It is clear that the nation must move forward and support programs to measure a baseline knowledge level for the school nurse, as well as collect evidence that will support and defend nurse-to-student ratios.

Across the United States, educational systems are struggling to do more with fewer resources. Yet, children's health needs continue to grow. When school districts are confronted with the harsh reality of limited financial resources, school nurse positions have historically been eliminated. Telljohann (2004) suggests that the lack of documentation on the benefit or outcomes of school nursing services has resulted in their efforts going undetected or devalued. The Manchester Health Department (MHD) in New Hampshire developed a productivity model to determine appropriate staffing needs for their city's school (Robert Wood Johnson Foundation [RWJF], 2010). Each nursing intervention was assigned a value based on time and intensity. Values ranged from five (determining a student's BMI) to sixty (developing a student's health plan). When heavy workloads increased in the school, additional registered nurses were provided for support.

Lack of funding is identified as a major barrier to not having a nurse in every school. School nurse services are typically supported by several different funding sources. Federal sources of funding come from the Individuals with Disabilities Education Improvement Act (IDEA), grants provided to states by the federal government, and Medicaid. Other funding sources include grants by the Centers for Disease Control and Prevention (CDC) for specific programs

addressing morbidities such as childhood obesity, diabetes or asthma (Michigan Association of School Nurses, 2012). Local resources for school nurse funding include private donors, health departments, hospitals, volunteer organizations (American Heart Association, American Cancer Society or Red Cross) and school districts.

DeNisco (2014) suggests that a better way for determining the number of nurses that are needed in a school is by examining the number of students who are eligible for free or low-cost lunches. Children who do not have access to health care services outside school are frequently observed as those who require school lunch assistance. Consideration of the number of times emergency service calls are required during the school year would be another cost to be factored into the budget.

Moving away from the medical care model to one that promotes health will require the support of society, health care providers, and policy makers. *The Future of Nursing: Leading Change, Advancing Health* document by the Institute of Medicine (IOM, 2011) posits that the improvement of population health is dependent on the ability of nurses to practice to the full extent of their education. Efforts to integrate school based health centers (SBHC) into the coordination of care have been suggested as the safety net for community health (Keeton, Soleimanpour, & Brindis, 2012; Wade et al., 2008).

SBHCs have been found to provide a wide assortment of services, while utilizing an interdisciplinary approach. In 2010, there were about 99,000 public schools in the U.S. and approximately 1,900 SBHCs, representing 2% of all schools (Keeton, Soleimanpou, & Brindis, 2012; US Department of Education, 2013). Although students are the predominant recipients of

services, SBHCs also provide services to faculty and school personnel (42%), family members (42%), and other community members (24%) (Stozer, Juszczak, & Ammerman, 2010).

Health, High School Graduation, and Finances

Frequently, the term dropout is used to describe a student who does not complete school (Collins English Dictionary, n.d.). Vaughn, Salas-Wright, and Maynard (2014) compared data from a national health survey of 189,896 individuals and found high school graduates reported lower levels of chronic health conditions than those who had dropped out of high school. When compared to high school graduates, high school dropouts reported higher levels of diabetes (11.8% versus 6.23%) and higher levels of heart disease (6.17% versus 3.90%).

One strong predictor of better health is associated with the attainment of a high school education (Feudenberg & Ruglis, 2007). Having a high school diploma does not automatically ensure a life of health, wealth and success, but not having one has been identified as a negative social determinant of health (Allensworth, 2011; Culter & Lleras-Muney, 2010).

According to the World Health Organization (WHO), social determinants of health are the circumstances with which people are born, grow up, live, work, and age in, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economic, social policies, and politics (WHO, 2008).

In a study by Maynard, Salas-Wright, and Vaughn (2015), behaviors pertaining to mental health, criminal activity and substance use among adults who had graduated from high school were compared to those who had dropped out of high school. High school dropouts were more likely to report a higher use of tobacco, suicide attempts, assaultive behaviors, burglary and possession of drugs.

