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## A Needs Assessment For Annual Physical Examination For Selected Richmond Public School Children

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*Virginia Commonwealth University*

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Master of Public Health Research Project

**A needs assessment for annual physical examination  
for selected Richmond Public School children**

by

*Aimee Gibbs*

*Advisor: Dr. Jack O. Lanier*

*Preceptor: Dr. V Ramakrishnan*

Department of Epidemiology and Community Health  
Master of Public Health Program  
MPH Research Project: EPID 691

Virginia Commonwealth University  
Richmond, Virginia

*August 2006*

# Submission Statement

## Master of Public Health Research Project

This MPH Research Project report is submitted in partial fulfillment of the requirements for a Master of Public Health degree from Virginia Commonwealth University's School of Medicine. I agree that this research project report be made available for circulation in accordance with the program's policies and regulations pertaining to documents of this type. I also understand that I must receive approval from my Faculty Advisor in order to copy from or publish this document, or submit to a funding agency. I understand that any copying from or publication of this document for potential financial gain is not allowed unless permission is granted by my Faculty Advisor or (in the absence of my Faculty Advisor) the Director of the MPH Program.

# Master of Public Health Research Project Agreement Form

## Department of Epidemiology and Community Health

Student name: Aimee Gibbs

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Home phone: (703) 647-6000

Number of semester hours (3-6): 3

Semester: Summer

Year: 2006

Please complete the following outline. Do not exceed 2 pages (A-H).

### A. PROJECT TITLE:

“A needs assessment for annual physical examination for selected Richmond Public School children”

### B. PURPOSE (state hypothesis/research question):

The purpose of this study is to (1) compare the presence of risk factors and health indicators in Richmond, Virginia to two surrounding counties and with the state of Virginia and (2) to assess the need for a program designed to conduct an annual physical examination program for selected Richmond Public Schools.

### C. SPECIFIC OBJECTIVES (list major aims of the study):

- To collect and analyze data on risk factors of inadequate access to health care pertaining to children enrolled in selected Richmond City Public Schools
- Examine and assess policy and procedures governing current wellness programs for Richmond Public Schools

### D. DESCRIPTION OF METHODS

*D.1. Identify source(s) of data (eg, existing data set, data collection plans, etc):*

Collect data on children and their families in Richmond, Chesterfield County, Henrico County, and Virginia from the following sources: Data was gathered from the US Census Bureau's Decennial Census, Kids Count census data, and the Annie E Casey Foundation's database of Community-Level Information for Kids (CLIKS).

*D.2. State the type of study design (eg, cross-sectional, cohort, case-control, intervention, etc):*

This will be a descriptive study providing a needs assessment for annual physical examination program in selected Richmond city schools.

*D.3. Describe the study population and sample size:*

The study population will be children in Richmond, Chesterfield County, Henrico County, and Virginia.

*D.4. List variables to be included (If a qualitative study, describe types of information to be collected)*

- Population count of children under 18
- Ethnicity/race distribution of children under 18
- Median family income
- Poverty status
- Female householder families
- Maternal education status
- Teen pregnancy rates
- Asthma hospitalization
- Lead poisoning cases

*D.5. Describe methods to be used for data analysis (If a qualitative study, describe general approach to compiling the information collected)*

- Count data
- Risk ratios
- Poisson regression: Chi-square, p-values

**E. ANTICIPATED RESULTS:**

- 1) It is anticipated risk factors for lack of adequate health care in children will be prevalent in Richmond
- 2) The description of program development, as well as the findings from the needs assessment will serve as a model for similar localities.

**F. SIGNIFICANCE OF PROJECT TO PUBLIC HEALTH:**

This project will show the steps of developing a program through the public school system to provide physical examination for children who do not currently receive physical examinations on a regular basis. It is significant to public health because it could provide early detection and treatment of unknown health and medical conditions. Through research, no other school district in the nation was found that administers complete annual physical examinations. The launching of this program would become the first to provide annual screening for **physical and mental health** conditions for selected schools in Virginia and is expected to serve as a model for other school districts to address the health needs of children who are at risk of development of certain health conditions.

**G. IRB Status:**

- 1) Do you plan to collect data through direct intervention or interaction with human subjects? \_\_\_yes \_\_\_Xno
- 2) Will you have access to any existing identifiable private information? \_\_\_yes \_\_\_Xno

Please indicate your IRB status:

- \_\_\_ to be submitted (targeted date \_\_\_\_\_)
- \_\_\_ submitted (date of submission \_\_\_\_\_; VCU IRB # \_\_\_\_\_)
- \_\_\_ IRB exempt review approved (date \_\_\_\_\_)
- \_\_\_ IRB expedited review approved (date \_\_\_\_\_)
- X IRB approval not required

