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# Impact of the School Health Innovations Grant Act on Healthcare Access, Outcomes, and Cost in the District of Columbia

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CAPSTONE PROJECT PAPER

A paper submitted in partial fulfillment of the
requirements for the degree of
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## EXECUTIVE SUMMARY

This paper provided a prospective policy analysis of the Washington, D.C. School Health Innovations Grant Act. This act establishes a grant program to facilitate the formation of school-based telehealth centers to provide mental health services to District school children. The purpose of this act is to improve access to mental health services for children, especially children in disadvantaged populations, such as those low-income, predominantly African American neighborhoods in eastern Washington, D.C., where a high burden of need is compounded by a shortage of health professionals.

This analysis was guided by the Bardach framework of policy analysis. The various factors affecting access to mental health services were explored, and the School Health Innovations Grant Act was analyzed in terms of its ability to address these barriers, its ability to maximize health outcomes and, and its overall cost effectiveness. A brief overview of telehealth and school-based health, and the evidence supporting their use, was also included.

Key words:

**Telehealth; School-based health; Behavioral health; mental health; telepsychiatry; Child health care access; urban healthcare access; Health Professional Shortage Area; Washington, D.C.**

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## ACRONYMS AND ABBREVIATIONS

| Acronym/Abbreviation | Meaning | Definition |
|---|---|---|
| **CHIP** | Children's Health Insurance Program | |
| **D.C.** | District of Columbia | |
| **DCPCS** | D.C. Public Charter Schools | Public schools in D.C. run by various non-profit organizations. |
| **DCPS** | D.C. Public Schools | Public school system run by the District Government |
| **DHCF** | Department of Health Care Finance | Department of the District of Columbia local government |
| **HPSA** | Health Professional Service Area | A federal health care shortage designation describing an absolute low provider density to a geographic area or population, based on a pre-defined population:provider ratio |
| **MCPAP** | Massachusetts Child Psychiatry Access Project | |
| **MUP or MUA (also written as "MUP/A")** | Medically Underserved Population or Medically Underserved Area | A federal shortage designation indicating low provider density relative to population need in a geographic area or population demographic |
| **PCP** | Primary Care Physician | |
| **SBHC** | School-Based Health Center | |
| **SHIGA** | School Health Innovations Grant Act | |

## INTRODUCTION

Poor access to healthcare continues to be a problem in the United States, affecting rural as well as urban populations. Although nearly 95% of American children have health insurance,[1] access to care remains a challenge. Structural barriers to child healthcare access, such as lack of transportation, distance to provider locations, uncertainty about how and where to obtain care, and long appointment wait times, have been identified.[2] Additional factors which present further obstacles to obtaining needed care include parental missed work hours and lost wages[3] and child school absences, which can have deleterious effects on academic performance.

Access to mental health care is of particular concern to the pediatric population. It is estimated that as many as 20% of children nationwide suffer from a mental disorder.[4] Children and adolescents with mental health conditions are more likely to have impaired social and academic functioning, including discipline problems, a higher number of absences, higher rates of suspension/expulsion, worse academic performance, higher dropout rate, and higher likelihood of out-of-home placement compared to their peers.[5] Early mental health intervention has been shown to improve functioning, leading to improved outcomes later in life, including reducing criminal convictions, substance abuse, and risky sexual behavior.[6] Evidence has also shown the African-Americans and other minority populations have disproportionately worse outcomes than their Caucasian peers resulting from mental health problems.[5] Additional downstream effects, such as increased emergency room usage by individuals who lack a medical home, and complications from longstanding, untreated mental health problems, may also contribute to rising healthcare costs.

In recent years, the use of telehealth has increased as a means of improving access for underserved populations. *Teleheath* broadly refers to the use of telecommunications technology for the delivery of healthcare services, in most cases patients communicate with providers via video conferencing. Abundant evidence supports the effectiveness of telehealth in improving outcomes in many fields of medicine, including mental health. Recent trends in healthcare practices for children have promoted the establishment of health care centers in schools, with on-site nurses, physicians, and telehealth centers. By allowing children to attend healthcare appointments at school, school-based telehealth centers have been demonstrated to be efficacious in overcoming many barriers to care, including lack of transportation, lost parental wages, school absences, and inconvenient provider location, without sacrificing the quality of care provided.[3]

To improve access to mental health care for high-need populations in Washington, D.C., the District Council passed the School Health Innovations Grant Act in 2018. This law establishes grants of up to $400,000 to be awarded to D.C. health providers who partner with D.C. public schools to create school-based telemental health clinics. Additionally, to further support community needs, the law allows for the school-based health center to operate after school hours as a general healthcare facility for the surrounding community.

The purpose of this capstone was to provide a policy analysis of the School Health Innovations Grant Act, including its potential impact in improving mental healthcare access for underserved populations, and overall feasibility. Alternative strategies that have been proposed in Washington, D.C. or elsewhere in the United States were examined, and the trade-offs between these approaches as the School Health Innovations Grant Act were analyzed. Likely outcomes were projected, including its potential to improve medical outcomes, remove barriers

to care for children and parents, as well as its cost effectiveness for schools and providers, economic sustainability, and its political acceptability to the populations served.