A systematic review by Galea, Tracy, Hoggatt, DiMaggio, & Karpati (2011) examined social determinants of health in relation to mortality rates. Findings from their mortality study suggested that having less than a high school education attributed to 240,000 deaths, income inequality to 119,000 deaths, and poverty to 172,000 deaths. Similarly, Montez, Hummer, and Hayward (2012) observed an inverse relationship between mortality risk and level of education. For both Caucasian and African Americans, completing high school was found to have a strong effect on mortality risk. Wong, Shapiro, Boscardin, and Ettner (2002) found that there was an increased life expectancy from six to nine years for individuals who graduated from high school when compared to those who dropped out. Less educated individuals were more likely to die from cardiovascular disease, cancer, lung disease, diabetes, and infection.

Youth determinants of health include poverty, crime, disproportionate health problems, and poor educational outcomes (Amos, 2008; Basch, 2011; Cutler & Lleras-Muney, 2010; Montez, Hummer, Hayward, Woo, & Rogers, 2011). There are several mechanisms in which a good education can contribute to better health. For example, the more years of education individuals obtain, the more likely they will be able to earn a higher income and purchase life necessities (Cutler & Lleras-Muney, 2006; Freudenberg & Ruglis, 2007). In a report by the National Center for Education Statistics (NCES), the median annual income of an individual with a high school diploma was \$29,960, whereas an individual without a high school education was \$22,910.00 (NCES, 2013). It is the completion of high school that serves as the ticket into college where the median income increases significantly to \$35,720-59,620.00.

Levin (2009) calculated earnings by educational level and found that over the lifetime, the total income of a White male high school dropout was \$627,000, as compared to high school

graduate \$949,000, and college graduate \$2,014,000.00. Minority students who drop out of high school experience greater income disparity. Lifetime earnings for a Black male dropout are estimated to be \$339,000.00, for a high school graduate \$637,000.00 and college graduate \$1,486,000.00.

Graduation and Crime

In the United States, the high school graduation rate in 2012-2013 was 81.4% (U.S. Department of Education, 2015) and in Kentucky 78.9% (Kentucky Department of Education, 2012). To help quantify the effects of an education at the state level, one study used a model approach. High school dropout rates for each state were calculated based on the monetary benefit the graduates would achieve over their lifetime. For Kentucky, the estimated graduation rate for 2007-2008 was 72.8%, which yielded a non-graduating class in 2011 of 15,482 students. If the 15,482 students had graduated, a total lifetime income was estimated to be over two billion dollars, creating a greater taxable income for the state's economy. In addition to the millions of dollars lost in tax revenue, individuals who become high school dropouts may even become a liability for society, forcing taxpayers to pay for public assistance and criminal justice (Alliance for Excellent Education, 2011).

Several researchers have studied education and its association with crime (Davis et al., 2014; Ewert, 2014; Groot & Brink, 2010; Lochner & Moretti, 2003; Machin, Marie, Vujic, 2011). In comparison to the rest of the world, the United States incarcerates a higher percentage of its populace than any other country (Schmitt, Warner, Gupta, 2010). Men represent more than 90% of the prison population and approximately 40% have not completed high school. Of the estimated 1.5 million individuals incarcerated (Carson, 2014) there is a disproportionate

representation of minorities, even though these subgroups make up much smaller segments in the overall population.

In a U.S. Department of Justice report, 33.1% of the imprisoned population was Caucasian, 36.5% Black/African American, 22% Hispanic, and 8.4% other ethnicities (Carson & Golinelli, 2013). Findings from the Groot and Brink (2010) study suggest that the likelihood of committing crimes such as vandalism, shoplifting, and assault decreased with years of education; however, the probability of committing crimes like tax fraud increase with years of education. Moretti (2005) posits that a 10% increase in male high school graduation rate would reduce murder and assault by 20%, vehicle theft by 13% and arson by 8%. Additionally, Moretti (2005) suggests that those incarcerated in state prisons without high school diplomas or a GED were more likely to be repeat offenders than those with a diploma.

In 2007, the federal government expenditure on justice related expenses far exceeded the education related expenses. It was found that approximately \$37 billion dollars were allocated to incarceration, whereas kindergarten through grade twelve education, was allocated \$14 billion. Financing education may provide a better return on investment in that the cost associated with educating a student is \$12,643.00 per year, while the annual cost to detain an inmate is \$28,323.00 (Alliance for Excellent Education, 2013).

