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**Taking the Pulse of Student Health Needs in  
America: *The role of school nurses in improving  
student health and academics***

**White Paper**

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# **Taking the Pulse of Student Health Needs in America: *The role of school nurses in improving student health and academics***

## **EXECUTIVE SUMMARY**

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### **BACKGROUND**

Children who are healthy and present in school perform better in the classroom for several reasons – fewer illnesses, better concentration, higher self-esteem, and stronger connections to others. This paper examines the current trends in children’s health in the United States, describes the need for additional nurses in the Jefferson County Public Schools (JCPS), explores the relationship between health and academics, and identifies strategies for using school nurses to improve the health and academic success of children. JCPS has a school nurse pilot program that has shown promising outcomes for attendance and academic achievement. The proposed ***Healthy Minds*** program expands the pilot program by enabling JCPS to place a full-time nurse in every school.

### **MAJOR POINTS**

Factors affecting student achievement include changing family support systems and more students with chronic illnesses such as asthma, diabetes, and obesity who are also taking more prescription medications. These factors challenge our students and school leadership every day. Even positive changes such as more inclusion of handicapped students into regular schools present challenges when necessary health personnel are not readily available. Of special concern is the impact of health problems on those who lack the financial resources to access regular health care. Current research documents the accelerating health needs of children and significant links between healthy students and academic success. When health issues are the dominant factors in a child’s life, attending and succeeding in school too often become insurmountable obstacles. This paper provides compelling evidence that pairing school nurses with a Coordinated School Health Program (CSHP) is a viable strategy for improving the health and academic success of America’s children.

### **RECOMMENDATIONS**

Three strategies for utilizing school nurses to improve the health and academic performance of this generation of children are offered:

- ***STRATEGY 1: Assign School Nurses to Individual Schools to Ensure Equitable and Systemic Access to Health Care for all Children***
- ***STRATEGY 2: Utilize School Nurses to Reduce Health Care Costs, Provide Preventive Services, and Treat Health Issues that Interfere with Academic Achievement***
- ***STRATEGY 3: Conduct High Quality Research on School Nurses to Support Empirically-Driven Policy Changes for Schools***

# Taking the Pulse of Student Health Needs in America: *The role of school nurses in improving student health and academics*

## INTRODUCTION

The connection between good health and academic success has been well substantiated in the research literature. Children who are healthy and present in school perform better in the classroom - for several reasons – fewer illnesses, better concentration, higher self-esteem, and stronger connections to others. Children learn and practice health-related behaviors in a variety of settings – home, school, after-school programs, neighborhoods and community settings. Ensuring the academic success of children is central to the role of schools. Schools also have a unique vantage point for addressing student health needs. It is in the interest of schools, communities, and policy-makers to understand the conditions that are conducive to children’s academic success. The goals of this paper are to examine the current trends for children’s health in the United States, explore the relationship between health and academics, and identify strategies for using school nurses to improve the health needs and academic success of children.

The health challenges and obstacles faced by many children, especially those living in impoverished environments, call for immediate attention. Clearly, the recent passing of the National Health Care Law and Michelle Obama’s “Let’s Move” campaign to fight childhood obesity show a heightened commitment to provide all citizens equitable access to resources that promote good health, adequately address health issues, and sustain a healthy lifestyle. Coinciding with this health movement is a shift towards focusing on the whole child in education. The Association for Supervision and Curriculum Development (ASCD, 2007) promotes the importance of communities, schools, and teachers working together to address the needs of the whole child – including providing active coordinated school health school structures within each school.

## JEFFERSON COUNTY PUBLIC SCHOOLS

### ***Background***

Jefferson County Public Schools (JCPS), located in Louisville, Kentucky is the 28th largest school system in the U.S., serving a diverse student body of over 98,000. JCPS is committed to giving students equal access to learning opportunities. JCPS is the only school system in the U.S. with a formal student assignment plan designed to ensure demographic balance within our schools. JCPS is also committed to the development of the whole child with a focus on providing each child a supportive school environment and creating learning communities within schools that cultivate a teamwork approach to serving student needs.

JCPS has a history of providing health services for its students. Reports found in the JCPS archives indicate that three school nurses were first placed in JCPS schools in 1913, funded by the district's PTA and the Louisville Board of Public Safety. After three months, the PTA lost funding for one of the nurses. At the same time, JCPS began to open schools intended for pre-tubercular and anemic children, which featured daily baths, two hour naps, and provision of breakfast and lunch for the students. Four such schools were opened between 1912 and 1924 – the last two closed in the 1930's. A nurse was hired in September 1916 who moved between these schools as needed. In the period between 1916 and 1930 the city school board hired 9 school nurses. By 1932, the city school board eliminated the school nurse program due to the financial difficulties of the Depression. The schools then relied on the visiting nurses from the city government's public health department. Seven nurses covered all of the city's schools. The Public Health Department also sent doctors to inspect the schools, primarily relating to concerns with communicable diseases. According to a district newsletter published in December 1961, public health department nurses known as the "Ladies in Blue" worked in all the schools in Louisville and Jefferson County. Fifty nurses were in this group, working part-time. Nurses checked on needs for eye appointments, dental assistance and immunizations and also worked to control communicable diseases. School nurses were removed when the city and county schools merged in 1975 because funds were not available to place nurses in the former county schools.

JCPS continues to believe that health and education go hand in hand. A Coordinated School Health Program (CSHP) known as the Health Promotions Schools of Excellence (HPSE) has been in place since 1992. Typically led by the school's physical education teacher with support from a district HPSE specialist, schools participating in the HPSE program complete the Healthy Kids Survey; the Youth Risk Behavior Survey (YRBS); and a fitness assessment administered in the fall and spring which measures height, weight, BMI, and aerobic endurance. Schools and parents receive reports on their children twice each year. Family and community events focus on nutrition and physical fitness occur throughout the year. Comparisons between HPSE and Kentucky outcomes on the YRBS have shown HPSE students take fewer health risks and/or have healthier behaviors than other Kentucky districts by outperforming Kentucky on measures related to physical activity, nutrition, alcohol and drug use, injury and violence, and tobacco use. In addition to the HPSE program, JCPS Health Services personnel provide students with immunization clinics and screenings for scoliosis, hearing, and vision. In-house counselors, Family and Youth Service Centers, and regional Neighborhood Centers working together represent a collaboration between JCPS and metro government that provides social services to families in high poverty areas.

The resources described above provided a solid foundation for expanding our reach to better meet the general physical health needs of JCPS students by beginning a pilot program in 2007 with 7 school nurses placed at individual elementary schools. This program grew to 16 school nurses at elementary schools in 2009-2010 and will expand next year with a school nurse placed at a high school for the first time. JCPS school nurses serve in a wide array of roles that range from providing health services to students and staff to collaborating with staff by serving on school attendance committees to consulting with custodial staff about sanitation needs. School nurses also play an important role in identifying students eligible for state insurance and helping their parents to enroll. Preliminary data (discussed more fully later in this paper) for the

schools have demonstrated positive changes in student attendance and academics. Just as in the past, funding challenges restrict placement of school nurses. To meet the recommended 750:1 student to nurse ratio (National Association of School Nurses, 2006), 64 nurses are needed at the elementary school level, 28 nurses are needed at the middle school level, and 35 nurses are needed at the high school level. The current student to school nurse ratio is 6200:1. JCPS is partnering with the Jefferson County Public Schools Foundation, Greater Louisville Incorporated, local businesses and community agencies to explore ways to expand the current school nurse pilot program to an initiative known as **Healthy Minds**. The ultimate goal of the **Healthy Minds** system-wide initiative is to meet the health needs of all JCPS students by providing a full-time nurse in every school.

### **Health Needs**

The Jefferson County Board of Education, administrators, faculty and staff recognize that students must be healthy to be ready to learn, and that a healthy school environment contributes to positive behavior and higher achievement. Yet, schools are facing many student health challenges caused by a number of related and potentially addressable factors. The poverty rate for our students is 61% and the growth of homeless students is outpacing all other demographic sectors. This means that many of our children's basic needs are not being met outside of school and we believe that school attendance and academic performance which consistently lag behind the State are affected by these unmet needs. To address the needs of the whole child medical access for our students must be improved. Only a small number of our schools offer in-house medical services. In 2008, nearly 9000 children residing in Jefferson County who qualified for state health insurance were not enrolled (KY Voices for Health, 2008). Jefferson County mirrors the national trend for chronic illness in childhood with the three largest health challenges being asthma, diabetes, and attention deficit disorder.