The remainder of this Introduction section is devoted to a thorough review of current evidence describing the scope of the problem in greater detail, as it relates to the population of Washington, D.C.

### *Defining the problem*

#### Need exceeds capacity in Washington, D.C.

An estimated 3,000 to 20,000 children in Washington, D.C. are low-income and have mental health needs.[7] The School Health Innovations Grant Act was designed to improve access to mental health services for children. In personal correspondence, Osa Imadojemu, JD, MPH, a member of the legislative staff for the DC Council observes a geographic access disparity, noting, "In the District, most of the children in need live in the east side of the city while most of the providers work in the west," *(*email communication, Sept 2018).

The federal government delineates healthcare shortage locations using the Health Professional Shortage Area (HPSA) designation. HPSA denotes a critically low provider density; the definition may vary based on certain population characteristics, but in most cases, it refers to a patient: physician ratio of 20,000 to 30,000:1.[8] There are three categories of HPSA's: primary care shortage areas, dental care shortage areas, and mental health shortage provider areas. A second federal designation, Medically Underserved Area or Medically Underserved Population (MUA/P), calls attention to areas and populations with met needs due to a combination of factors, including poverty rate, infant mortality, and percent of population over 65 years old, as well as provider density.

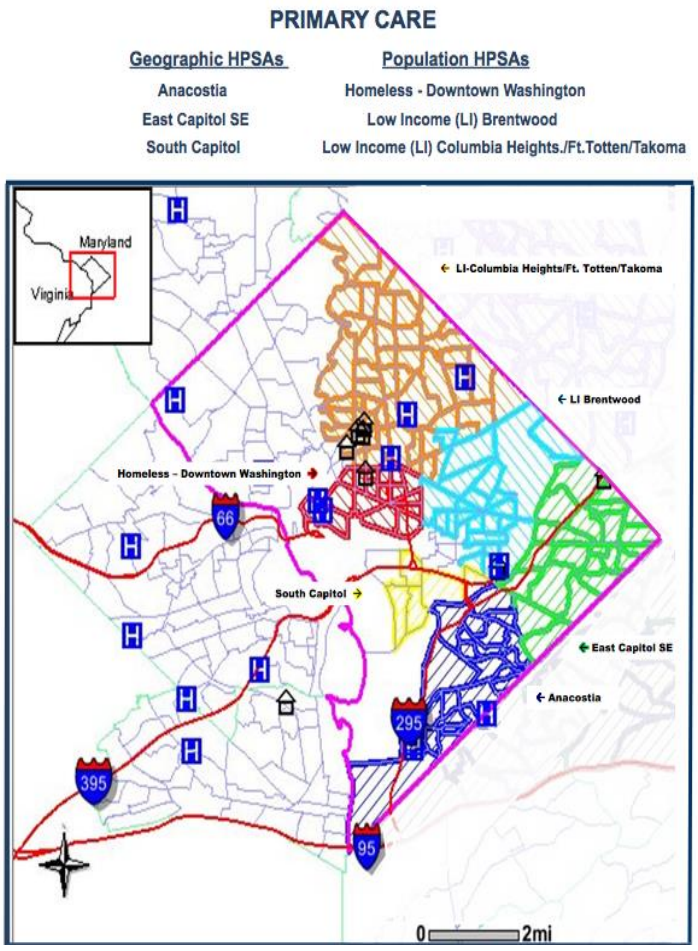


**Figure 1: Most HPSAs are in the eastern half of the District, with providers disproportionately located in the western half**
**(source: Shortage Designations, dchealth.dc.gov)**

There are nine federally recognized HPSA's in Washington, D.C, as illustrated by Figure 1. The majority of HPSA's are in the eastern portion of the District, while most of the District's major medical centers are located in the western portion.

Anacostia (represented in Figure 1 as the dark-blue shaded area), in addition to being the District's sole mental health HPSA is also both a Primary Care and a Dental HPSA, singularly representing three of Washington's nine HPSA's. It should also be noted that, because some common pediatric mental health conditions such as ADHD and some mood disorders are frequently treated by primary care physicians, primary care shortages are also likely to impact mental health access.

The District's eight MUP's and MUA's are almost entirely found in the eastern half of the District, indicating not only a provider shortage but a high need patient population. Notably, a recent survey[9] revealed that there in only one child psychiatrist east of the Anacostia river (Wards 7 and 8, the dark blue and green areas in Figure 1) where more than 1/3 of the district's children live.[10]