Levin (2009) used the data from the Medical Expenditure Panel Survey (MEPS), a sample of 40,000 civilians, to evaluate public insurance enrollment, demographic characteristics, and medical expenses. Results indicated that significant differences in Medicaid coverage exist across education levels. Regardless of ethnicity, high school dropouts enroll in Medicaid at rates

of 15%-32% for men and 28%-51% for women. High school graduates enrollees rates were found to be half the amount and college graduates rates were 1%-3%.

Public Education Laws

Since the 1960s, laws have been sanctioned to protect the rights of children who attend public school (National Association of School Nurses [NASN], 2015). The Civil Rights Act of 1964, also known as Public Law [P.L.] 88-352, was the first statute to address discrimination. The Act made it illegal to discriminate against individuals in public places based on race, gender, religion, or ethnicity (Gibbons, Lehr, Selekman, 2013). The Elementary and Secondary Act of 1965 (P.L. 89-10) was the next subsequent law. Public Law 89-10 was the first law to commit government funds to schools for educationally disadvantaged children from low income families (United States Department of Education Office of Civil Rights, 2010).

In 1973, the U.S. Congress passed the Rehabilitation Act (P.L. 93-112) to protect persons with disabilities in both the employment setting and education setting. Section 504 of the Rehabilitation Act was crafted specifically to ensure equality in access and fairness to students with disabilities (United States Department of Education Office of Civil Rights, 2010). This Act requires school to determine what accommodations are necessary to ensure involvement in school and school related activities (Knowles, Littleton, & Rhrub, 2010).

The Education for All Handicapped Children Act (P.L. 94-142) was passed in 1975. Public Law 94-142 required that school districts receiving federal funding provide free and appropriate education in the least restrictive environment. All related health care services necessary for a child to learn must be included in the school day (United States Department of Education Office of Civil Rights, 2010).

In 1990, the Education of the Handicapped Act Amendment was enacted and significant changes resulted from this piece of legislation. For example, the name of the law was changed to Individuals with Disabilities Education Act (IDEA). IDEA guarantees public school students with disabilities the right to a free and appropriate education. By law, the IDEA requires schools to provide special education and related services, including direct-care nursing services, to students who need them (Robert Woods Johnson, 2010).

Children receiving services under this Act (IDEA) are required to have an individual education program stipulating their accommodations (Aleman, 1991, Knowles, Littleton, & Rhib, 2010). Children with IEPs have physical, intellectual, or emotional health issues that make them eligible for special education. School nurses take an integral part in IEPs and in developing individual health plans (IHPs) to meet these student's health needs and educational objectives (Fleming, 2011).

Background and Significance of School Nurse

One of the greatest resources of a nation is its youth. Future generations can only be as sustainable as their health. Successful matriculation through the educational process is predicated upon many factors, with health a priority. The role of the school nurse has evolved over time to meet the needs of the public. School nurses deliver a comprehensive range of services that are based on primary, secondary and tertiary prevention. Undoubtedly, dropping out of high school before graduating, can result in negative consequences for both the individual and society. An important way to facilitate this process is to provide access to a nurse who would consequently address gaps in care.

Whether a person is ill or well, the central tenet that makes up the practice of nursing is based on the whole person concept. It is the integration of a person's biological, psychological, sociologic, and spiritual dimension that forms the basis for every nurse's assessment (Potter & Frisch, 2007). Nurses situated in the school setting are in a perfect position to identify students at risk. Nurse interventions in student populations have been successful in obesity prevention (Tucker & Lanningham-Foster, 2015), immunization compliance (Baisch, Lundeen, & Murphy, 2011; Luthy, Thorpe, Dymock, & Connely, 2011), psychosocial support from victimization (Vernberg, Nelson, Fonagy, & Twemlow, 2011), and smoking cessation (Fritz, Hardin, Gore, & Bram, 2008). It has been suggested that when a nurse is present, students will experience better attendance rates, higher graduation rates, higher standardized test scores in addition to better health (Basch, 2011; Chan, 2002; Fleming, 2011; Krenitsky-Korn, 2011; Maughan, 2003; Rodreguez et al., 2013).