Each year, more than 2,700 Jefferson County children go to Kosair Children's Hospital for asthma. Of those, 581 need to stay in the hospital (Norton's Healthcare, 2010). In the Commonwealth, 10.6 percent of children 11 years of age and younger, 13.6 percent of middle school students, and 11.8 percent of high school students have asthma. In 2007, there were more than 6,000 asthma-related hospitalizations with costs totaling approximately \$62 million (Nunn, Hudson, & Robeson, S., 2009). The contribution of poor air quality in Jefferson County has been linked to resident health problems. Specifically, Jefferson County is not expected to meet new EPA guidelines for sulfur dioxide which is attributed to asthma, and can contribute to worsening emphysema, bronchitis, and heart disease. Jefferson County was the only county in Kentucky identified by the EPA in June as potentially out of compliance with a new sulfur dioxide standard (Bruggers, J., 2010).

It isn't only chronic illnesses that stand to affect the health of students. Students who are at-risk for engaging in unsafe or unhealthy behaviors jeopardize their ability to succeed in school, and in some cases, may jeopardize their lives. JCPS collects data on health behaviors and emotional needs using three survey instruments: (a) the CDC's Youth Risk Behavior Survey administered in a select set of middle and high schools, (b) the district's Safe and Drug Free School survey, and (c) the district's Comprehensive School Survey. This year, JCPS middle and high school students at five schools completed the Youth Risk Behavior Survey. Key student

responses for middle schools (questions for high school students are slightly different) are shown in Table 1. The survey responses show that over 25% of students reported being diagnosed with asthma by a doctor and that 14.6% and 5.9% (respectively) of the students responded that they had not eaten breakfast or brushed their teeth in the past seven days. Table 2 shows district-wide middle and high school responses for the YRBS administered to JCPS students in 2010. The data regarding alcohol and cigarettes demonstrate a need for student health education and interventions. When asked whether the student had engaged in a behavior 7 or more times, students indicated “Yes” for the following: alcohol (7.5%), 5 or more alcoholic drinks in a row (11.5%), and cigarettes or tobacco products (12.6%).

**Table 1**

**Selected 2010 Youth Risk Behavior Survey Results for 3 JCPS Middle Schools**

Survey Question (N=2232)	%YES
Has a doctor or nurse ever told you that you have asthma?	25.6
	<b>%0 DAYS</b>
During the past 7 days, on how many days did you eat breakfast?	14.6
During the past 7 days, on how many days did you brush your teeth?	5.9

**Table 2**

**Selected 2010 Safe and Drug Free School Survey Results for JCPS Middle and High School Students**

Survey Question (N=38,681)	0 Times	1 - 3 Times	4 - 6 Times	7 or More Times
How many occasions (if any) have you had alcohol to drink in your lifetime? (beer, wine or hard liquor-more than just a few sips)	56.51%	21.44%	7.45%	14.60%
How many occasions (if any) have you had five or more drinks of alcohol in a row in your lifetime?	77.78%	10.44%	4.31%	7.46%
How many occasions (if any) have you smoked cigarettes or used other tobacco products in your lifetime?	75.54%	8.97%	2.90%	12.60%

Responses from JCPS 4<sup>th</sup> and 5<sup>th</sup> grade students from the 2010 Comprehensive School Survey shown on the next table provide insight into health behaviors of elementary students with 16% of the students disagreeing with the statement “I eat breakfast nearly every day” and nearly 20% of the students disagreeing with the statement “I do physical exercise 3 times per week”.

**Table 3**

**Selected 2010 JCPS Comprehensive School Survey Results for Elementary Students**

Survey Question (N=13, 789 )	Strongly Agree	Agree	Disagree	Strongly Disagree
I eat breakfast every day.	59.24%	24.65%	12.60%	3.52%
I do physical exercise 3 times per week.	47.63%	32.51%	14.06%	5.80%

The statistics from each of the three surveys above indicate that many of our students have needs for basic services such as medical care, health education, and nutrition that push schools to become community service providers. The following excerpt from a JCPS nurse illustrates the potential for school nurses to contribute to the well-being of students by providing individualized attention and serving as a liaison to parent, school, and community partners.

*"I have been following a student since November. She is in the fourth grade and will be 11 years old in April. I first became aware of her within weeks of starting at my school in mid-October. It was obvious that she was grossly underweight. I immediately brought her to my office and measured her weight and height. She weighed 44.4 lbs. and was 50 ½ inches tall. I quickly figured her BMI at 12.4 which places her BMI-for-age below the first percentile for girls with her birth date. I met with the counselor and her teacher to discuss my concerns and to present a plan of action. I have since started visiting with her at lunch and documenting her daily intake. In addition she now visits my office each afternoon so that I can observe while she has a snack from home. Prior to my presence at school she rarely finished a meal. She now finishes her lunch and has begun gaining weight. We continue to have set backs from time to time (for example, she lost 2.2 lbs over the holiday break while visiting family) but I feel she is making progress. I continue to keep the lines of communication open with both her family and her primary care physician. I have been privileged to be involved helping not only the student but also her sister who is her legal guardian. I have helped initiate medical tests via her PCP, provided nutritional teaching to the family and assisted with obtaining additional benefits from Passport. The family was not able to afford PediaSure but now is receiving a prescription for the supplement. Additionally I am providing contact information for case management through Passport, WIC and a new PCP. The situation has been win/win. The family is grateful for my help and was pleasantly surprised with the attention the student received when I came on staff. The staff is also appreciative and happy that I could assist in ways that they did not have either the time or knowledge in which to do so. Lastly, I am extremely pleased. I feel I have made a difference in the life of a child which is my ultimate goal. Not to mention I have a new little friend to have an afternoon snack with."*  
Statement from a JCPS school nurse on January 20, 2010.

The student described above had 9 absences during the first half of the year compared to 3 absences the second half of the year. She also improved her benchmark assessment scores in both reading and math over the course of the year; scoring distinguished in both content areas.

This paper identifies effective ways that schools can target health barriers to improve the health of children by placing a nurse in every school. School nurses can harness the growing

momentum for health care and use it as a catalyst to improve the delivery of health services in educational settings. School nurses are uniquely qualified to ensure what research has shown: healthier kids do better academically and that is an advantage that all kids, of all backgrounds, deserve. The following sections review research relevant to the health challenges faced by today's youth and suggest strategies for using school nurses to effectively reduce health-driven obstacles to academic success.

# ISSUES

## ***ISSUE 1: The Health of Our Youth is Declining***

The overweight and obesity rates among American adults and children are increasing – and poor nutrition is a key culprit (Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal (2006). In adults, the prevalence of excessive weight and obesity among low socioeconomic status populations is greater than among higher socioeconomic status populations (Zapata, Bryan, McDermott, & Helefinger, 2008). When compared to youth living in more affluent neighborhoods, children living in poorer neighborhoods are more likely to experience numerous inadequacies such as physical and mental health issues, unhealthy bodyweight, poor nutrition, poor school performance and delinquency (National Association for Sport and Physical Education, 2001). Obesity is classified as a chronic illness by the CDC (2010) because it meets the definition of a persistent and long lasting condition that causes limitations in daily living and can typically be avoided through preventive measures.

One of the most startling research findings of the last five years is that because of childhood obesity, today's youth may be the first generation of children to not outlive their parents because of chronic illnesses (Koebnick, 2010). In her recent study of over 700,000 children in California, Koebnick found that the number of children classified as extremely obese (weighing more than 1.2 times the 95th percentile) is increasing at an alarming rate with 7.3% of the boys and 5.5% of the girls classified as extremely obese. The outcomes were worse for Hispanic and African American teenagers whose extreme obesity rates were 7.9% and 8.2%, respectively. The obesity epidemic is attributed to a combination of low physical activity and unhealthy eating habits. Extremely obese children may continue to be extremely obese as adults who are plagued by serious health problems such as diabetes and heart disease that may cost 10 to 20 years of their life span. In other words, our current generation of children can be expected to suffer from potentially fatal chronic illnesses like heart disease and diabetes in their 20's instead of their 40's (Koebnick, 2010).