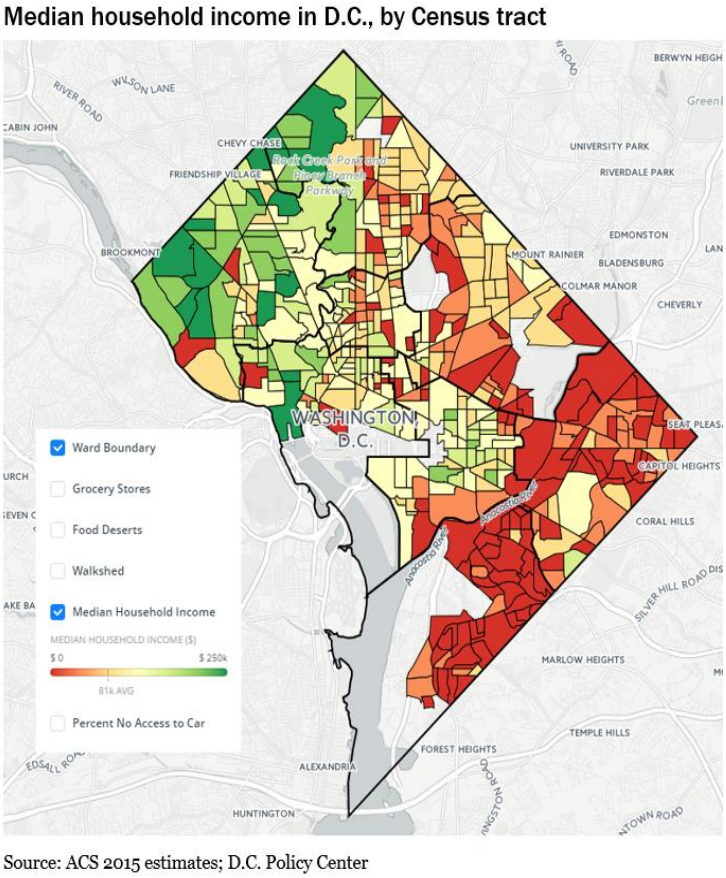


**Figure 2: household incomes are markedly lower in eastern Washington, D.C.**
**source:** https://www.dcpolicycenter.org/publications/food-access-d-c-deeply-connected-poverty-transportation/

Studies have shown that poverty is associated with a higher prevalence of mental health problems.[4] Figure 2 illustrates a sharp income segregation in the District, with lower-income households located in the eastern section. Poverty can be an additional barrier to healthcare access in itself, as individuals with lower incomes are less likely to have access to reliable

transportation, and more likely to work for hourly wages, in which time off to go to doctor appointments can result in lost income and friction between employers and employees.

These problems are compounded by the well-publicized shortage of child and adolescent psychiatrists nationwide.[11] It is estimated that by 2020, there will be 8300 child psychiatrists practicing in the United States, falling short of the estimated needed 12,600.[12] Existing practices are often very busy, creating long wait times for appointments, as well as long waiting room times on appointment days. Many children are unable to receive timely treatment, and even short, routine appointments can require several hours including travel time and administrative delays. In addition to these logistic hurdles, parents with multiple children may need to arrange for costly child care for their other children while attending appointments.[13]

**Burden of mental illness**

One in ten children suffers from mental illness of sufficient severity to impair their ability to function at home or in the community.[5] A substantial portion of mental health problems affecting adults have their onset during childhood and adolescence.[14] Conversely, a number of juvenile and adolescent mental health diagnoses persist into adulthood and have sequelae affecting adults.[15] Untreated childhood mental illness is associated with a number of adverse outcomes in childhood and persisting into adulthood. There is a higher risk of academic difficulties among mentally ill children. It has been estimated that children with mental problems may be absent as many as 18-22 days per year, have a high rate of D- and F-level grades, and a high school dropout rate of 44%.[4] Childhood mental health problems are associated with increased likelihood of violent crime and substance abuse.[6] Children with mental problems are also have a higher poverty rate as adults, a higher healthcare usage rate, and higher healthcare costs than other adults.[16] The social factors associated with low-income communities, such as

exposure to crime and violence, poor housing, and limited resources, have also been shown to worsen outcomes and increase the burden of mental illness.[17]

## METHODS

### *Framework*

The policy analysis is guided by the framework outlined in Eugene Bardach's *A Practical Guide to Policy Analysis: The Eightfold Path to More Effective Problem Solving*.[18] This process involves eight steps: 1) Define the Problem; 2) Assemble Some Evidence; 3) Construct the Alternatives; 4) Select the Criteria; 5) Project the Outcomes; 6) Confront the Trade-Offs; 7) Decide; and 8) Tell Your Story. . In order to ease the flow of discussion in this report, the order of these steps was modified. The first two steps, covered in the Introduction, involved an extensive review of literature to obtain quantifiable data regarding the scope of the problem, the populations affected, and economic and social factors contributing to or resulting from the problem. The review of literature also informed steps three and four, by revealing other policy solutions that have been proposed or tried in other cities, and in elucidating the public health needs that the School Health Innovations Grant Act addresses. Step four, selecting the criteria by which to evaluate the Act, was also assisted by information gathered from the D.C. Council website, and personal correspondence with D.C. Council Legislative Staff members, to clarify the goals of the legislation and the factors leading to its creation. Step five, projecting the outcomes, relied on data from existing programs to project the outcomes of the School Health Innovations and Grant Act, as well as some alternative policies. The sixth step involved a comparative evaluation of the likely outcomes of the policies, using the criteria established step four, to form the basis of the rationale in support or opposition of the Act. Steps seven and eight

represent the composition of the final composition of the analysis, its conclusions, and relevant recommendations.