**H. PROPOSED SCHEDULE:** Start Date: 10-2005 Anticipated End Date: 8-2006

**I. INDICATE WHICH OF THE FOLLOWING AREAS OF PUBLIC HEALTH KNOWLEDGE WILL BE DEMONSTRATED:**

1. Biostatistics – collection, storage, retrieval, analysis and interpretation of health data; design and analysis of health-related surveys and experiments; and concepts and practice of statistical data analysis.

yes no (if yes, briefly describe):

2. Epidemiology – distributions and determinants of disease, disabilities and death in human populations; the characteristics and dynamics of human populations; and the natural history of disease and the biologic basis of health. yes no (if yes, briefly describe):

3. Environmental Health Sciences – environmental factors including biological, physical and chemical factors which affect the health of a community. yes no (if yes, briefly describe):

4. Health Services Administration – planning, organization, administration, management, evaluation and policy analysis of health programs. yes no (if yes, briefly describe):

The proposal will demonstrate the application of public health practice and the assessment of policies, procedures and management structure applicable to the initiation of a program to administer annual physical examinations to school children enrolled in selected Richmond Public Schools.

5. Social/Behavioral Sciences – concepts and methods of social and behavioral sciences relevant to the identification and the solution of public health problems. yes no (if yes, briefly describe):

## **Table of Contents:**

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## Acknowledgements:

I would like to thank Dr. Jack Lanier for his help in this project and for allowing me to be a part of the development of the program to provide physical examinations for children in Richmond Public Schools.

I would also like to thank Dr. Ramakrishnan for his assistance in the analysis.

Additionally, I would like to thank Dr. Fitrer and Mrs. Rodgers from the Richmond Public School System for providing me the opportunity to work with the development of this program and gain further knowledge on the inner workings of public policy development.



**Abstract:**

**Introduction:** The following risk factors have found to be associated with inadequate health care and have been found to affect the well-being of children: racial or ethnic minority, poverty status, median family income, family structure of household, maternal education level, and parental employment status. Also, there has found to be health indicators including, teen pregnancy, asthma hospitalization, and lead poisoning cases that affect the well-being of a child and are associated with the presence of these risk factors in a population

**Objectives:** The objectives of this study is to (1) compare the presence of risk factors and health indicators in Richmond, Virginia to two surrounding counties and with the state of Virginia and (2) to assess the need for a program designed to conduct an annual physical examination program for selected Richmond Public Schools.

**Methods:** The United States Decennial Census data was collected for Richmond City, Chesterfield County, Henrico County, and for the state of Virginia. Also, data on health indicators was collected from Virginia Health Communities and Kids Count Data respectively. Ratios were calculated for the risk factors aforementioned, as well as for health indicators available. Poisson regression was used to determine the cumulative effect of a child have multiple risk factors.

**Results:** There was a significant difference between the four localities in regards to distribution of racial/ethnic minorities, poverty status of children, family structure of households with children, maternal education level, and parental employment status. Richmond was found to have higher ratios for all risk factors tested. In terms of the health indicators analyzed, there was a significant difference between Richmond, Chesterfield, Henrico, and Virginia in regards to teen pregnancy, asthma hospitalization, and lead poisoning cases, with Richmond having the highest prevalence of each of these indicators.

**Discussion:** Because of the prevalence of risk factors in Richmond children for inadequate access to health care, a program was designed to conduct an annual physical examination program for select Richmond Public schools. The initiative would attempt to identify populations within the city at greatest risk and provide a program that would not only provide annual physical examinations, but also provide continual care for children with additional health needs.

**Conclusions:** The use of public school systems for an avenue to provide needed health care for children has been found to be beneficial. The program described to provide annual physical examinations for children in selected Richmond Public Schools, can serve as a template for other communities with similar risk factors.

## **Introduction:**

An unknown number of children attend or begin school annually with undetected physical and mental conditions that may impede their ability to learn or progress at the expected grade level. The short- and long-term effects of physical and mental conditions in children, makes the health care of children an important issue. Also, because the health needs of children are uniquely different from adults, a focus on children's health is inherently important<sup>1</sup>.

Research by Stevens et al found that most health problems in children are acute and often preventable or treatable conditions that can be addressed through continuity of care<sup>1</sup>. Therefore, the use of effective, preventive methods has been found to be essential in addressing the health needs of children and in reducing childhood conditions such as hearing loss, which can result from untreated ear infections<sup>1</sup>. Continued primary care has found to be important for both the care of the patient and the success of the physician-patient relationship<sup>2</sup>. Particularly in children, access to a regular source of health care was found to be critical<sup>3</sup>. Children who have a regular source of care are more likely to receive recommended immunization by six years old<sup>3</sup> and Lieu et al found that children without a regular physician were much more likely to be delayed in the receiving needed immunization by more than three months<sup>4</sup>. Research by Wang et al showed that children without access to primary care were also more likely to utilize a hospital's emergency department for regular care as compared to children with adequate access to health care and a primary physician<sup>5</sup>. Having a usual source of health care has been found to be related to fewer hospitalizations, better problem or need recognition, lower costs, better prevention and increased satisfaction in children<sup>3</sup>.