Closer to home, Kentuckians outweigh most of the nation; 36.5% of adults are overweight [body mass index (BMI) of 25-29.9] and 30.3% are obese (BMI of 30 or higher) when compared with the national average of 36.6% overweight and 26.7% obese (Centers for Disease Control [CDC], 2005). Obesity rates among American children ages 6 to 11 more than doubled between 1980 and 2006, going from 6.5% to 17.0%. Over the same time period, obesity rates for adolescents ages 12 to 19 more than tripled, increasing from 5% to 17.6% (Ogden, Carroll, & Flegal, 2008). In Kentucky, 16% of high school students were obese in 2007 (CDC, 2009).

Kentucky's health problems go beyond obesity. The CDC (2009) reports that 37% of Kentucky youth use alcohol, 25% engage in binge drinking, 26% smoke cigarettes, and 15% use smokeless tobacco. Meeting the health needs of our students is an issue that has implications for the future physical and economic health of our state and local community. Table 4 shows Behavioral Risk Factor Surveillance System Survey data (CDC, 2008a) for national and Kentucky health measures. Kentucky's data shows either greater rates of declining health

and/or greater overall health risks than the national averages for all indicators except a small improvement in reported health status and the number of adults  $\geq 65$  yrs reporting having a flu shot in the past 12 months. The remaining health data show Kentucky lagging behind national measures. For instance, the rate of diabetes increased by 1.3% nationwide compared to an increase of 2.6% for Kentucky from 2004 – 2009 and while the number of current smokers has declined on both a national and state level, Kentucky still had 25.6% smokers compared to 17.9% on a national level. Perhaps the most telling statistic is the reported health status of Kentuckians compared to the national average. In 2009, 22.7% of Kentuckians reported having fair or poor health (as opposed to good or excellent) compared to a national rate of 14.2%, making the difference between the national and state averages substantial. Also substantial are the Kentucky and National differences for binge drinking, asthma, and obesity. While the National average for binge drinking has held steady over the last five years, Kentucky's average has increased by 3.7%. The same trend is shown for asthma with Kentucky's average gaining nearly 1% while the National average remained stable. Obesity rate gains for Kentucky have nearly doubled the National average.

**Table 4**

**CDC Data Comparing National Health Statistics to Kentucky**

<b>Survey Question Topic</b>	<b>Nationwide %</b>		<b>Kentucky %</b>	
	2004	2009	2004	2009
<b>Health Status</b> - % of adults reporting general health as fair or poor	14.5	14.2	22	22.7
<b>Exercise</b> - % of adults reporting doing no leisure time exercise or physical activity in the past 30 days	22.5	24.6	29.8	29.6
<b>Diabetes</b> - % of adults told by doctor they have diabetes	7	8.3	8.9	11.5
<b>Flu Vaccination</b> -% of adults $\geq 65$ yrs reporting having a flu shot in past 12 months	68	71.1	64.3	70.4
<b>Current Smoking</b> -% of adults reporting having smoked at least 100 cigarettes in their lifetime and currently smoke	20.9	17.9	27.5	25.6
<b>Binge Drinking</b> -% of males reporting having five or more drinks on an occasion, % females reporting having four or more drinks on an occasion	15.4 (2006)	15.7	8.6 (2006)	12.3
<b>Asthma</b> - % of adults told by doctor they have asthma	13.3	13.4	13.9	14.8
<b>Obesity</b> -% of adults reporting Body Mass Index $\geq 30$ .	23.2	26.9	25.8	32.3

## ***ISSUE 2: There is a Long-Term Economic Impact of Declining U.S. Health***

Beyond the moral imperative of improving children's health, there are economic consequences to ignoring the health needs of our children. The United States spends more on health per capita than any other country, and health spending continues to increase. In 2007, national health expenditures in the United States totaled \$2.2 trillion—a 6% increase from 2006 (Trust for America's Health [TFAH], 2009). This represents 16% of the total U.S. gross domestic product (GDP). In 1980, national health expenditures were 9% of the GDP. Hospital spending, which accounts for 31% of national health expenditures, increased 7% in 2007. The TFAH reports that Kentucky is 15<sup>th</sup> on the national list of obesity costs per capita (\$282). They contend that a \$10 investment in effective disease prevention strategies on **each** American could save the U.S. \$16 billion over five years in health care costs alone. The savings for Kentucky is estimated at \$248 million with a return on the investment after five years of \$6.00 to every \$1.00 spent. The net savings for Kentucky after five years would benefit Medicare by \$67,200,000, Medicaid federal by \$16,700,000; Medicaid state by \$7,410,000, and private payer and out of pocket by \$157,000,000.

## ***ISSUE 3: Disparities in Children's Health Care are Alive and Well***

The CDC (2010) defines health disparities as preventable differences in the burden of disease, injury, violence or opportunities to achieve optimal health that are experienced by socially disadvantaged populations. Factors that contribute to health disparities include: (a) poverty, (b) environmental threats, (c) access to care, (d) individual and behavioral factors, and (e) educational inequalities.

Disease-related disparities linked to income for children across a wide array of chronic health conditions were documented from 2003-2006 (CDC, 2008b). Asthma and obesity rates for children illustrate the role that poverty plays in health status:

- Asthma rates for children ages 5 – 17 years were 14.4% for those classified as non-poor compared to 19% for children classified as poor.
- Children in poor families were more likely to have ever been diagnosed with asthma (18%) or to still have asthma (12%) than children in families that were not poor (13% and 9%).
- Children in fair or poor health were three and one-half times as likely to have ever been diagnosed with asthma (42%) and four and one-half times as likely to still have asthma (36%) as children in excellent or very good health (12% and 8%).
- Children ages 6 – 19 years were less likely to be reported as overweight if they were classified reported as non-poor (15.1%) vs. poor (20.4%).

An unacceptable number of all U.S. children have unmet medical needs. Findings from the National Health Interview Survey (CDC, 2008b) indicated the following access issues for children less than 18 years of age:

- 5.2% No usual source of healthcare
- 6% 1-2 years since contact with ANY health professional
- 2.8% Unmet medical needs
- 4.8% Delayed care due to medical costs
- 8.9% No health insurance

The connections between chronic health conditions, poverty, and access issues to healthcare contribute to the challenges faced by our schools. Excessive absenteeism, discussed in the next section, is just one example of how students with unmet medical needs are at risk for falling behind academically. Most likely, the schools with the greatest health needs are also the schools with children that face a myriad of societal burdens. Schools can't directly improve family income, housing conditions, or parental support but school nurses can provide an access point to healthcare for all students, minimizing disparity issues.

#### ***ISSUE 4: Poor Health Doesn't Make the Grade***

How can a child be successful at school and progress when he/she is too ill to attend school on a regular basis? Guttu, Engelke, and Swanson (2004) and the CDC (2008b) report:

- 48% of children with chronic health (i.e., persistent and long lasting) problems report falling behind at school
- 58% of those children routinely miss school
- 10% of those children miss more than 25% of the school year
- 5% of all children ages 5 – 11 years missed 11 or more days of school in the past 12 months due to illness or injury
- Children in single-mother families were almost twice as likely to have been absent from school for 11 or more days in the past 12 months due to illness or injury

Hanson, Muller, Austin, & Lee-Bayha (2005) reviewed research related to student health, attendance, and academic success. They reported the following direct links between health and academic progress:

- Students grades and attendance are better when their health needs are met

- Addressing student health needs promotes long-term learning and strongly impacts school readiness and early learning
- Schools with health services had higher student achievement through lower absenteeism and dropout rates as well as improved student attitudes about learning

In a review of the research on student health and learning, Basch (2010) provides evidence that the academic success of today's children is strongly linked to their health. Health-related factors such as hunger, physical and emotional abuse, and chronic illness can lead to poor school performance. Health-risk behaviors such as substance use, violence, and physical inactivity are consistently linked to academic failure and often affect students' school attendance, grades, test scores, and ability to pay attention in class. Hanson, et. al. (2005) published a review of studies demonstrating the connection between health and academics. Their findings for the connection between physical health, school health services, and academic success are shown in Table 5.