***Review of Literature***

A search of primary literature was performed using the National Library of Medicine's online database (PubMed) and Google Scholar. The following keywords or phrases (or combinations of these) were used: telehealth, healthcare access, children, school-based, telepsychiatry, telebehavioral health, telemental health, health professional shortage area, school-based. Assistance was provided in some instances by University of Kentucky Medical Center Library Staff. PubMed was accessed on multiple occasions throughout August, September, and October, 2018. Criteria for inclusion were materials published after 2000, that focused primarily on school-aged children, or on high-need, low-income populations. The most recent literature concerning telehealth was given priority, to ensure that financial, economic, and technological considerations were as consistent as possible with present-day conditions. For policy-based data, preference was given to articles focusing on American populations, as other countries may not have analogous healthcare systems, and the applicability of such data to the present topic may therefore be limited.

Information on the School Health Innovations Grant Act and the political factors leading to its ratification was found on the D.C. Council website. Additional information was obtained from federal health policy websites such as the Health Resources & Services Administration (HRSA) and Centers for Medicare and Medicaid Services (CMS), as well as online resources from nonprofit professional organization such as the American Telehealth Association and the Center for Connected Health Policy.

## RESULTS

The Results section includes a summary of literature and relevant data regarding the School Health Innovations Grant Act. The first subsection, "Addressing the need through policy," consists of a summary of the Act, including a logic model. A second subsection, "Overview of telehealth and school-based telehealth," summarizes the current medical evidence regarding the use of telehealth as a means of health care services delivery, as well as its potential for impacting medical outcomes. A third section, "Financial impact projections," addresses some of the financial costs and benefits of the Act and attempts to quantify them. While further evidence was assembled and cited, the preponderance of the Results section relates to step 5 of the Bardach framework, Project the Outcomes.

### *Addressing the need through policy*

#### School Health Innovations Grant Act

To improve access to underserved areas in Washington, D.C., the District Council unanimously passed the School Health Innovations Grant Act (SHIGA) in May 2017 (revised March 2018). This act establishes the School Health Innovations Grant Program, under which the D.C. Department of Health Care Finance (DHCF) may award grants to health care providers who "partner with District of Columbia public schools and public charter schools to give students, and the communities that surround the schools, opportunities to access behavioral health care services, including through the incorporation of remote computer access." This will be achieved by establishing a school-based health care clinic. Providers receiving the grant may also elect to extend the services of this arrangement to include a community-based clinic to provide services to "school employees, family members of the students, and the local neighborhood community that surrounds the D.C. school." The fiscal impact statement declared

the program unfeasible with respect to the 2018 District budget, so the program has not yet been implemented.[19]

The grants may be awarded for up to $400,000, and up to eight such grants may be awarded, potentially entailing a total budget of $3.2 million. To receive funding, grant applicaants must meet several requirements with regard to the services that the school-based clinic is required to provide. Each clinic will be located within a D.C. school, and will offer: 1) screening for mental health conditions and needs; 2) referrals to healthcare and social services providers; 3) healthcare navigation services; and 4) on-demand health care provider access services via "real time computer access" (i.e. telehealth). School-based clinics are also required to coordinate care with students' parents and primary care physicians and relevant social services providers. The law also allows the provider the option to run a community-based primary care and mental health clinic out of the school site only after school hours and only if adequate, qualified professionals can be staffed to meet the needs of the clinic and its patients. The law further stipulates that the provider will own any medical records and bears responsibility for maintaining them according to District and Federal law.

In applying for the grant, providers must also furnish a clinic plan. Along with an outline of the clinic's ability to meet the requirements described above, the plan must demonstrate provider's ability to engage and obtain consent from parents, must specify the clinical staff and precise scope of services, and must provide a memorandum of understanding between the provider and school principal of the school relating the school's ability to accommodate the health center and integrate any existing health services at the school into the plan. Importantly, a financial outline must be included detailing a budget of the funds needed to implement the plan, and how the clinic will obtain reimbursement for health care services. Providers will also be

asked to forecast the number of schools into which the services could be provided, and the estimated costs per school.

Lastly, the providers receiving this grant will be required to maintain records to be submitted to the DHCF semiannually, noting the number of student referrals made to providers of health care and social services; number of students connected to these services; the number of student screenings administered for mental health needs; gross revenue; an evaluation of the most efficient manner to run a school-based clinic; and identification of other schools into which service could be expanded (as well as cost projections).

Although the program allows for the establishment of a community-based clinics to serve the larger needs of the community, the scope of this analysis focused primarily on the program's capacity to meet the mental health care access needs of the pediatric community of Washington, D.C.

**Logic model of the School Health Innovations Grant Act**

The SHIGA represents a solution to address a complex set of public health problems, with a variety of inputs, as well as both quantifiable and unquantifiable outcomes. The logic model below outlines some of the inputs required to implement the law, the processes undertaken by the law, the outputs, and the anticipated outcomes.

While by no means comprehensive, this model provides an overview of the SHIGA. The following subsections address the existing data on each of these outcomes, as found in current literature. Where possible, it also included outcome projections with regard to measurable variables, such as cost and financial benefits.