Because of the benefits of preventive and continual care in children, it is important to look at the barriers that prevent some children from receiving appropriate care. One barrier to

health care is the lack of health insurance. Research has shown that children who are uninsured are more likely to not have adequate access to health care and to have worse health status than do children covered by Medicaid or private insurance<sup>5,6</sup>. Also, uninsured children are less likely to receive preventive care, increasing the risk of preventable conditions such as asthma and hearing loss<sup>3</sup>. Currently, it is estimated that more than 11 million children in the United States are uninsured<sup>7</sup>. This is a major public health concern and in recent years, the federal government has tried to increase coverage of children through the State Children's Health Insurance Program (S-CHIP) enacted by Congress in 1997<sup>8</sup>. This program was included in the Balanced Budget Act and was intended to improve insurance coverage of low-income children by including families whose incomes are too high to qualify for Medicaid<sup>8</sup>.

Even in children who are insured under Medicaid or S-CHIP, there was found to be an association between living with certain social and economic risk factors and reduced use of needed or optional health services for children<sup>3</sup>. An evaluation of S-CHIP found that extending health insurance alone to low-income children will not insure adequate use of health care. In particular, children living with these risk factors have not been shown to increase use of health care services when given public insurance coverage<sup>3</sup>. Therefore, even though lack of health insurance is a barrier to adequate healthcare in children, it is the underlying factors that must be studied to understand the problem.

Table 1 provides a literature review that provides a summary of studies that identify risk factors associated with both lack of health insurance and inadequate access to health care in children. Throughout the literature review, the following risk factors were found to be associated with a lack of health insurance and inadequate access to health care: racial/ethnic minority, family poverty status, median family income, female householder families, and maternal

education level<sup>9</sup>. In addition, a positive dose-response relationship has been found between an increased number of risk factors and poor health status in children<sup>9</sup>. There has also been shown to be an interrelationship between these risk factors, in that the existence of one risk factor makes the child more susceptible for other risk factors. As a result, not only do children with these risk factors have poorer health status, they also lack the resources and access to health care necessary for preventive medication and treatment<sup>9</sup>.

The continuance of disparities in health care and health status for racial and ethnic minorities makes it a risk factor for inadequate access to health care in children<sup>10</sup>. Shi et al found that minority children experience significant shortfalls in being able to access adequate health care as compared to white children, even after controlling for health insurance coverage, poverty status, and health status<sup>11</sup>. One risk associated with minorities is teen pregnancy, with the Center for Disease Control reporting that African American girls, ages 15 to 17 had a birth rate of 76 per thousand as compared to 23 per thousand for white girls in the same age group<sup>10</sup>. There are both direct and long-term implications of teen pregnancy, which impacts the well-being of the teenage mother, as well as her child's health status and living environment. Minorities are also more likely to live in poverty, with forty-two percent of African American children lived in poverty compared to eleven percent of white children in the United States in 1995<sup>10</sup>. Twenty-seven percent of Hispanic children were found to not have health insurance, as compared to fifteen percent and thirteen percent of black and white children respectively<sup>10</sup>. Hispanic children have also been found to be less likely to finish high school as compared to black or white children in the United States, putting them at increased risk for being unprepared for employment into adulthood and more likely to live in poverty<sup>10</sup>. Because of the association of race/ethnicity with various disparities, as well as the cumulative effect of the factors associated with racial

disparities, it is important that populations with high percentages of minorities be given special attention and that the health needs of the children in the community is addressed<sup>10</sup>.

Another risk factor to the well-being of children is the economic status of a child's family. Children who live in poverty are at greater risk for abuse, more likely to not receive adequate health care, and have greater difficulty in school<sup>10</sup>. Children living in poverty are also at a greater risk of teen pregnancy and as adults are more likely to earn less and be unemployed<sup>10</sup>. The Center of Disease reports that fifty percent of female householder families live in poverty, as compared to ten percent of two-parent households<sup>10</sup>.

The relationship between poverty and family structure is especially strong in certain racial groups<sup>10</sup>. In African American families, thirteen percent of children lived in poverty where there was a two-parent household as compared to sixty-two percent of children in female householder families. Sixty-six percent of Hispanic children lived in poverty in female householder families, as compared to twenty-eight percent in two-parent household. The change in family structure in recent years and increase in female householder families has been associated with increase births to unwed mothers, with one in three births in 1994 being to an unwed mother<sup>10</sup>. Children who live with one parent are substantially more likely to live in poverty than children who grow up with two parents. Also, unwed mothers have been found to be more likely to smoke during pregnancy and have children with low birth weight, after adjusting for both age and maternal education level<sup>10</sup>.