The American College Testing (ACT) is a standardized college admission exam. A composite score ranges from one to thirty-six; the composite score is the average of five components (Math, Science, English, Reading and Writing). In the United States, the ACT provides a performance measure of a student's academic achievement and readiness for college. In 2013, the ACT composite score for the United States was 20.9 (ACT, 2013). Wide variation in composite scores is seen among the different race-ethnicities. Asian students have the highest composite ACT scores (23.5), followed by White students (22.2) and Native Hawaiian/Pacific Islanders (19.5), then Hispanic/Latino (18.8), and Black/African American students (16.9). Delaware and Massachusetts, the only two states mandated to have school nurses, were among the states with the highest ACT composite scores (respectively 22.9 and 24.1) while Kentucky's

composite score ranked among the lowest at 19.2 (ACT, 2013; Daugherty, 2008; Kentucky Department of Education, 2012-2013).

The Kentucky Department of Education (2013) reports a wide variation in ACT scores among the public high schools throughout the state ranging from the highest (26) to the lowest (15.4). Race-ethnicity had similar results as those observed on the national level; state results indicated that Asian students had the highest composite ACT score (21.5), followed by White students (19.5) and Hispanic (17.7), then American Indian/Alaska Native (17.5) and Black/African American students (16.4). Perhaps some of the most troubling statistics are the ACT scores of those who are classified as Migrant students (16.0) and those students who have limited English Proficiency (13.7).

Absenteeism continues to be a significant problem in the U.S., contributing to gaps in student achievement and requiring a coordinated approach toward prevention (Brasch, 2011). In a statewide study of Utah's public schools, chronic absenteeism was explored. Chronic absenteeism is defined as missing 10% of the school year, regardless of the reason (Balfanz & Byrnes, 2012). The Utah study found that kindergarten (16%) and first grade (12.1%) students were chronically absent more than second through sixth grade students. In junior high, chronic absenteeism begins in the sixth grade (10.6%) and continues to steadily rise until the twelfth grade (20.1%). Starting in the eighth grade, a student who is chronically ill in any year, was found to be seven times more likely to drop out of school, when compared to students who were not chronically absent during any of the preceding years. It was also noted that 22% of students dropped out in their junior year of high school and 56% of students dropped out in their senior year (Utah Educational Policy Center, 2012).

It has been suggested that a student's ninth grade year is pivotal. Research has demonstrated that of all grade levels, 40% of students who fail to progress, do so at the ninth grade level. Furthermore, fewer than 20% of those students recover and reenter the educational process (Herlihy & Kennelly, 2007). Allenswork and Easton (2007) propose that the most powerful predictor of high school completion is a student's course performance and attendance during ninth grade year of high school.

According to the KDOE Pupil Attendance Manual, schools in Kentucky are awarded funds, based on how many students are in attendance each school day. The reporting of student absences is a daily occurrence, as mandated by law, and one that can ensure resources to fund schools (Holliday, 2014). Regardless of the reason, student absenteeism impacts the individual's academic success and the school's sustainability.

Roby (2004) examined achievement in selected Ohio schools by comparing the top 10% schools and the lowest 10% schools, as determined by Ohio Proficiency tests. Results demonstrated a significant relationship, when comparing student attendance averages and student achievement for grades four, six, nine, and twelve. In addition, Roby (2004) posits that the consequence of absenteeism is represented by the loss of instructional time. For example, in a school with 400 students receiving five hours a day of instruction time, if there were no student absences in the school year (100% attendance), there would be 360,000 instructional hours for the school year. But if the attendance rate was 95%, then there would be a loss of 18,000 instructional hours. Recapturing that instructional time is a challenge for educators and students alike. Chan (2002) postulates that both high school dropout rates and student achievement scores are intimately linked.

Allen (2003) examined nurse presence and found that the percentage of students that checked out of school early for complaints of illness was significantly lower in schools with a full time nurse, when compared to schools without a nurse ($p = .04$). Telljohann, Price, Dake and Durgin (2004), in their study of part time versus full time nurses, suggested that children who attend school where only part time nurses are present may not be receiving adequate access to school based health care. It is suspected that student health problems are either unmet, or are addressed by nonmedical personnel. For chronic diseases such as diabetes, treatment delays for presumed non-urgent problems may predispose children to long-term complications as adults.