*Table 4: Logic model of the SHIGA*

| Inputs | Processes | Outputs | Outcomes |
|---|---|---|---|
| Money: $3.2 million | Physician services (psychiatry medication management) | Number of children who receive health services | Improved mental health outcomes |
| Time | Psychotherapy/counseling | Number of children who benefit from education services | Healthcare cost reduction |
| Equipment | Care coordination | Parental participation in healthcare process | Increased student knowledge and confidence with healthcare |
| Personnel | Health education | # of local residents receiving care | Better access to care |
| School space | Primary care to local community | | Improved parental engagement |

### *Overview of telehealth and school-based telehealth*

The Washington D.C. district government legally (e.g. for Medicaid billing purposes) defines telehealth as, "the delivery of healthcare services through the use of interactive audio, video, or other electronic media used for the purpose of diagnosis, consultation, or treatment; provided, that services delivered through audio-only telephones, electronic mail messages, or facsimile transmissions are not included."[20] While there are many different forms of telehealth, the term most commonly refers to the use of videoconferencing between a provider and a patient. This medium allows for a provider at a distant site to interact with a patient who may be miles away. Although this functionality is very similar to that seen in such common apps as Skype or

FaceTime, HIPAA-compliant software and audiovisual equipment with augmented security capability are usually required.

At most school-based telehealth centers, a qualified health professional (such as a nurse or trained administrator) is present at the patient site, to help operate equipment and provide technical assistance. In many cases, an interested third party (such as a parent or guardian) may also attend the session remotely using a secure video-linked website, or by phone.[13]

For purposes of billing and reimbursement, Washington, D.C. has a telehealth parity law, requiring insurers and payers to reimburse the same amount for services rendered by telehealth as they would be in person. Medicaid, which would likely cover a large percentage of the low-income children benefiting from services, uses the D.C. legal definition of telehealth above for billing purposes in the District of Columbia. To be eligible for reimbursement patients must be at a Medicaid-approved telehealth site, which includes D.C. public schools, and a provider (though not necessarily a doctor) must be present at the patient site. In addition to covering psychiatrist services, Medicaid will also reimburse for several provider types offering behavioral healthcare services, consultation, evaluation, and management.[21]

**Summary of evidence supporting the use of school-based telemental health care**

Telehealth has robust evidence supporting its effectiveness. A meta-analysis confirmed telemental health results in outcomes similar to in-person care, with data for both physician and non-physician providers.[22] There is also a great deal of evidence detailing the advantages of school-based health centers in general. Because most children spend a great deal of their time in school, SBHC's are able to minimize or bypass barriers related to transportation or scheduling, and to reduce school absences.[23] SBHC's have demonstrated the ability to reduce healthcare cost overall, including reduced cost to Medicaid,[24,25] and result in fewer ED visits[26] than for students

who do not have school-based services. SBHC's also serve as an access point to children who may not receive care otherwise, often helping eligible students to enroll in state CHIP programs or Medicaid.[23] SBHC's also reduce risky sexual and substance use behaviors.[27] Furthermore, school-based telehealth can help to alleviate the psychiatrist shortage. By reducing travel time to school health centers, telehealth can free providers to be available for patient care, potentially providing access to services to patients at multiple schools in a single day.[13]

Currently, there are 238 public schools and public charter schools in Washington D.C.,[28,29] all of which are eligible for the School Health Innovations Grant Program. The D.C. Department of Health currently oversees eight school-based health centers (SBHC's) in D.C. schools.[19]

**Academic outcomes**

School-based health centers have been shown to result in increased grades for users. One study found a statistically significant 2.5 point increase for SBHC users compared to non-users, and found that these points on average meant the difference between a B- and a C+.[30] School-based mental health in particular has been shown to result in improved academic outcomes, including a steeper increase in GPA over time when compared to similar students who were not SBHC users, as well as an improved graduation rate, especially among African-American male students.[31]

***Financial impact projections***

**Cost-saving in emergency room visits**

One potential impact of the SHIGA could be realized as cost savings due to reduced mental health-based ED visits for children receiving school-based serviced under the program. Precise data on the cost of pediatric emergency department visits were not easily obtained, so

estimations were calculated using available data. First, an up-to-date population estimate was obtained from the US Census Bureau, which published an estimate July, 2017 estimate of the Washington, D.C. population, of 693,972 residents. The same data set offered stratification by age grouping, and estimated an under-18 District population of 17.9%, revealing an estimate of approximately 124, 221 children in D.C.[19] Data obtained from the Agency for Healthcare Research Quality's (AHRQ) revealed a national emergency department (ED) visit rate of 382.9 per 1,000 children yearly (or 0.383 visits per child per year), to produce the number of pediatric ED visits yearly in Washington D.C., approximately 47,576 visits.[33] Finally, a 2018 report from CNN claimed the national average out-of-pocket cost of a visit to the ED was $1,917.[34] These numbers were all multiplied to yield a dollar amount of $91,204, 425 (Table 2) as the yearly direct cost to patients of pediatric emergency room visits in Washington D.C.

*Table 5: Total estimated yearly out-of-pocket ED costs in Washington, D.C.*

| Population of Washington, D.C. | Portion of population 18 years old or younger | National pediatric ED use rate | Average out-of-pocket cost per ED visit | = Out−of−pocket ER cost |
|---|---|---|---|---|
| (693,972) | (0.179) | (0.383) | ($1,917) | $91,204,425 |

It should be noted that the $1,917 amount is likely very low, as it is a simplified estimate, including only ED facilities fees, and excluding other services likely obtained during an ED visit, including the fees for simply being evaluated by a doctor, which are often billed separately. Nonetheless, this serves as a useful metric of the cost-saving potential of the School Health Innovations Grant Act.