Another risk factor to the well-being of a child is teen pregnancy, which has serious implications to the young mother and the child. Teen pregnancy has been found to be associated with poverty and the inability of the mother to obtain a high school diploma. Heck et al found that maternal education level was associated with a child's access to health care and health care

needs, with children of mothers with less education being more likely to lack adequate health care, regardless of family structure<sup>12</sup>. Also, children born to teen mothers have been found to have lower levels of emotional support and cognitive stimulation and are also less likely to graduate from high school<sup>10</sup>.

Children who live in an environment with these aforementioned risk factors have also been found to be more likely to be abused and neglected. There are both short- and long-term consequences of abuse both emotionally and physically and can even result in death. Research by the Center for Disease control found that children who live with single parents are at a much greater risk for both abuse and neglect than children who live with both parents<sup>10</sup>. Children who lived in families in poverty were found to be twenty-two times more likely to be abused than children in families living above the poverty line<sup>10</sup>.

Certain health conditions in children have been found to be associated with social and economic risk factors to adequate health care. Increased asthma hospitalization has been found in low income areas with a high minority population<sup>13</sup>. Research has suggested that this disparity may be due to the inability to access health care in the population, in particular asthma hospitalization has been linked with lack of adequate, preventive care to help control the condition<sup>14</sup>. Increased asthma in children has also been found to be associated with parents having less than a high school education<sup>14</sup>.

As with asthma, increased exposure to lead is also associated with poverty and high minority communities<sup>15</sup>. Lead is a neurotoxin and increased exposure can result in lowered intellectual function, as well as reduced behavior regulation and failure in school<sup>15</sup>. Both of these conditions are more prevalent in low income, minority populations who also have additive

risks to lack of adequate health care, therefore increasing the likelihood that these conditions will not receive timely and effective treatment.

In recent years, the public school system has served as a mechanism for providing children in need with adequate health care<sup>16</sup>. The need for health services in certain school systems is often based on the demand in the area, as well as economic and social factors in the population<sup>16</sup>. Research by Billy et al also found that in an area where there is a high population of minority and low-income children, a school-based health service program may help provide treatment for children with documented risk factors to lack of sufficient health care<sup>16</sup>.

In a study in performed in Wisconsin, where the rate of uninsured children is low, yet access to care remains a problem, collaboration between the Milwaukee public school system and local leaders, along with the use of state health resource was developed in order to increase points of access of care for children. The program targeted children of working-poor families with high social risk factors for lack of access to care. The study identified populations with high rates of poverty, teen pregnancy, childhood hunger, and limited access to health services. By providing a school health center, barriers to access to health care were reduced, including lack of health insurance, primary care, and transportation. The study also found that the service provided a mainstream safety net for children in the Milwaukee school system and that points of access for health care were increased. The study also found that building collaborations with the community were especially important in the success of the program<sup>17</sup>.

In Stamford, Connecticut public schools, community health and school nurses and a consulting physician from the Stamford Health Department worked in coordination with the Board of Education to provide increased health services to public school children. A planning group, including physicians, nurses and members of the Board of Education developed a

program that required physician examinations for children in kindergarten, sixth, and tenth grade and made provisions for children without a primary care physician. The pediatric clinic at Stamford Hospital and the Community Health Center were used to provide the physical examinations for those children without a personal physician during the month of August. This program created a way to make sure children in Stamford public schools are receiving some form of health care. By providing access to care, barriers to care for those without a primary care physician were reduced<sup>18</sup>.

Through a review of the literature the following risk factors for lack of access to health care in children have been identified: racial/ethnic minorities, family poverty status, family median income, family structure, and maternal education level (Table 1). In this study, a needs assessment will provide a comparison of the status of children in Richmond, Virginia for these risk factors to lack of access to health care, as well as rates of asthma hospitalization, incidence of lead poisoning, and teen pregnancy rates. This study will also discuss the policy development and program implementation involved in providing annual physical examinations for selected Richmond Public Schools.

**Objectives:**

The objectives of this study are to (1) compare the presence of risk factors and health indicators in Richmond, Virginia to two surrounding counties and with the state of Virginia and (2) to assess the need for a program designed to conduct an annual physical examination program for selected Richmond Public Schools.

**Methods:**

Data was gathered from the US Census Bureau's Decennial Census, Kids Count census data, and the Annie E Casey Foundation's database of Community-Level Information for Kids



(CLIKS). Kids Count Census data was used to collect information for the following variables: population, population under 18 years of age, poverty status, median family income, race and ethnicity distribution, maternal education, family structure and teen pregnancy rates.

Additionally, data for the following variables was collected from the Annie E. Casey Foundation's online database of Community-Level Information for Kids: child health insurance, births to mothers with less than a 12<sup>th</sup> grade education, and asthma hospitalization. Lead poisoning cases were collected from the Virginia Department of Health. Data was collected for Richmond City, Chesterfield County, Henrico Country, and Virginia for comparison.