Rodriguez et al. (2013) found that while children with asthma tend to be absent more frequently due to their illness, when a full time nurse is present, mean absenteeism declined and fewer emergency room visits were reported by their parents. In a retrospective study, Weismuller, Grasska, Alexander, White, and Kramer (2007) reviewed elementary health and attendance records to determine a relationship between nurse interventions and student absenteeism. From the review, it was found that there were no referrals to the school nurse for absenteeism, and school nurse interventions were not targeted to attendance, despite the occurrence of 17% of the students missing eleven or more school days. Most students visited the nurse for physical illness (21.7%), screenings (65.8%) or injuries (3.3%).

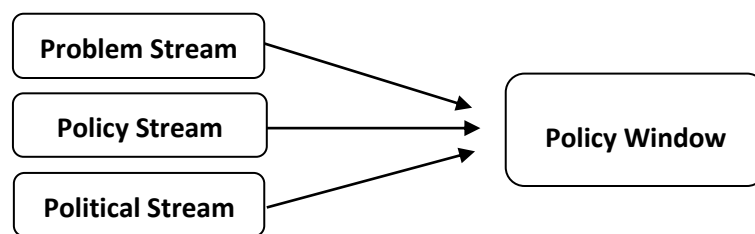
Theoretical Framework

The presence of a nurse in the school setting is impacted by public policies on a number of levels. The present study is the first major analysis of Kentucky high schools in determining the prevalence of nurses in the school setting. The aim of investigating nurse prevalence is to seek a remedy or starting point for effecting change in current health policy. Undoubtedly, health

policies have the potential to impact the community as a whole. Typically, opposition to a policy change or program expansion, is from those who would be required to finance it (Liu, Lindquist, Vedlitz, & Vincent, 2010; Mayes & Oliver, 2012).

John Kingdon's (1995) Multiple Streams Theory was used to help understand and predict the policy process required to facilitate change. Kingdon's model is useful for shaping issues based on theory which can produce changes in policy or create new policies (Walhart, 2013). Kingdom views the public policy arena as a combination of problems, solutions and politics (Gladwin, Church, & Plotnikoff, 2008). According to Kingdon's theoretical model, the policy window opens, making the passage of a policy more likely when the three converging streams come together. The three streams include: (1) problem stream, (2) policy stream, and (3) political stream.

Figure 1 – Kingdon's Multiple Streams Model



Problem Stream

The problem stream refers to the process of recognizing, defining, and organizing the focus area. Problems that are perceived as serious have a better chance of rising on the agenda (Walhart, 2013). To capture the attention of elected officials, the articulation of a clear message based on evidence is essential. New policies are more likely to be formed if they can be seen as solving a problem or having an economic benefit for society as a whole. In general, Americans

favor money spent on public health interventions that save money in the long term. However, if a significant amount of funding is required for chronic conditions, they are less likely to support the investment (Blendon, Benson, SteelFisher, & Connolly, 2010). Kentucky's Department of Education does not require each public elementary, middle, and high school to have a full time nurse. Therefore, the creation of a new model for school health would necessitate a change in current policies.

Policy Stream

The policy stream involves solutions, developing proposals, and defining alternatives that can be realized and supported. Frequently, there are competing problems and proposals requiring much time and strategic planning. Kingdon presents the idea of the policy entrepreneur. Policy entrepreneurs are individuals or groups with strong interests or commitment to the problem (Walhart, 2013). Results of a successful project are dependent on working with the identified stakeholders. The stakeholders identified for this study are dependent upon whether they are involved in supporting or opposing the project. It is expected that stakeholders will have some form of involvement in this project that includes planning, development, and implementation. Stakeholders include those who will embrace the initiative and become a champions for change. Stakeholders include: Kentucky Nurses Association, Kentucky School Nurses Association, Kentucky Public Health Association, Kentucky Department of Education, Kentucky Youth Advocates, 173 school districts, parents and children in Kentucky, Kentucky legislators, and the Commonwealth of Kentucky. Barriers or those special interest groups who may be in opposition of the initiative include school board officials and Kentucky Teacher's Union.

In stocking the policy stream, interest groups and various stakeholders were brought together for the common purpose of advocating for the health of Kentucky's children and future. Ultimately, based on the data from this study, and subsequent studies to provide sustainable methods of funding school nurses, a Kentucky policy mandate will be proposed.