It has been estimated that between 3,000 and 20,000 low-income children in D.C. suffer from mental health conditions requiring management. A study by McConnochie et al[35] demonstrated that access to school- and community-based Telehealth led to a reduction of ED use by 22%. Therefore, if 3,000 children are able to use newly-established telehealth systems

(the low end of the need estimate), we can expect a 22% decrease in ED visits among that group. Table 3, below, projects cost savings in this event, as well as savings of 11,500 children (the midpoint of the estimated need range) and 20,000 children (the high end of the range) are served by the school-based telehealth centers.

*Table 6:estimated ED cost savings attributable to SHIGA*

| **# students using school-based telehealth** | **X**<br><br>**National pediatric ED use rate** | **X**<br>**Use rate reduction associated with telehealth** | **X**<br><br>**Average out-of-pocket cost per ED visit** | **=**<br><br>**Savings in out−of−pocket ER costs.** | **Approx. # of ED visits saved (to nearest whole #)** |
|---|---|---|---|---|---|
| 3,000 | 0.383 | 0.22 | $1,917 | $484,579 | 253 |
| 11,500 | 0.383 | 0.22 | $1,917 | $1,857,554 | 969 |
| 20,000 | 0.383 | 0.22 | $1,917 | $3,230,528 | 1685 |

Superficially, these savings appear modest, especially when compared to the $3,200,000 budget of the grant project. However, this is a very conservative estimate; as mentioned previously, the estimate per-visit cost includes only facility fees, and excludes physician fees, lab testing, and other health care costs. Total savings due to reduced ED utilization are likely to be much higher.

**Reduction in lost parental wages**

Another anticipated benefit of the SHIGA is a reduction in parental lost wages associated with accompanying children to physician appointments. As mentioned previously, lack transportation, long waiting room times, and long geographic distances separating patients from providers are all factors that prolong the amount of time required to attend a pediatric appointment, resulting in hours of missed work. A 2003 study gathered patient reported survey

data to quantify the average hours of work missed by parents that was obviated by telehealth, and the associated wages lost. Average reported values were 5.1 hours for an ED visit, and 3.0 hours for a doctor appointment. Lost wages averaged $43 per visit (no distinction was given between ED and appointment visits), with associated travel costs for urban patients of $3.20 and $3.97 for ED and physician appointments, respectively.[3] Using the Bureau of Labor Statistics Inflation Calculator,[39] these 2003 values were adjusted to 2018 equivalents (Table 4). No more recent data regarding missed work hours was available.

*Table 4: estimated parental lost wages and travel expenses, adjusted for inflation*

| Visit type | Lost work hours | Lost wages | Travel Expenses | 2018 adjusted lost wages | 2018 adjusted travel expenses |
|---|---|---|---|---|---|
| ED visit | 5.1 | $43 | $3.20 | $59.74 | $4.45 |
| Office visit | 3.0 | $43 | $3.97 | $59.74 | $5.52 |

Using these numbers, we can project total estimated wage- and travel-related cost savings for ED visits and doctor appointments. To perform these calculations (Table 5), the visit-related expenses are multiplied by the estimated number of ED and in-person physician visits that are avoided through the use of school-based telehealth, for user populations of 3,000, 11,500, and 20,000.

*Table 5: parent costs savings due to ED visit reduction (expenses per visit x number of visits)*

| # students using school-based telehealth | 2018 adjusted Lost wages + travel expenses per visit (Table 4) | X Estimated # of visits saved (Table 2) | Total projected yearly cost savings due to ED visits |
|---|---|---|---|
| 3,000 | $64.19 | 253 | $16,240 |
| 11,500 | $64.19 | 969 | $62,200 |
| 20,000 | $64.19 | 1685 | $108,160 |

To estimate office visits avoided, more data is required. McConnochie[36] gathered data from a school-based telehealth program in Rochester, NY, revealing that in their program, 2,265 children had 6,693 telehealth encounters; diving these two numbers, we see that each child

averaged 2.95 visits. Next, it cannot be assumed that each school-based telehealth visit substitutes for one office visit; some may substitute for ED visits, or may simply not have warranted a physician visit under other circumstances. Young and Ireson (2003) gathered survey data on a school-based telehealth program and found that parents felt school-base telehealth encounters allowed them to avoid a physician office visit 91% of the time,[3] so we will assume that 91% of SBTH encounters substitute for physician office visits. Using these numbers, we can project financial impact due to lost wages and travel expenses. Number of users is multiplied by 2.95 visits per user, times 0.91office visits saved per school-based telehealth visit. This value is multiplied by travel expenses and lost wages to project total parental cost savings due to MD office visits, as show in Table 6.