Descriptive data on the population under 18 years of age for each locality was transformed into ratios. The count data for racial/ethnic minorities, poverty, female householder families, and maternal education status with children was also transformed to ratios to allow for comparison between the four localities. Poisson Regression was performed using SAS 9.1 statistical software and provided chi-square values and p-values to test the differences between the four localities on the risk factors measured. Available health indicators for children (lead poisoning incidences, asthma hospitalizations, and teen pregnancy rates) were also given in ratios and compared for the four localities using Poisson Regression.

### **Results:**

The data gathered for analysis gives a summary of the four localities for comparison of the following risk factors for inadequate health care, lack of health insurance, and poor health status: racial/ethnic minority, poverty, female householder families, maternal education status, and unemployment status in families with children under age 18. There was a significant difference in the distribution of African American children in the four localities ( $X^2 = 8.179E8$ ,  $p < .0001$ ). In Richmond, there were 802 African American children per 1000 children ages 5 to

17 as compared to 167, 208, and 199 per 1000 children ages 5 to 17 in Chesterfield County, Henrico, and Virginia respectively (Table 2). In regards to the total minority population for children under 18, the four localities were found to have significantly different ratios ( $X^2 = 2.042E7$ ,  $p < .0001$ ) with Richmond having 814 children per 1000 that are minorities as compared to 287 per 1000 children in Chesterfield and 363 per 1000 children in Henrico.

There was also a significant difference in the ratio of children under 18 years of age living in poverty between the Richmond, Chesterfield County, Henrico County, and Virginia ( $X^2 = 1.335E8$ ,  $p < .0001$ ). In Richmond, 325 per 1000 children under 18 years old were found to be living in poverty, as compared to 59 per 1000 children in Chesterfield, 83 per 1000 children in Henrico, and 128 per 1000 children in Virginia (Table 3). Additionally, there was a significant difference in poverty status between minority and white children in all localities ( $X^2 = 6.861E9$ ,  $p < .0001$ ). African American children and other minorities were more likely to be below the poverty level for all localities as compared to white children, with minority children in Richmond having the highest rate of poverty among the four localities (Table 3).

Female householder families were found to be significantly more likely to live in poverty as compared to married and single father families ( $X^2 = 1.759E7$ ,  $p < .0001$ ). Minorities and African American children were found to be over twice as likely as minority and African American children in Chesterfield County and in Virginia as a whole to live in a female householder family and almost twice as likely as children in Henrico County. There was a significant difference in poverty status of female householder families in the four localities ( $X^2 = 6.81E6$ ,  $p < .0001$ ) with 426 per 1000 female householder families in Richmond living in poverty as compared to 187 per 1000 female householder families in Chesterfield and 198 per 1000 in Henrico (Table 4). Also, there was a significant difference in the maternal education status in

Richmond, Chesterfield County, Henrico County, and Virginia, when comparing mothers with less than a twelfth grade education with those mothers with at least a twelfth grade education ( $X^2 = 303.61, p < .0001$ ). In Richmond, children under age 18 were twice as likely as children in Chesterfield County and in Henrico County to have mothers with less than a twelfth grade education.

The median family income in Richmond was \$28,714 as compared to \$63,752 and \$57,736 in Chesterfield and Henrico respectively. The median income for married couples, single fathers, and single mothers were all lower than the median incomes for their counterparts in the state, Chesterfield, and Henrico (Table 5).

In reference to health indicators for children, table 6 gives a comparison of the four localities. There was a significant difference in teen pregnancy rates between Richmond, Chesterfield, Henrico, and Virginia ( $X^2 = 1.77E3, p < .0001$ ), with sixty-nine pregnancy per 1000 girls ages ten to nineteen in 2001 in Richmond, as compared to seventeen, twenty-three, and thirty per 1000 girls in Chesterfield County, Henrico County, and statewide. Also, there were a significant difference ( $X^2 = 2.64E5, p < .0001$ ) in asthma hospitalizations between the Richmond, Chesterfield, and Henrico, with twice as many asthma hospitalizations in children under age six in Richmond (1,238 per 1000 children under age 6) as compared to Chesterfield (643 per 1000) and Henrico (589 per 1000). Fifty per 10,000 children under age 15 were reported to have lead poisoning in 2003, as compared to 1 per 10,000 in Chesterfield and three and four per 10,000 in Henrico and Virginia respectively ( $X^2 = 1.99E, p < .0001$ ).