The data from the CDC's 2003 YRBS found that students with lower grades were significantly more likely to have engaged in the following risky and/or unhealthy behaviors:

- Carried a weapon
- Current cigarette use
- Current alcohol use
- Ever had sexual intercourse
- Did not eat for 24 or more hours to lose weight or to keep from gaining weight

Vision, asthma, teen pregnancy, aggression and violence, physical activity, breakfast, inattention and hyperactivity were identified by Basch (2010) as high priority health concerns that have educational implications. Drug use, dental problems, ear infections, obesity, and accidental injuries were also identified as pervasive problems affecting youth. Recent survey data indicate that lifetime asthma prevalence across 34 states ranged from 15.4% to 28.7% (Basch, 2010). Asthma is an example of a chronic illness associated with income levels for children. These children are more likely to have been born prematurely, live in industrial (poorer air quality) areas, have home environmental issues, have parents who smoke, and a mother who received low quality pre-natal care. Because of health equity concerns, prevalence, and an established connection to absenteeism, asthma is a prime candidate for exploring the relationship between chronic illness, attendance, and academic achievement.

Literature on the connection between student health and learning indicate a strong, positive relationship between asthma and school absenteeism (Basch, 2010). In 2003, the 4 million youth who reported having had an asthma attack in the preceding year were estimated to have missed a total of 12.8 million school days directly attributable to asthma (Akinbami, 2006). No research was found on the effect of chronic illnesses on school attendance for siblings but it is not difficult to identify situations where siblings would miss school because transportation is

**Table 5**

**Research Showing a Positive Relationship between Health and Academics**

HEALTH COMPONENTS	RESEARCH FINDINGS	STUDY AUTHORS
General physical health	• Meeting the health needs of students resulted in better grades and improved school attendance.	Furstenberg, Cook, Eccles, Elder, & Sameroff 1999
	• Investing in children’s physical health needs promotes learning over the school years and impacts school readiness and early learning.	Mistry, Crosby, Huston, Casey, & Ripke 2002
	• Middle and high school students with recurrent health problems also reported school failure.	Needham, Crosnoe, & Muller 2003
	• Lower grades were earned by obese adolescents and those at risk for obesity.	Crosnoe & Muller 2003
School health services	• Schools with health services contribute positively to students’ health.	Ma 2000; Millstein 1988
	• Students who used school-based clinics were more likely to stay in school, be promoted, and graduate.	McCord, Klein, Foy, & Fothergill 1993
	• Schools health services promote student achievement through lower absenteeism and dropout rates as well as improvements in student attitudes about learning.	Felner & Felner 1989

SOURCE: Hanson, Muller, Austin, & Lee-Bayha, J. (2005)

unavailable (e.g., parent had to take ill child to doctor or emergency room) or because they have to stay home to provide care to the ill sibling. Specific ways cited by Basch (2010) that asthma can directly relate to absenteeism include:

- Poorly controlled symptoms
- Doctor’s appointments
- Environmental irritants at school
- Fatigue due to attacks during sleep
- Failure to take medication
- Secondary illnesses related to asthma

Factors that determine school attendance for children with asthma may play a role in determining school attendance for other chronic illnesses just as factors related to improving school conditions to address asthma symptoms likely generalize to improving other chronic health conditions. Systemic changes that provide management and support systems for school health and mental health services; education; healthy school climate; physical education; and coordinated school, family, and community efforts are needed. Concerning effective approaches to providing school health services, Murray et al. (2007) concluded that overall, the implementation of a coordinated approach to addressing children's well-being showed promise for improving academic achievement. Specific actions that focus on action plans, student identification, policies that support student medication, staff and family, training, and a full-time registered school nurse on site are recommended by the CDC and the National Asthma and Education and Prevention Program (as reported in Basch, 2010).

The presence of a school nurse in the public schools has a long history of supporting school attendance (Weismuller, Grasska, Alexander, White, & Kramer, 2007), especially among minority students (McCord, Klein, Foy, & Fothergill, 1993) and research findings indicate a strong relationship between school attendance and achievement. In other words, attendance is viewed as a necessary prerequisite to academic success (Klem & St. Connell, 2004). More specifically, nurses in schools have a positive effect on academic performance, school attendance, and healthy behaviors of students (Guttu, et al., 2004). A review of 15 studies found that school nurses can impact school performance, such as reducing absenteeism through the management of chronic diseases as well as through health instruction (Maughan, 2003). For instance, parents of children with asthma reported that their children missed fewer school days as a result of a comprehensive asthma education program (Clark, et al., 2004). School nursing interventions that targeted students with histories of high rates of absenteeism proved effective in decreasing the number of days of absent from school. Regular school attendance encourages a student to develop healthy habits, to take part in developmentally appropriate activities, and to be regularly involved with their education (Weismuller, et al., 2007). In a study on the impact of school nurse case management on several school outcomes, Bonaiuto (2007) found that students improved in attendance, academics, health compliance, and quality of life.

### ***ISSUE 5: More Research is Needed***

A review of 250 school nurse publications screened for empirical research designs resulted in 50 studies meeting the criteria. The majority of the research was descriptive, preventing conclusions about school nursing practice or policy making (Wainright, Thomas, & Jones, 2000). In the next three years, empirical research on school nurses began to surface. Maughn (2003) reported finding 11 quasi-experimental designs with 7 studies showing a significant change in absenteeism that a school nurse could influence. Though none of the studies established a clear link between school nurses and outcomes, she concluded from her review of 15 research articles that school nurses can positively affect outcomes for students with high rates of absenteeism, asthma, anxiety, tensions headaches, and coping skills. Wyman (2005) conducted a matched comparison study on the impact of school nurses on dismissal rates and found that 57% fewer students had an early dismissal with a school nurse than students without a school nurse.

Perhaps the largest school nurse initiative was the Essential School Health Service (ESHS) program implemented in Massachusetts. The ESHS program was designed to address the impact of societal changes on student health care needs and had the following goals: (a) provide high quality school health services to all children; (b) support the educational process; and (c) link school health service programs to the health care delivery system that serves children and their families (Massachusetts Department of Public Health, 1998). Considered a national model, school nurses hold a prominent role in the ESHS model. While services provided by nurses were heavily documented, the final report (Massachusetts Department of Public Health, 2008) did not provide outcome data on the relationship between student health and academics.

Identifying correlational relationships between variables provides direction for research; however, it is time to expand our understanding of the relationship between health and academics. Randomized or quasi-experimental studies are needed to pinpoint the variables that significantly contribute to school-based health approaches that lead to healthier and more academically successful students.

# STRATEGIES

## ***STRATEGY 1: Assign School Nurses to Individual Schools to Ensure Equitable and Systemic Access to Health Care for all Children***

The requirement to attend school is the common denominator for 50 million U.S. children. Equipping those schools to deliver health services will ensure that all children receive basic health care. In 1902, the first school nurses were placed in four schools by the New York Department of Education. For over 100 years, nurses have been employed in schools (Guttu, et al., 2004). Today, there are approximately 56,000 full-time nurses who work with other healthcare providers who serve as the primary care providers for the approximately 8 million children without health insurance. They provide daily care for health conditions, help coordinate community care, and conduct health screenings (e.g., vision and hearing) that promote early identification of health issues (Guttu, et al., 2004).

The National Association of School Nurses (2006) recommends a student to nurse ratio of 750:1 in a regular student population, yet few school systems consistently reached this ratio. In reality, only 32% of junior high/middle and senior high schools meet the recommended ratio (Guttu, et al., 2004). A measure of the impact of school nurses on student health is whether the student: nurse ratio is related to student health outcomes. Guttu, et al., (2004) found that districts with lower student to nurse ratios were more likely to identify children with chronic illnesses and nurses were more likely to be involved in their care. It is estimated that one in four students has a vision difficulty requiring treatment. Research has found no difference in screening rates related to student to nurse ratios; however, a significant difference in the number of students who received follow-up treatment was reported - lower ratios resulted in more comprehensive care for the students (Guttu et al., 2004). Bradley (1998) explored how the availability of school nurses is related to a child's well-being in 47 states and found that states with lower student-to-nurse ratio had higher well-being indexes, whereas those with higher ratios had lower scores.

The CSHP is a concept developed and extensively researched by the CDC. The CSHP provides a framework for managing new and existing health-related programs and services in schools and the surrounding community (Stoltz, Coburn, & Knickelbein, 2009). Incorporating the CSHP approach into the provision of health services and prevention is practical and effective in promoting the academic success of students (Kolbe, 2005) and school nurses can play a key role in successful implementation of the CSHP.