*Table 6: Total projected parental cost savings due to office visits*

| **# students using school-based telehealth** | **X Average # of yearly visits per user** | **X # of physician office visits saved per telehealth visit** | **X 2018 adjusted lost wages + office visit travel expenses (Table 4)** | **= Total projected yearly cost savings due to office visits** |
|---|---|---|---|---|
| 3,000 | 2.95 | 0.91 | $65.26 | $524,690 |
| 11,500 | 2.95 | 0.91 | $65.26 | $2,011,313 |
| 20,000 | 2.95 | 0.91 | $65.26 | $3,497,936 |

**Start-up costs for telehealth centers**

The cost of establishing a telehealth center varies greatly. Technology costs vary based on such factors as the technical specifications needed; specific brand, manufacturer, or models used; and the local market prices. Additionally, different centers have different staffing needs, including variation in operating hours and patient load, disparate numbers of full- and part-time nurses, heterogenous information technology (IT) personnel needs. Additional staff may be needed, but in some cases, current provider staff or existing school nurses may be trained in telehealth use. In some cases, schools may already have videoconferencing equipment for

educational use, that can be easily modified for telehealth. These considerations make meaningful projections difficult, but the following data can assist in creating a rough projection.

One published source disclosed a range of $17,000 - $50,000 for technology to start a telehealth emergency room.[37] In personal correspondence, Elana Wells, MPH, a program manager at the Medical University of South Carolina (MUSC) Center for Telehealth stated that their school-based telehealth technology costs approximately $22,000 (email communication, October 2018). She also stated that they have an IT team that oversees several telehealth sites but was not able to provide associated cost estimates. Another potential cost consideration is construction or remodeling of school space to accommodate telehealth. Ms. Wells stated that the MUSC program required no construction or remodeling. Notably, telehealth equipment may by portable (e.g. through use of a "telehealth cart"), limiting the need for building modifications.

To test the sufficiency of the $400,000 grant cap, costs will be estimated liberally. It will be assumed that each will require entirely new equipment; one new full-time nurse; and one new full-time IT support specialist. Equipment costs are estimated to be $30,000. The average yearly salary of an IT Network Support Specialist in the District of Columbia is $92,060; the average registered nurse in D.C. makes $90,110.[38] A hypothetical figure of $50,000 will be designated for building costs such as electrical upgrades to the school and new monthly utilities costs. An additional $100,000 incidental fund will be added to cover expenses such as repairs, overtime or part-time wages for cross-covering nursing staff, etc. By this liberal estimate, the startup cost of a single school-based telehealth site falls short of the $400,000 maximum grant.

*Table 7: Projected startup costs per telehealth site*

| Teleconferencing equipment | Full time RN | Full-time IT | Building/ utilities | Incidental | Total |
|---|---|---|---|---|---|
| $30,000 | $90,110 | $92,060 | $50,000 | $100,000 | **$362,170** |

# INTERPRETATION

The Interpretation section includes the remaining steps of the Bardach process. A discussion of the criteria for evaluating the policy is included (Step 4), along with a summary of its merits with respect to these criteria. An analysis of the limitations of this analysis and of the law itself, (step 6) follows. Finally, some policy alternative are explored, and used to generate recommendations for policy modifications that may address the limitations identified (step 3).

## *Criteria and Evaluation*

To evaluate the School Health Innovations Grant Act, three primary criteria were selected: 1) Mental health outcomes; 2) Access to mental health services; and 3) Cost effectiveness. The nature of the problem as revealed by the relevant literature and described in the Introduction section informed these criteria as the most relevant aspects of the public health problem to be addressed through policy.

Primary literature indicates a high degree of consensus regarding the use of school-based telehealth and telemental health. As described in the previous section, use of telehealth has consistently displayed non-inferiority to in-person services. Few drawbacks have been noted.

A wealth of research in recent years has also supported school-based telehealth as an effective means of providing health care access to children who might not otherwise have it. In addition to the direct provision of care, the SHIGA's requirement that its SBHC's provide care coordination is likely in increase the potential for improved health care access, by allowing eligible children to be enrolled in social services, increasing linkage to primary care, etc. The

SHIGA there can be expected to effectively improve access for users; however the number of expected users is difficult to quantify.

Cost effectiveness is the most difficult variable to predict, and the majority of the results section will be devoted to exploring this criterion. To create an Overall Cost Savings projection, the savings projected in the Results section were added together. Although a range of patient population sizes were presented in that section, the lowest value of 3,000 users was selected for the Overall Cost Savings projection. This value was selected due to uncertainty with respect to the anticipated reach of the SHIGA (see the Limitations section below for more detail), and because a more conservative estimate of savings provides a more rigorous test of cost effectiveness.

*Table 8: Overall Cost Saving projected for 3,000 school-based telehealth users*

| Savings in out−of−pocket ER costs. (Table 3) | Total projected yearly cost savings due to ED visits (Table 5) | Total projected yearly cost savings due to office visits (Table 6) | Total Overall Cost Savings Projection |
|---|---|---|---|
| $484,579 | $16,240 | $524,690 | $1,025,510 |

Under these circumstances, the projected cost savings cannot be said to justify the projected $3.2 million of the program overall. However, it should be noted that these measures are likely not the only cost savings likely to be realized by the SHIGA. Other, less quantifiable cost avoidances must be considered as well. To elaborate on these, it is necessary to discuss the limitations of the present analysis.