## **Discussion:**

In comparison to Chesterfield, Henrico, and Virginia, the prevalence of risk factors for lack of access to health care are greater for children in Richmond. Also, there is evidence that many children have multiple risk factors for lack of health care including being a minority, living in female householder families, and living in poverty. Because of the dose-response relationship between multiple risk factors and increase risk of inadequate health care<sup>9</sup>, the children in Richmond face a greater risk than other children found in Chesterfield and Henrico, as well as in the state as a whole. Children in Richmond also suffer more abuse and are more at risk of lead poisoning. Also, because of the environment that many of the children grow up in, the girls in Richmond are also more likely to become pregnant as teenagers. Children in Richmond were also found to have higher incidence of asthma attacks that result in hospitalization possibly due to lack proper preventive care for the condition. Because of the social and economic demographics of children in Richmond, along with the persistence of certain health conditions, the need for resources to be provided to meet the specific needs of children in Richmond is validated.

Currently, physical examinations are required to enter the Richmond public school system either in pre-kindergarten or kindergarten or as an out of state transfer students. Through a grant awarded to Richmond public schools in 1997, the School Based Health Center was created, which allows physical examinations EPDST screenings to be performed on certain groups of children. Children who are exceptional education students are able to received exams in the school-based health center upon request. Special Olympic and Athletic participants are required to receive physical examinations prior to participation and are available through the health center for these portions of students. Also, in selected schools a grade level is selected to provide physical examinations for children on Medicaid who have not received a physical

examination in two or more years. The center is also available for appointments for physical examinations upon a parent's request. Any abnormal findings during these physical examinations are reported to the parent, who is given recommendations on how to address the problem.

Because of Richmond school system having a school-based health center and providing the aforementioned services, it is important that the development of a program providing physical examinations build on what is already being done. In concert with school officials a program was developed to provide physical examinations for students in selected Richmond city public schools. The program would facilitate physical examinations during the month of August in accessible locations to the at-risk population of children. The goal is to provide physical examinations to children who have barriers to regular care, including the risk factors analyzed here. As with the program developed in Stamford, Connecticut, this program is designed to be a coordinated effort with various resources for the community, including Richmond city public school system, Richmond city officials, the Richmond health department, Virginia Commonwealth University Health Systems, and other local partners.

The program proposed would enhance the current services by building on what is in place and including additional resources. The program would include providing physical examinations for children in selected Richmond city public schools who are entering pre-kindergarten, kindergarten, third grade, seventh grade, or ninth grade, who would not regularly receive an annual physical examination through a primary care provider. The program would utilize school nurses and nurse practitioner, nurses from the Richmond Health Department, and nursing and nurse practitioner students from Virginia Commonwealth University. Physicians from the community, those who work with the Richmond Public School system and preventive medicine

residents from Virginia Commonwealth University would be used to perform the physical examinations. The uniqueness of this program design is the provision of physical examination in concert with extended care for children with additional health needs. Preventive medicine residents from Virginia Commonwealth University would be available to provide additional care throughout the year to children identified to need extended care. This is a key component of this program, as it addresses a deficiency of other programs that only diagnose a health problem without providing additional means for treatment.

**Conclusion:**

The National Research Council's Panel on High-Risk Youth suggested that the decision to engage in health risk behaviors by youth is largely influenced by their environment and evaluated the role that the school system played in intervening on children's health and reducing risk behaviors<sup>16</sup>. The Panel recommended collaboration among communities, families, and schools as a successful method of addressing health problems in children. By using the school system as means of intervention, the Panel suggested that barriers to access can be reduced including lack of transportation, inability to pay, and concern about confidentiality or parental consent. Schools in particular serve as a successful mechanisms for capturing children who are uninsured or lack access to health care because of the ability to reach almost all youth. By implementing programs that work to meet the health needs and reduce health-risk behaviors, the Panel suggested that schools could serve as the setting to encourage healthy development and productive adulthood, through resources provided by the community<sup>16</sup>.

In 2001, the Committee on School Health suggested the following benefits to providing health services through the school system: facilitate access to care to children who do not have reasonable access to other medical services, reduce class time lost to travel time to outside

services, improve follow-up compliance, increased adolescents use of medical services, families educated on the use of health services, and behavioral risk assessment, as well as the implementation of preventive services to address the major causes of mortality and morbidity in children<sup>19</sup>. The Committee concluded that health services through school systems should provide health supervision and medical care that is continuous, coordinated, and comprehensive, as well as family-centered and culturally sensitive<sup>19</sup>.

The high prevalence of risk factors for lack of health care and barriers for access to health care in Richmond, Virginia serve as evidence that a program to reach children in the city with primary care is needed. Because of the high population of children enrolled in public schools in the city, providing a program through the school system to facilitate not only physical examinations, but also follow-up care for special cases would be made available. Our study shows that Richmond has a high prevalence of risk factors associated with lack of health care in children and also that children in Richmond suffer more health problems such as asthma hospitalization and lead poisoning.