Political Stream

The political stream involves working within the political arena. Influencing the political climate by organizing political forces through consensus building and partnering with coalitions is essential. Over the past eighteen months, multiple meetings have assembled stakeholders, both within specific interest groups, as well as among various interest groups. Coalitions have formed among members of the Kentucky Nurses Association (KNA), the Kentucky School Nurses Association (KSNA), Kentucky Youth Advocates (KYA), Kentucky Public Health Association (KPHA), and pediatric nurse researchers.

State Innovation Model

Additional opportunities to collaborate have been seized by participating in a state-wide initiative sponsored by the Kentucky Cabinet for Health and Family Services (CHFS) workgroup, known as the State Innovation Model (SIM). The purpose of the workgroup is to engage stakeholders in transforming Kentucky's delivery of health care services. Prevention and chronic disease management are key to creating a more sustainable, cost efficient, coordinated care model (Commonwealth of Kentucky Cabinet for Health and Family Services, 2015). Visibility of the issue is expanding as members network and present data at KSNA, KPHA, and KNA conferences. The goal is to shift the paradigm from a health care system of disease

management to one of health promotion and chronic disease management, beginning in the youngest age child within the school system, and continuing until that child graduates.

There are four proposed phases of this initiative:

<i>Phase 1</i>	Was focused on providing data that supports the value of a full time nurse in Kentucky public high schools;
<i>Phase 2</i>	Will address reading and math skill calculations at grade level for grades one through five;
<i>Phase 3</i>	Will address funding options for the proposed school nurse mandate; and
<i>Phase 4</i>	Will involve moving forward in pursuit of legislative mandates for school nurses in every school.

To enhance the efforts of the school nurse initiative phase 3 (above), additional support has been garnered from the Kentucky Nurses Association (KNA) in the form of a scholarship. KNA has earmarked \$20,000.00 for a scholarship to be awarded to a doctoral nursing candidate who has an interest in health policy and a desire to develop this phase of the project. Throughout phases one through three, legislative support and stakeholder involvement will be crucial to the overall success of the initiative.

Currently, several funding streams exist for school nursing services. Grants, hospitals, health departments, school districts, and a combination of school districts and local health departments assist in funding school nurses. Robert Woods Johnson (RWJ) recommends solutions for improving school health service by considering several proposals (RWJ, 2010). One proposal is for a dedicated tax. A tax linked to property value would provide additional capital necessary to fund school nurse services. Another solution proposed includes the development of partnerships. The partnership between the Archdiocese of Boston and Regis

College of Nursing and Health Professions is one example. As a result of the partnership, children in several parochial schools in Boston have been provided school nursing services (RWJ, 2010).

Ultimately, the long term objective of this school nurse initiative involves providing sufficient data to open the policy window for passage of a school nurse in every school mandate.

This can be accomplished only by:

1.	Ensuring increased attendance, improved ACT scores and better graduation rates	<i>Problem Stream</i>
2.	Gaining stakeholders' support by demonstrating return on investment (e.g., employability, physical and mental health status and criminal behaviors)	<i>Political Stream</i>
3.	Providing solutions/methods for funding school nurses as demonstrated in the literature (Delaware and Massachusetts)	<i>Policy Stream.</i>

Research Methodology

The purpose of this study was to identify whether the presence of a nurse in the public high school setting was associated with improved graduation rates, better attendance rates, and higher ACT scores. To ensure consistent, reliable data, a full time nurse was defined as one who was physically present in the school for 7-8 hours per day, 35-40 hours per week, five days a week (Monday through Friday). The four clinical questions of the study were: (1) Compare the prevalence of public high schools in Kentucky with a full time nurse to public high schools without a nurse; (2) Compare student attendance rates between public high schools with a full time nurse to public high schools without a nurse from the 2012-2013 school year; (3) Compare student graduation rates between public high schools with a full time nurse to public high schools without a nurse from the 2012-2013 school year; (4) Compare student ACT performance

scores between public high schools with a full time nurse to public high schools without a nurse from the 2012-2013 school year.

Study Design

A non-experimental, cross-sectional survey was selected to examine the relationship of school nurses and student outcomes. Cross-sectional studies are useful in providing a snapshot of a group or population at a specific time (Gordis, 2009). The study was not designed to identify causal relationships but to explore for possible relationships.