Implementation of a CSHP with the school nurse as a school-based conduit of the health system and the health service provider is the systemic component of Strategy 1. The CDC first proposed the concept of CSHP to improve school children's health status. The CSHP program promotes: (a) positive interaction among health education, (b) physical education, (c) health services, (d) nutrition services, (e) counseling/psychological/social services, (f) the school environment, (g) health promotion activities for staff, and (h) family and community involvement (Prevention, 2009). These eight components can help improve students' knowledge, behaviors, attitudes, and skills in health; they can also improve academic and social outcomes.

The health services component of the CSHP model highlights the importance that school nurses play in the improvement of the health and well-being of school children. In the CSHP model, health services are defined as services provided for students to appraise, protect, and promote health. These services are designed to: (a) ensure access and/or referral to primary health care services, (b) foster appropriate use of primary health care services, (c) prevent and control communicable disease and other health problems, (d) provide emergency care for illness or injury, (e) promote and provide optimum sanitary conditions for a safe school facility and school environment, and (f) provide educational and counseling opportunities for promoting and maintaining individual, family, and community health (Jones, 2008).

***STRATEGY 2: Utilize School Nurses to Reduce Health Care Costs, Provide Preventive Services, and Treat Health Issues that Interfere with Academic Achievement***

School nurses help contain health care costs and promote disease prevention by identifying health issues earlier; providing education on healthy living and disease prevention; reducing the number of emergency room visits, and ensuring that eligible students are enrolled in public health care programs such as Children's Health Insurance Programs (CHIP). Table 3 highlights the extent to which nursing services focus on prevention and the comprehensiveness of school nurse services in addressing the eight components of the CSHP model. Nearly all of the services listed in Table 3 address disease prevention and all of the items, especially monitoring attendance and dismissals, have the potential to directly impact academic achievement. Fewer health-related dismissals mean that children spend more time in school and research has shown that schools with full-time nurses have fewer health-related dismissals (Allen, 2003). Pairing school nurses with a CSHP is a promising strategy for delivering systemic, cost-effective health care services to students that will eliminate some of the health issues that interfere with success in school. School nurses are well-qualified to help schools bring a CSHP model to full implementation and can also serve as a leader in helping schools assess school health needs and develop action plans using the CDC's School Health Index (SHI).

The SHI is a free tool designed to guide school action plans aimed at health improvements (see CDC, 2009) using prevention strategies. The SHI is grounded in and structured around the CDC's CSHP Model and is designed for stakeholders to assess each of the eight components of the CSHP and to develop a plan to improve their school's focus primarily on the prevention of health issues related to: (a) physical activity and physical education, (b) healthy eating, (c) tobacco-use prevention, (d) unintentional injury and violence prevention, and (e) asthma (Prevention, 2009). The SHI enables schools to (a) identify the strengths and weaknesses of their health-promotion policies and programs, (b) develop an action plan for improving student health, and (c) involve teachers, parents, students, and the community in improving school policies, programs, and services. When schools follow the recommendations described above and use the SHI, they are implementing a CDC recommended approach to improving student wellness.

School nurses provide preventive and screening services, health education and counseling, health assessment of students, interventions for illness, injuries, obesity, and communicable

diseases (Pediatrics, 2008). CSHPs provided in conjunction with school nurses can make a major impact on the students' ability to succeed in school. This impact is reflected in better attendance, decreased dropouts and suspensions, and higher graduation rates (McCord et al., 1993). Related, Freudenberg and Ruglis (2007) connected student health to high school drop-out rates and called for health professionals to reframe the school dropout rate as a public health issue. These authors suggested a CSHP and a school-based health clinic as two health-based interventions likely to help kids stay in school.

**Table 3****Contributions of School Nurse to Systemic Health Care**

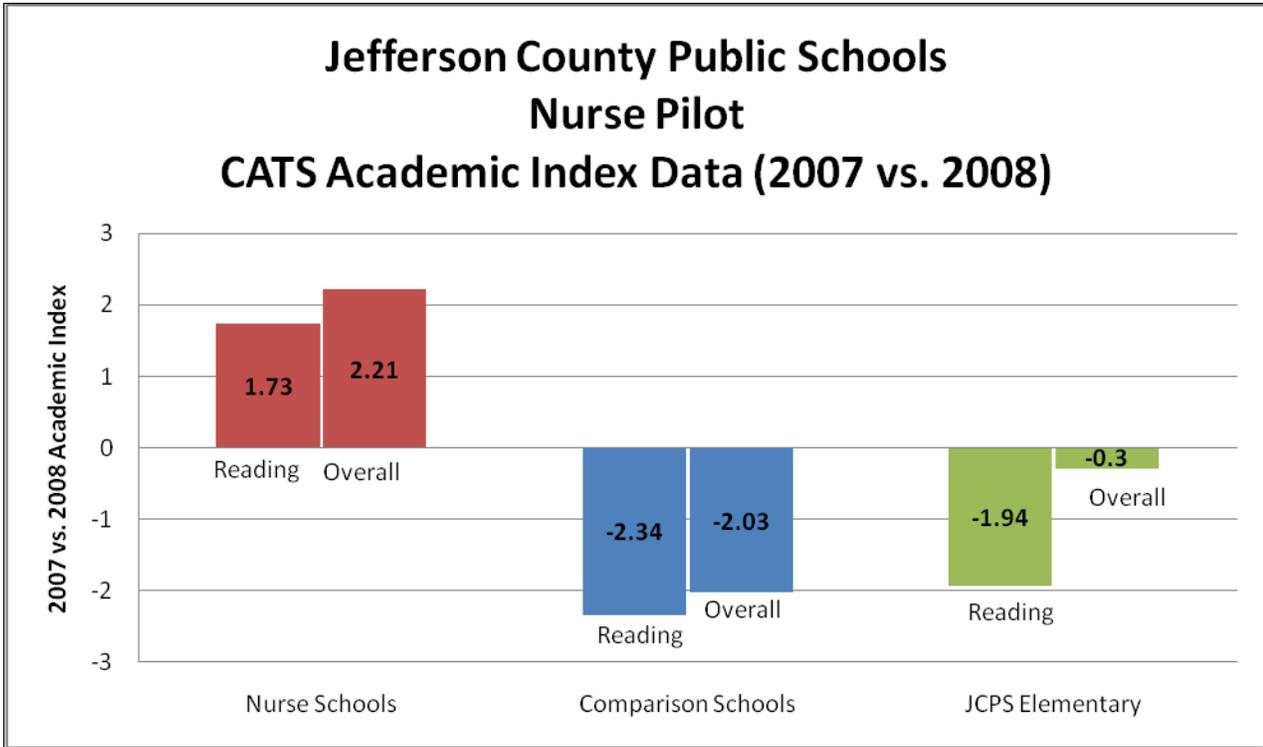
<b>CSHP COMPONENTS</b>	<b>EXAMPLES OF SCHOOL NURSE CONTRIBUTIONS</b>
Health Services	<ul style="list-style-type: none"> <li>• Provide early diagnosis of illness (based on scope of practice) that can speed recovery and prevent contamination of others</li> <li>• Manage chronic illnesses, life-threatening allergies, and medical emergencies in schools</li> <li>• Ensure safety in management of medications</li> <li>• Provide vision and hearing screening that supports educational achievement</li> <li>• Support the integration of children with medical needs into mainstream classrooms</li> <li>• Provide immediate referral to a medical professional</li> <li>• Monitor the health condition and health-related trends of the student body (e.g., health-related attendance declines)</li> <li>• Assist medically uninsured with enrolling in CHIP programs</li> </ul>
Health Education	<ul style="list-style-type: none"> <li>• Ensure selection and delivery of a comprehensive school health education programming and curriculum</li> <li>• Collaborate with district health service personnel to plan, implement, and evaluate health education services</li> </ul>
Physical Education	<ul style="list-style-type: none"> <li>• Work with Physical Education teacher to conduct physical fitness assessments</li> <li>• Identify students with high risk health profiles and develop intervention plan</li> </ul>
Family and Community Involvement	<ul style="list-style-type: none"> <li>• Provide and arrange for health education classes on topics that reflect family and community needs such as controlling hypertension</li> <li>• Support parents and families with health-related issues</li> </ul>
Health Promotion for Staff	<ul style="list-style-type: none"> <li>• Provide physical fitness assessments; provide education on staff fitness and health needs</li> <li>• Provide information on health improvement strategies</li> </ul>
Healthy School Environment	<ul style="list-style-type: none"> <li>• Provide important input to policies regarding school wellness and disaster preparedness</li> <li>• Monitor attendance and dismissals</li> </ul>
Counseling and Psychological and Social Services	<ul style="list-style-type: none"> <li>• Provide referrals to school counselor, family resource and youth service center, or counseling agency</li> <li>• Monitor status of student as a member of the student support staff team</li> </ul>
Nutrition Services	<ul style="list-style-type: none"> <li>• Consult with nutrition services and work with students who may have eating disorders or special nutritional needs</li> </ul>