Our study was limited because the data was collected at the population level as compared to individual data. Also, because of the nature of the data, no causal relationship could be drawn. In addition, because there is no standard system of reporting health conditions in children for city and county localities in Virginia, it is difficult to fully assess their current health status. This is an area that the program designed to provide physical examinations would be able to address in the future. The program would allow for future research into the effect that the social and economic risk factors reported in this study is having on the health of Richmond children, as well as the impact that the program have in improving the physical and mental health of children in Richmond.

In our research, we did not find another program that fully addresses the issues surrounding barriers to health care in children. By providing physical examinations at convenient locations and making arrangements to provide transportation to the location, the barrier of being able to physically get to the site is removed. Also, by providing physical examinations with little or no fees, the high prevalence of poverty in Richmond would not be a barrier to physical examinations. Furthermore, a critical feature of this program is the provision for extended care throughout the year by the preventive medicine residents, which provides a means for treating children who may otherwise go without necessary care.



**Table 1: Literature Review on risk factors to lack of access to care in children**

<b>Study:</b>	<b>Purpose of study:</b>	<b>Risk factors:</b>	<b>Conclusions:</b>
Access to care and utilization among children: estimating the effects of public and private coverage. Selden TM, Hudson JL.	Examines the relationship between health insurance and children's access to and use of care. Access measures are having usual source of care (USC) & lacking USC for financial or insurance reasons; examine indicators for ambulatory visits, well-child visits, dental visits, emergency room use, and inpatient hospital stays	Financial or insurance reasons for lacking usual source of care	Public and private coverage are both associated with large increases in access and utilization; private coverage has the largest effect  Emphasizes the importance of providing health insurance to children.
Cumulative disadvantage and child health. Authors: Bauman LJ, Silver EJ, Stein RE. <sup>21</sup>	Examines 4 risk factors to access to health care for children and whether they have cumulative effects on child health and whether access to health care reduced health disparities	Poverty  Minority race/ethnicity  Low parental education  Not living with biological parents	The accumulation of social disadvantage among children was strongly associated with poorer children health and having insurance did not reduce the observed health disparities.
Gradients in the health status and developmental risks of young children: the combined influences of multiple social factors. Authors: Stevens GD.	Analyze child vulnerability as profile of multiple risk factors for poorer health; profiles examined in relation to disparities in health status & developmental risks	Race/ethnicity Social class (maternal education/ family poverty status)  Health insurance coverage  Maternal mental health	A child having more risk factors is associated with poorer health status, being at a higher risk for developmental delays, and poorer access to health care.  A dose-response of higher risk profiles with poorer child health status and higher developmental risk was found; children w/ higher profiles of risk are more likely to lack access to care. Therefore, children with more risk factors are those who have the greatest need for care, but have the greatest difficulty getting health care.
Disparities in	Study assessed the	Racial and ethnic	Racial and ethnic minority

access to care and satisfaction among US children: the roles of race/ethnicity and poverty status. Authors: Shi L, Stevens GD.	progress made toward reducing racial and ethnic disparities in access to health care among US children between 1996 and 2000	minorities  Health insurance coverage  Poverty status	children experience significant deficits in accessing medical care compared with whites; both before and after controlling for health insurance coverage, poverty status, and health status.
Family structure, SES, and access to health care for children. Authors: Heck, Parker	Tests the hypothesis that among children of lower SES, children of single mothers would have relatively worse access to care than children in 2-parent families, but there would be no access difference by family structure among children in higher SES families.	Single mothers  SES status  Mother's educational level	Children of single mothers were as likely to have no physician visit in past year; more likely to have no usual source of health care; more likely to have an unmet health care need.  The relationships differed by mother's education level, with those with a higher education level, having children with increased use of health care. At high levels of maternal education, family structure did not influence physician visits or having a usual source of care, while at low levels of maternal education, single mothers appeared to be better at accessing care.  Health insurance coverage explains some of the differences in access  Medicaid is important for children of single mothers, but children in 2-parent families whose mothers are less educated do not always have access to that resource.

**Table 2: Distribution of race by age**

	<b>Richmond</b>	<b>Chesterfield</b>	<b>Henrico</b>	<b>Virginia</b>
<b>Population</b>	197,790	259,903	262,300	7,078,515
<b>Population under 18</b>	43,178	73,427	64,702	1,635,562
<b>Population under 18 per 1000</b>	218	283	247	231
<b>Population ages 5-17</b>	30553	69,337	69,296	1,530,421

<b>Population ages 5-17 per 1000</b>	155	267	264	
<b>African-Americans ages 5-17</b>	24,488	11,577	14,388	304,115
Ages 5-17 per 1000 children 5-17	802	167	208	199
Ages 5-9	9991	4193	5925	118,492
Ages 10-14	9466	4680	5533	118,950
Ages 15-17	5031	2704	2930	66,673
<b>White ages 5-17</b>	5129	52,625	51,618	1,108,883
Ages 5-17 per 1000 children 5-17	168	759	745	725
Ages 5-9 per 1000	2247	15,029	18,812	327,687
Ages 10-14 per 1000	1835	11,211	22,756	495,955
Ages 15-17 per 1000	1047	9673	10,050	285,241
<b>Other Minorities ages 5-17</b>	936	5135	3290	117,423
Ages 5-17 per 1000 children 5-17	31	74	47	78
Ages 5-9 per 1000	278	1415	1379	48,905
Ages 10-14 per 1000	412	1361	1164	42,966
Ages 15-17 per 1000	246	2359	747	25,552