Participants and Setting

Public high schools having a full time school nurse, identified from the School Nurses in Kentucky Survey, were asked to participate. In a joint effort, the School Nurses in Kentucky Survey was constructed and deployed by the Kentucky Nurses Association (KNA), Kentucky School Nurses Association (KSNA), Kentucky Department of Education (KDOE) and the Kentucky Department of Public Health (KDPH). Schools that were identified as having a full time nurse were invited to participate. Inclusion criteria involved: (1) willingness to participate, (2) availability at the time of data collection, (3) public high schools in the state of Kentucky, and (4) schools having grades nine through twelve. Schools excluded from the study sample included private schools, elementary schools, middle schools, and special education schools.

The survey described in this study, conducted January 2014, collected self-reported data via telephone from Kentucky public high school personnel. The survey was developed by the project manager and its design was dictated by the variables of interest. School personnel from 232 public high schools were contacted and invited to verbally respond to three questions on a voluntary basis. Of the contacted, two schools did not participate due to inaccessibility of school

personnel. All individuals participating in the IRB approved school nurse prevalence study were provided the opportunity to decline. There were no risks associated with the study; increased knowledge and understanding of the impact of a school nurse on student outcomes were identified as benefits to the participants. There was no compensation for participating and no identifiable information indicating the person's identity was collected. The survey consisted of three questions structured as follows:

Telephone Survey

- | | |
|--|---|
| 1. Has there been a full time nurse for the last 5 years? | <input type="checkbox"/> Yes
<input type="checkbox"/> No |
| 2. If not, how long has the nurse been in a full time position? | <input type="checkbox"/> Less than 1-year
<input type="checkbox"/> 1-2 years
<input type="checkbox"/> 3-4 years
<input type="checkbox"/> Between 4-years and 5-years (> 4 but < 5)
<input type="checkbox"/> More than 5 years |
| 3. During the school day, where does the nurse spend their time? | <input type="checkbox"/> Providing care to students in the health office
<input type="checkbox"/> Providing health education in the classroom
<input type="checkbox"/> 50% in health office & 50% in the classroom
<input type="checkbox"/> Other: _____ |

In addition to the telephone survey, secondary data was collected from two online sources. Secondary data are routinely collected from stored electronic databases providing instant access to collection (Houser, 2012). The Kentucky Department of Education website provided data on student graduation rates, attendance rates, ACT scores, gender, and ethnicity. The Kentucky Youth Advocates website provided data on other variables of interest, including youth incarceration, poverty, and the amount of money spent per pupil.

Results

All statistical analyses were computed in Stata (v. 12) and further analyzed by the study's statistician. Means were calculated for continuous variables and proportions calculated for categorical variables. Multivariable linear regression analysis was used to examine the association between having a nurse within schools (full-time, part-time, and no nurse) and the school's absentee rate, graduation rates, and average student ACT performance. All models controlled for the school's gender, and race-ethnicity proportion, poverty level, youth incarceration rate, and cost spent per pupil. Statistical significance was established as $p < 0.05$.

Of the 232 schools contacted, 230 or 99.1% participated. Among the 230 schools, 42.2% had a full-time nurse ($n=97$), 37.4% had a part-time nurse ($n=86$) and 20.4% did not have a nurse ($n=47$). Looking at the secondary data, the association between having a nurse in the school and the school's absentee rate, schools with a full-time nurse (6.3% absentee rate) had a lower absentee rate than schools with no nurse (6.98% absentee rate) ($p = 0.04$); however, there was no significant difference in absentee rate between schools with a part-time nurse and no nurse (6.71% vs. 6.98%, $p = 0.41$). The relationship between having a full-time nurse and absentee rate persisted even after adjusting for the school's gender and race-ethnicity proportion, incarceration rate, poverty level and cost spent per pupil ($\beta=-0.76$, $p = 0.01$).

With regard to graduation rates, schools with a full-time nurse (83.1% graduation rate) had a higher student graduation rate than schools with no nurse (76.9% graduation rate) ($p<0.001$); however, there was no significant difference in graduation rates between schools with a part-time nurse and schools with no nurse (79.5% vs. 76.9%, $p = 0.12$). The relationship between having a full-time nurse and graduation rate persisted even after adjusting for the school's gender and

race-ethnicity proportion, incarceration rate, poverty level and cost spent per pupil ($\beta=5.67$, $p<0.001$).