### ***STRATEGY 3: Conduct High Quality Research on School Nurses to Support Empirically-Driven Policy Changes for Schools***

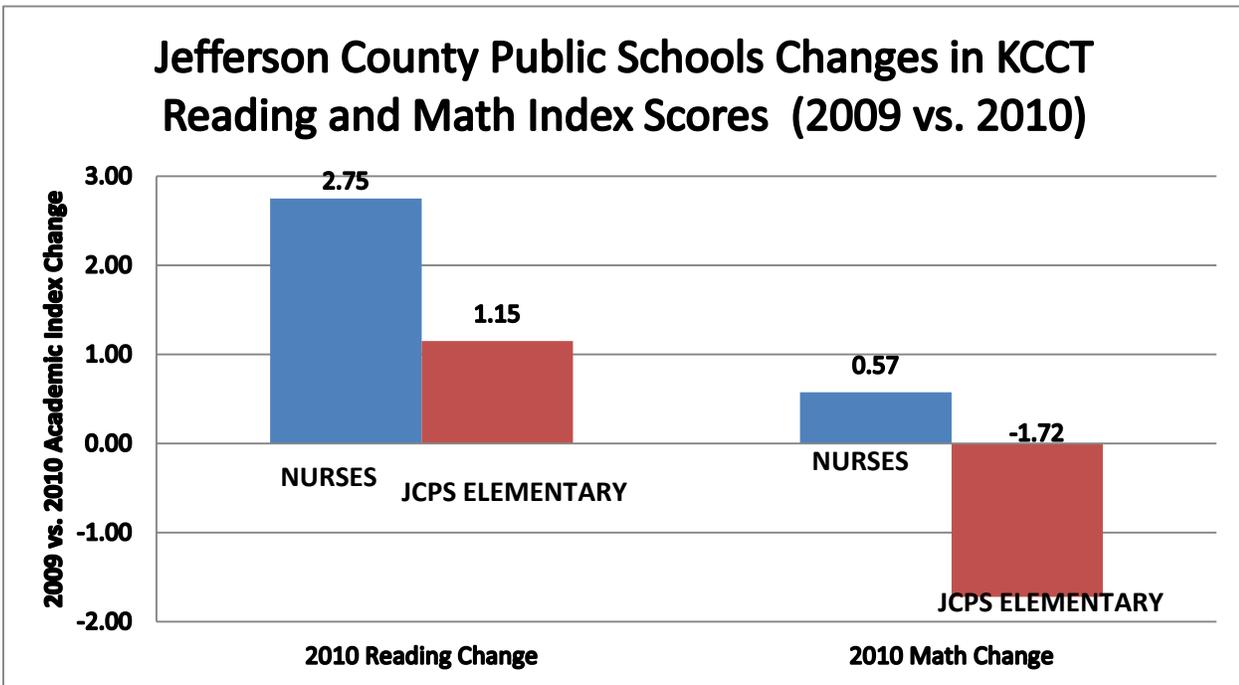
Resources need to be allocated to support empirical research on school nurses so that the factors that influence the health and academic success of students can be identified. In general, the findings of Wainright, et.al (2000) still hold true in that much of the research available today remains correlational or descriptive. More research designs that utilize random assignment, quasi-experimental designs, or at least matched comparison groups are needed so that educational and health leaders can confidently use research outcomes to build successful school nurse programs. Two programs that used comparison groups to study the impact of nurses are described below.

In 2010, JCPS had 16 full-time nurses with each assigned to one elementary school (14 of which are Title 1 schools). Six Advanced Registered Nurse Practitioners (ARNPs) provide health services for the entire district and serve as clinical supervisors for the Licensed Practical Nurses (LPNs) assigned to the 16 schools. The district's internal evaluation shows the following counts for LPN school nurse health services for the 2009-2010 school year: (a) 9,066 health history forms reviewed, (b) 3,177 physicals reviewed, (c) 7,192 immunizations reviewed, (d) 2,406 height/weight screenings, (e) 1,530 vision screenings, (f) 6,719 head lice screenings, (g) 37,545 well room visits, and (h) 90% of students who visited a well room were returned to their classroom. Additionally, LPNs made 6,780 phone consultations regarding student health, and taught formal health classes to 8,560 students. They assisted in 379 emergencies and called Child Protective Services 69 times. Staff at three elementary redesign schools (these schools have been equipped with a number of curriculum and professional development opportunities) consistently rate having school nurses as one of the top assets provided in the redesign initiative. District wide, asthma, allergies, and diabetes are the most commonly documented chronic illnesses in the district.

Data from the first two pilot years showed a small advantage for attendance for one-year improvement compared to the average for district elementary schools. The academic data in Figure 1 show that the schools with nurses outgained both a comparison group and the district elementary schools on gains in the academic index for reading. A mid-year 2009 study of the impact of school nurses on attendance for students with documented chronic conditions showed attendance was 1% higher for students with asthma and 2% higher for students with diabetes for students with access to a school nurse. The 2009-2010 data for the 16 schools with nurses showed advantages for both academics and attendance. Schools with nurses showed gains that outpaced district elementary schools on the academic index for both reading and math (see Figure 2).



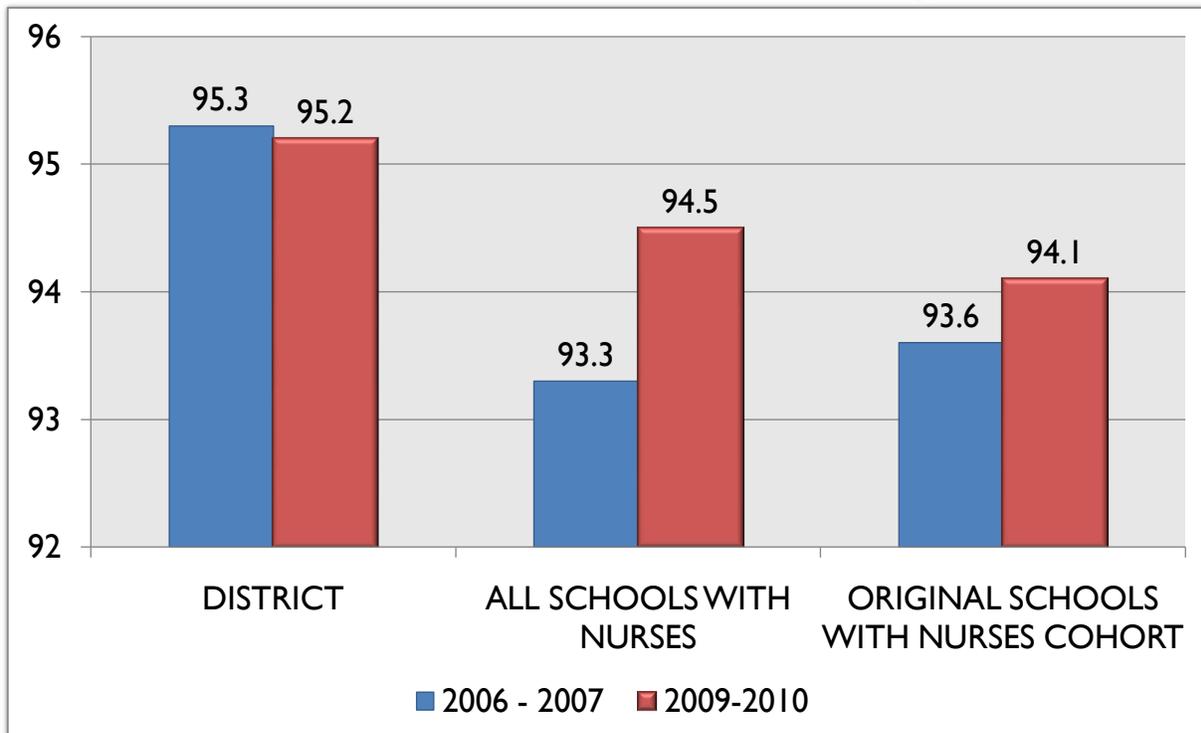
**Figure 1. Year 1 Academic Index Comparisons for School Nurse Pilot Program**



**Figure 2. Year 3 Academic Index Comparisons for School Nurse Pilot Program**

Attendance data for schools with nurses outpaced district gains using two different approaches to data analysis. The first analysis approach examined attendance data for the actual set of schools; accounting for yearly additions to the number of schools with nurses. The second analysis approach examined attendance data over the course of the pilot program for the original, remaining set of schools with nurses. Attendance advantages have been reported each year of the program but additional, more rigorous research is needed to understand the relationship between school-based nursing, attendance, and academic achievement.