**Table 3: Poverty of children under 18 by race**

<b>Population &lt;18</b>	<b>poverty</b>	<b>above poverty</b>	<b>total</b>	<b>Rate</b>	<b>Percentages</b>
<b>Richmond</b>					
white	636	7396	8032	79 per 1000	7.90%
Black	12751	19392	32143	397 per 1000	39.70%
Other	653	1240	1893	366 per 1000	36.60%
Total	14040	28028	43068	326 per 1000	32.6%
<b>Chesterfield</b>					
white	2292	50207	52499	44 per 1000	4.40%
Black	1612	12836	14448	112 per 1000	11.20%
Other	448	4489	4937	91 per 1000	9.10%
Total	4352	67532	71884	61 per 1000	6.1%
<b>Henrico</b>					
white	1590	38054	39644	40 per 1000	4.00%
Black	3095	16070	19165	162 per 1000	16.20%
Other	693	4333	5026	138 per 1000	13.80%
Total	5378	58457	63835	84 per 1000	8.4%
<b>Virginia</b>					
White	84834	1057435	1142269	80 per 1000	8.00%
Black	103309	290667	393976	262 per 1000	26.20%
Other	21389	150275	171664	125 per 1000	12.50%
Total	209532	1498377	1707909	123 per 1000	12.3%

**Table 4: Family structure and poverty status of children under 18**

<b>&lt;18,related</b>	<b>Poverty</b>	<b>Above poverty</b>	<b>Total</b>	<b>Children</b>
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<b>Richmond</b>				
married	674	8710	9384	72 per 1000
single dad	417	1435	1852	225 per 1000
single mom	5231	7062	12293	426 per 1000
<b>Chesterfield</b>				
married	508	31112	31620	16 per 1000
single dad	154	1919	2073	74 per 1000
single mom	1296	5620	6916	187 per 1000
<b>Henrico</b>				
married	517	24906	25423	20 per 1000
single dad	157	1919	2076	76 per 1000
single mom	1884	7650	9534	198 per 1000
<b>Virginia</b>				
married	28033	669340	697373	40 per 1000
single dad	7650	50166	57816	132 per 1000
single mom	63280	149360	212640	298 per 1000

**Table 5: Median family income with children under 18 based on family structure**

<b>Median Income</b>	<b>married</b>	<b>single dad</b>	<b>single mom</b>	<b>families with child &lt;18</b>
Richmond	58193	24494	16735	28714
Chesterfield	71914	37944	29165	63752
Henrico	71252	35464	26223	57736
Virginia	63157	31274	21602	51970

**Table 6: Health indicators for children under 18**

	<b>Richmond</b>	<b>Chesterfield</b>	<b>Henrico</b>	<b>Virginia</b>
<b>Abuse or neglect reported per 1000 children</b>	10	5	4	6
<b>Teen pregnancy (ages 10-19) per 1000 girls</b>	69	17	23	30
<b>Asthma hospitalization; children under 6 per 100,000</b>	1,238	643	589	
<b>Lead poisoning in children under age 15 per 10,000 (2003)</b>	50	1	3	4

**Appendices:**

**Glossary of terms:**

**Risk factors:** Factors shown to be associated with lack of adequate health care in children

**Maternal Education Level:** Divided into either above or below a twelfth grade education

**Poverty level:** defined by the US Census Bureau, based on size of family, median income, age of family members, and inflation rates based on the Consumer Price Index for All Urban Consumers (CPI-U) (US Census Bureau)

**Median Family Income:** as defined by the US Census Bureau as the amount which divides the income distribution into two equal groups and is based on the number of individuals in a household and the number of people age 15 and over with income.

**Family Structure:** description of the family unit of children as married parents, male householder families, or female householder families.

**Teen pregnancy:** pregnancy in girls ages 10-19

**Lead Poisoning:** acute or chronic exposure of at least 10µg of lead per deciliter of blood (source)

**Asthma hospitalization:** those cases that timely and effective ambulatory care can prevent the onset of an illness or condition, control an acute episode of an illness, or manage a chronic disease or condition so that hospitalization is unnecessary ([www.getasthmahelp.org](http://www.getasthmahelp.org))

**Medicaid:** a state administered program for certain low-income individuals and families that provides payment for medical care (US Department of Health and Human Services; Centers for Medicare and Medicaid)

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