With regard to average ACT scores at each school, schools with a full-time nurse (18.9 ACT) and part-time nurse (19.1 ACT) had higher ACT scores than schools with no nurse (18.5 ACT). After adjusting for the school's gender and race-ethnicity proportion, incarceration rate, poverty level and cost spent per pupil, schools with a full-time nurse ($\beta=0.51$, $p=0.04$) and part-time nurse ($\beta=0.77$, $p=0.002$) had a higher average student ACT score than schools with no nurse.

Limitations

While this study did provide information regarding the prevalence of school nurses in Kentucky, limitations were identified. The study did not examine the different educational levels found among school nurses, nor was there an attempt to associate education with student outcomes. The data collected in the study was self-reported which is known to be less reliable. Additionally, secondary data was utilized in this study. The accuracy and completeness of secondary data is dependent upon the individual capturing the data at the time, which may also lead to less reliable data (Houser, 2012).

Discussion and Application for Practice

In 1999, a report by the Institute of Medicine, *To Err Is Human*, captured the attention of the country as it described deficits in patient safety (Institute of Medicine [IOM], 1999). The report suggested that as many as 98,000 individuals die each year in the hospital setting from preventable medical errors. Since this landmark report, the concept of failure to rescue has emerged as an important patient safety, nurse sensitive outcome (Malone & Bergren, 2010).

Failure to rescue (FTR) has been described as a disregard or failure to recognize circumstances that may ultimately result in a patient's death. It has been found that failure to rescue rates tend to be lower in the acute care setting with higher nurse-to-patient ratios and with the majority of nurses holding higher educational credentials (Aiken, Clarke, Sloane, Lake, & Cheney, 2008). In consideration of the work environment, Aiken, Clark, and Sloane (2002) found that post-surgery patients in hospitals with poor nurse staffing had up to a 31% increased chance of dying. Nurses' practice environments, resources invested in nursing services, nurse-to-student ratios, multi-school traveling and educational preparation, may be as critical to student safety in the school setting as it is to patients in the hospital setting (Malone & Bergren, 2010).

Future recommendations for this school nurse initiative include completing the remaining three phases. Phase two will address reading and math skill calculation at grade level for grades one through five. Phase three will address funding options for the proposed school nurse mandate; and Phase four will involve moving forward in pursuit of a legislative mandate that will require a nurse in every Kentucky school.

Conclusions

One of the greatest resources individuals can possess is their health. A common societal misperception is that personal health and well-being are entirely determined by the individual and not by other external factors (Niederdeppe, Bu, Borah, Kindig, & Robert, 2008). This ideology attributes illness in its entirety to personal responsibility and is a destructive message. Consequently, this will ultimately skew society's awareness of social determinants of health and stifle support in addressing population health. MacDonald, Newburn-Cook, Allen and Reutter (2012) emphasized the importance of embracing a population based framework and challenged

nurse researchers to seek out opportunities for evaluating interventions and processes that connect social determinants of health at multiple levels.

The ethical principle beneficence is to take on a positive action to help others or do good (Cravens & Hirnle, 2009). In school nursing practice, student advocacy is the outcome of beneficence. The ethical principle nonmaleficence is to do no harm. Safety, protection and prevention are the outcomes of nonmaleficence. Regardless of the setting, nursing practice is guided by ethical principles. High nurse-to-student ratios, multiple building assignments and use of unlicensed assistant personnel (UAP) provide ethical dilemmas for school nurses each and every day.

Factors such as inadequate education, incarceration and poverty, clearly impact individual health and well-being. Yet, these social determinants of health are generally marginalized by society. This study provides a starting point for dialogue and an eventual change in practice. Advocating and changing policies that are in the best interest of children will result in moral, equitable care and a more sustainable future for Kentucky's youth. Placing nurses in schools only when there is a surplus of funding is a failure to grasp the financial benefit of increased attendance rates for local schools. Additionally, there are undeniable personal and societal benefits to be gained in the achievement of higher ACT scores and graduation rates that follow. In essence, failure to mandate school nurses in every school, is the purest example of failure to rescue.

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