## JCPS Average Attendance for Baseline and Year 3 for School Nurses Pilot Program



▶ All School with Nurses = actual set of schools with nurses each year; Original Schools with Nurses Cohort = original set of schools over time

**Figure 3. Year 3 Attendance Data for School Nurse Pilot Program**

Spearheaded by Pat Cooper in 1996 (the district's superintendent at the time), the McComb Mississippi School District launched a Safety Net Health program which featured the CSHP's eight components and a ninth component—academics (Cooper, 2003). The nine-component model was used at the site level and district wide. The health services component provided services for students in a clinic setting to appraise, protect, and promote health. Existing services were re-organized and expanded to include a full-time registered nurse in the clinic who also served on the health and wellness student assistance team focused on prevention. A centralized district health office was administered by a health service supervisor. The Safety Net program created a 450:1 student to nurse ratio where 80% of students seeing the nurse were returned to the classroom. The Safety Net program established a **comprehensive, integrated** approach to student, staff, and parent wellness. By 2003, the Safety Net Program was credited with achieving the following:

- Increased reading, language and math test scores
- Increased graduation rates
- Decreased dropout rates
- Increased inclusion of special education students
- Decreases in suspensions/detentions and expulsions

The JCPS and McComb County programs provide data that indicate a potentially important connection between school nurses, improved student health, and academic achievement. They also provide models to extend into empirical research initiatives. Now is the time to substantiate these findings and others described in this paper through more rigorous research that demonstrates a causal relationship between school nursing and improvements in student outcomes.

## CONCLUSIONS AND RECOMMENDATIONS

Childhood is an important time when health behaviors are learned and adopted (Brustad, 1993); therefore, it is crucial that school systems promote health enhancing behaviors in this developmental stage (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2002). In a society where achievement gaps, health disparities, and social and economic injustices are prevalent, giving all children the chance to achieve academic success is a difficult but worthy goal. Since school attendance and academic performance are highly correlated with health and well-being, especially for urban, disadvantaged children, it is important to identify school and environmental programs and policies that cultivate success (Services, 2000). Schools can't fix all of the health problems of our youth but there is a movement gaining momentum that calls for an integrated approach to health care for children and schools should play a pivotal role. JCPS has a pilot school nurse program in place that has shown promising outcomes for attendance and academic achievement. **Healthy Minds** is an expansion of this initiative which seeks to place a full-time nurse in every JCPS school.

Factors affecting student achievement include changing family support systems and more students with chronic illnesses such as asthma, diabetes, and obesity who are also taking more prescription medications. These factors challenge our students and school leadership every day. Even positive changes such as more inclusion of handicapped students into regular schools present challenges when necessary health personnel are not readily available. Of special concern is the impact of health problems on those who lack the financial resources to access regular health care. Current research documents the accelerating health needs of children and significant links between healthy students and academic success. This paper outlines three strategies for utilizing school nurses to improve the health and academic performance of this generation of children.

- **STRATEGY 1: Assign School Nurses to Individual Schools to Ensure Equitable and Systemic Access to Health Care for all Children**
- **STRATEGY 2: Utilize School Nurses to Reduce Health Care Costs, Provide Preventive Services, and Treat Health Issues that Interfere with Academic Achievement**
- **STRATEGY 3: Conduct High Quality Research on School Nurses to Support Empirically-Driven Policy Changes for Schools**

Preventing children from developing health risks is the best way to change the negative health statistics presented in this paper. It makes sense from economic, educational, and social responsibility viewpoints to invest in systemic health prevention services for our children. Health data for both children and adults show a need to take immediate action by providing easily accessible healthcare designed to prevent avoidable illnesses and provide needed treatments. When health issues are the dominant factors in a child's life, attending and succeeding in school too often become insurmountable obstacles. This paper provides compelling evidence that pairing school nurses with a CSHP approach is a viable strategy for improving the health and academic success of America's children.

## REFERENCES

- Akinbami, L.J. (2006). The State of Childhood Asthma, United States, 1980-2005. *Advance data from Vital and Health Statistics: No. 391*, MD: National Center for Health Statistics.
- Allen, G. (2003). The Impact of Elementary School Nurses on Attendance. *The Journal of School Nursing, 19*, 225-231.
- American Society for Curriculum and Development (2007). *The Learning Compact Redefined: A Call to Action*. Retrieved March 30, 2010, from <http://www.ascd.org/SearchResults.aspx?s=Learning%20Compact%20Redefined&c=1&n=10&p=0>
- Basch, C. E. (2010). *Healthier Students are Better Learners: A Missing Link in School Reforms to Close the Achievement Gap*. Retrieved March 15, 2010 from [http://www.equitycampaign.org/i/.../12557\\_EquityMattersVol6\\_Web03082010.pdf](http://www.equitycampaign.org/i/.../12557_EquityMattersVol6_Web03082010.pdf)
- Baranowski, T., Cullen, K. W., Nicklas, T., Thompson, D., & Baranowski, J. (2002). School-based obesity prevention: A blueprint for taming the epidemic. *American Journal of Health Behavior, 26*(6), 486-493.
- Bonaiuto, M. M. (2007). School nurse management: Achieving health and educational outcomes. *Journal of School Nursing, 23*, 202-209.
- Bradley, B. J. (1998). Establishing a research agenda for school nursing. *Journal of School Nursing, 14*, 4-13.
- Bruggers, J. (2010, June 3). EPA issues new sulfur dioxide rule; Louisville, Floyd County, likely not complying. Retrieved June 10, 2010 from: <http://www.courier-journal.com/article/20100603/NEWS01/6030338/1016/OPINION/EPA-issues-new-sulfur-dioxide-rule—Louisville--Floyd-County--likely-not-complying>.
- Brustad, R. J. (1993). Who will go out and play? Parental and psychological influences on children's attraction to physical activity. *Pediatric Exercise Science, 5*, 210-223.
- Centers for Disease Control and Prevention (2003). *Student Health and Academic Achievement*. Atlanta: National Center for Chronic Disease Prevention and Health. Retrieved April 22, 2010 from [http://www.cdc.gov/HealthyYouth/health\\_and\\_academics](http://www.cdc.gov/HealthyYouth/health_and_academics)

- Centers for Disease Control and Prevention (2005). State-Specific Prevalence of Obesity Among Adults – United States, 2005. *Morbidity & Mortality Weekly Report*. 2006;55(36):985-988.
- Centers for Disease Control and Prevention (2008a). *Behavioral Risk Factor Surveillance System Survey Data*. Atlanta: U.S. Department of Health and Human Services  
Retrieved March 15, 2010 from <http://apps.nccd.cdc.gov/brfss/display.asp>
- Centers for Disease Control and Prevention (2008b). *Summary Health Statistics for U.S. Children: National Health Interview Survey, 2008*: National Center for Health Statistics.  
Retrieved April 2, 2010, from [http://www.cdc.gov/nchs/nhis/new\\_nhis.htm](http://www.cdc.gov/nchs/nhis/new_nhis.htm)
- Centers for Disease Control and Prevention (2009). *Healthy Youth*. Atlanta: National Center for Chronic Disease Prevention and Health Promotion. Retrieved April 22, 2010 from <http://www.cdc.gov/HealthyYouth>
- Centers for Disease Control and Prevention (2010). *Chronic Disease Control and Prevention*. Atlanta: Centers for Disease Control and Prevention. Retrieved May 24, 2010 from <http://www.cdc.gov/chronicdisease/index.htm>
- Clark, N. M., Brown, R., Joseph, C. L., Anderson, E. W., Liu, M., & Valerio, M. A. (2004). Effects of a comprehensive school-based asthma program on symptoms, parent management, grades, and absenteeism. *Chest*, 125(5), 1674-1679.
- Cooper, P. (2003). *Children - Their Future Depends on What We Do Today*. Retrieved April 22, 2010 from <http://faculty.mwsu.edu/nursing/marty.gibson/pdf/pdfcorrections/coordinatedschoolhealthmodel.ppt>.
- Crosnoe, R., & Muller, C. (2003). *Weight, academic achievement, and school context: Examining the educational experiences of obese adolescents*. Austin: Population Research Center, University of Texas.
- Felner, R. D., & Felner, T. Y. (1989). Primary prevention programs in the educational context: A transactional-ecological framework and analysis. In L. A. Bond & B. E. Compas (Eds.), *Primary prevention and promotion in the schools*. Newbury Park, CA: Sage Publications.
- Freudenberg N, & Ruglis J. (2007). Reframing school dropout as a public health issue. *Prev Chronic Dis* 2007;4(4). Retrieved April 22, 2010 from: [http://www.cdc.gov/pcd/issues/2007/oct/07\\_0063.htm](http://www.cdc.gov/pcd/issues/2007/oct/07_0063.htm)

- Furstenberg, F. F., Cook, T. D., Eccles, J., Elder, G. H., & Sameroff, A. (1999). *Managing to make it: Urban families and adolescent success*. Chicago: University of Chicago Press.
- Guttu, M., Keehner, M., Engelke, M.S. (2004). Does the School Nurse-to-Student Ratio Make a Difference? *Journal of School Health*, 74, 6 – 9.
- Hanson, T. L.; Muller, C.D.; Austin, G; Lee-Bayha, J. (2005). Research Findings About the Relationship Between Student Health and Academic Success. in *Getting Results: Developing Safe and Healthy Kids Update 5, Chapter 1, 5 - 20*. California Department of Education.
- Jones, S. E. (2008). A CDC Review of School Laws and Policies Concerning Child and Adolescent Health. *Journal of School Health*, 78(2), 69-128.
- Kentucky Voices for Health (2008). Estimate of Uninsured Kentucky Children who are Currently Eligible but not enrolled in Medicaid/KCHIP. Retrieved June 16, 2010 from: [http://kyvoicesforhealth.com/siteadmin/modules/page\\_editor/images/files/Kchip%20County%20Chart.jpg](http://kyvoicesforhealth.com/siteadmin/modules/page_editor/images/files/Kchip%20County%20Chart.jpg)
- Klem, A., & St. Connell, J. (2004). Relationships matter: Linking teacher support to student engagement and achievement. *Journal of School Health*, 74(7), 262-273.
- Koebnick, C. S. (March, 2010). Prevalence of Extreme Obesity in a Multiethnic Cohort of Children and Adolescents. *Journal of Pediatrics* , 1-6.
- Kolbe, L. J. (2005). A framework for school health programs in the 21st century. *Journal of School Health*, 75, 226-228.
- Ma, X. (2000). Health outcomes of elementary school students in New Brunswick: The education perspective. *Evaluation Review*, 24, 435-456.
- Massachusetts Department of Public Health (2008). The Essential School Health Services Program Data Report 2006 – 2007 School Year. Massachusetts Department of Public Health Bureau of Community Health Access and Promotion, Office of Statistics and Evaluation.
- Maughan, E. (2003). The impact of school nursing on school performance: A research synthesis. *Journal of School Nursing*, 19(3), 163-171.
- McCord, M. T., Klein, J. D., Foy, J. M., & Fothergill, K. (1993). School-based clinic use and school performance. *Journal of Adolescent Health*, 14(2), 91-98.
- Millstein, S. G. (1988). The potential of school-linked centers to promote adolescent health and

- development. Washington, DC: Carnegie.
- Mistry, R. ; Crosby, D.; Huston, A.; Casey, D.; & Ripke, M. (2002). Lessons from New Hope: The impact on children's well-being of a work-based antipoverty program for children. In G. J. Duncan & P. L. Chase-Lansdale (Eds.), *For better or for worse: Welfare reform, families, and child well-being*. New York: Russell Sage.
- Murray, N. G., Low, B. J., Hollis, C., Cross, A. W., & Davis, S. M. (2007). Coordinated school health programs and academic achievement: A systematic review of the literature. *Journal of School Health, 77*(9), 589-600.
- Needham, B., Crosnoe, R., & Muller, C. (2003). *Academic failure in secondary school: The inter-related role of physical health problems and educational context*. Austin: Population Research Center, University of Texas.
- National Association of School Nurses (2006). *Position Statement on Caseload Assignments*. Retrieved April 20, 2010, from <http://www.nasn.org/Default.aspx?tabid=209>
- National Association for Sport and Physical Education (2001). *Appropriate Practices for Middle School Physical Education*. Reston, VA: National Association for Sport and Physical Education.
- Norton Healthcare (2010). Retrieved June 15, 2010, from <http://www.nortonhealthcare.com/body.cfm?id=1429>
- Nunn, K., Hudson, N., Robeson, S. (2009). Kentucky Asthma Surveillance Report. Retrieved June 15, 2010, from <http://chfs.ky.gov/NR/ronlyres/23A767BB-66D2-4F3D-A060-C81F8F5A36C3/0/2009StatePlanforAddressingAsthmainKentucky.pdf>
- Ogden C.L., Carroll M.D., Curtin L.R., McDowell M.A., Tabak C.J., Flegal, K.M. (2006). Prevalence of overweight and obesity in the United States, 1991-1998. *Journal of the American Medical Association, 295*:1549-1555.
- Ogden C.L., Carroll M.D., Flegal K.M.(2008). High body mass index for age among US children and adolescents, 2003-2006 . *Journal of the American Medical Association, 299*(20):2401-2405.
- Pediatrics, A. A. o. (2008). The role of the school nurse in providing health services. *121*(5), 1052-1056.
- Prevention, C. f. D. C. a. (2007). *Comparison Between Kentucky Students and U.S. Students 2007 YRBS*.

- Prevention, C. f. D. C. a. (2009). Healthy Youth! Coordinated School Health Program. from <http://www.cdc.gov/HealthyYouth/CSHP/>
- Services, U. S. D. o. H. a. H. (2000). *Healthy People 2010*. Atlanta: USDHHS, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- Stoltz, A. D., Coburn, S., & Knickelbein, A. (2009). Building local infrastructure for Coordinated School Health Programs: A pilot study. *Journal of School Nursing, 25*(2), 133-140.
- Trust for America's Health (2008). Healthy America Report. Retrieved March 30, 2010, from <http://healthyamericans.org/states/?stateid=KY>
- Trust for America's Health (2009). Prevention for a Healthier America: Investments in Disease Prevention Yield Significant Savings, Stronger Communities Report. Retrieved April 22, 2010 from <http://healthyamericans.org/reports/prevention08>
- United States Dietary Association (2005). *Dietary Guidelines for Americans*, 6th ed. Washington, DC: US Government Printing Office.
- Wainright, P.; Thomas, J.; Jones, M. (2000). Health promotion and the role of the school nurse: a systematic review. *Journal of Advanced Nursing, 32*(5), 1083 – 1091.
- Weismuller, P. C., Grasska, M. A., Alexander, M., White, C. B., & Kramer, P. (2007). Elementary school nurse interventions: Attendance and health outcomes. *The Journal of School Nursing, 23*(2), 111-118.
- Wyman, L. (2005). Comparing the number of ill or injured students who are released early from school by school nursing and nonnursing personnel. *The Journal of School Nursing, 21*(6), 350-355.
- Zapata L.; Bryant C.; McDermott, R.; & Helefinger, J. (2008). Dietary and physical activity behaviors of middle school youth: The Youth Physical Activity and Nutrition Survey. *Journal of School Health, 78*(1):9-18.

## AUTHOR NOTE

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