### *Limitations*

#### Uncertain Reach of the SHIGA

A major limitation school health innovations and grant act is the uncertainty regarding its reach. Although the Act in its present form specifies a maximum of eight school-based telehealth

centers, there is language in the Act suggesting that this is a pilot program. For example, requirements that grant recipients submit business models, keep data, and provide suggestions for how the program could be expanded strongly suggest an interest in expanding the program. However, the initial population affected may be much smaller than the range projected in the Results section. Data available on the DC Public Schools website[40] provides the enrollment size of all DC public schools; while there is a great deal of variation, average school size for middle and high schools in wards 7 and 8 is approximately 350 students, although the largest, Ballou High School, has 880 students enrolled for the 2018-19 year. No equivalent data was available for DC Public Charter School enrollment, creating another source of uncertainty. Further uncertainty derives from the language of the bill itself, which mandates a provider partnership with a school, but does not specifically limit a provider to partner with a single school, meaning a provider could potentially service multiple schools with a single grant.

For these reasons, a conservative estimate of the number of student users was felt most appropriate, and the 3,000-user estimate was selected. While the eventual reach of the program may exceed this figure, the eight grants provided by the current program may serve even fewer students than this.

**Financial projections**

The projections in this analysis were calculated using the most appropriate data available, but its applicability to Washington, D.C., and to the specific concerns of this analysis, is likely very limited. For example, the high number of poor children in the District, as well as the magnitude of the provider shortage there, may indicate that the pediatric ED usage rate exceeds the 38.3% national average used in Tables 2 and 3. Additionally, the out-of-pocket cost may be higher for ED visits in Washington, D.C. than the average $1,917 cited in Table 2, due to an

inflated cost of living in the District; however, the cost may also be lower when mental health visits are specified, as these visits tend to involve fewer costly tests and procedures. These and many similar factors create a great deal of uncertainty, potentially causing a large disparity between the actual financial conditions in the District of Columbia, and the estimates used to describe them. The result is a strong limitation in the accuracy of these projections.

**Startup Costs**

As discussed previously, very limited data was available regarding startup costs. A wide variation was found in the published literature, but the estimate the was felt to be most relevant came via personal correspondence from an anecdotal (though credible) source at the MUSC Center for Telehealth. This is likely to limit the accuracy of the startup cost projections, and it is difficult to predict whether this analysis' projected figure over- or underestimates the actual cost.

**Unquantifiable Variables**

Several other considerations should be weighed when discussing costs and benefits, many of which are difficult to quantify. While we can project some outcomes, such as cost savings due to ED use reduction, others are less easily predicted. These include both costs (such as repair costs, construction costs, and variations in the staffing needs of the different health centers) and benefits (such as downstream cost savings resulting from prompt treatment and prevention of complications, or reduced healthcare costs from enrolling well children in insurance programs or primary care practices). Other unknown variables may result in increases in both costs and benefits. For example, variations in the student populations at individual schools may provide one school with a high volume of relatively uncomplicated patients, resulting in a high reimbursement rate and profit, while another school has an unusually high number of complex

patients requiring many resources, and increasing costs. Differences in business models, workflow, and billing strategies are also difficult to anticipate.

Other variable benefits include cost savings to insurers and other third-party payers resulting from reduced ED usage; savings associated with health center use by students who are not in the high need mental health population; effects of health educational interventions the provider staff may enact on the student populations at large; and the community effects realized in those centers that elect to clinically serve the surrounding neighborhoods. Likewise, many of these benefits may be balanced by increased associated costs.

### *Policy Alternatives*

Two similar programs were identified that address the problem of poor access to child psychiatry services, in Massachusetts and Georgia. The first, the Massachusetts Child Psychiatry Access Project (MCPAP) makes use of six state-run regional telehealth sites, which distant primary care physicians can use to contact child psychiatry specialists. This program is more of a consultation services; cases are presented, and the psychiatrist discusses the issues with the pediatrician and they jointly form a care plan. The pediatrician is encouraged to manage the medications and related issues to the best of his or her ability and uses MCPAP as an educational tool to improve his or her skill and comfort in managing behavioral diagnoses. Referral to more

intensive psychiatric services is available if needed. Studies showed that primary care pediatricians' ability and willingness to manage psychiatric illnesses improved significantly over time with use.[41] This program most likely has medical outcomes and cost effectiveness similar to those expected with the SHIGA; access to services is also improved because it empowers primary care physicians to manage conditions they might otherwise have referred to a psychiatrist. This model would likely be impactful in Washington, D.C. in the long term, but is limited in that it does not address the structural barriers to care, and relies on patient access to primary care services. This strategy would be particularly ineffective in the primary care HPSA's of Wards 7 and 8, which are of particular interest to the SHIGA.

The Georgia Partnership for Telehealth is very similar to the SHIG Program, using school-based telehealth. It has proved cost-effective and relies on public and private grants. An important difference is that it is geared toward rural access, and as such relies on parents attending appointments at the child's school, as opposed to a multi-hour trip to the nearest city.[42] This also may prove impractical for parents in Washington, who may lack reliable transportation or be required to navigate congested city traffic, losing valuable work hours.

A final strategy that deserves discussion is the recruitment of additional child psychiatrists into Washington, D.C. to fill the need. First, it should be noted that the shortage of psychiatrists is nationwide, meaning successful recruitment is likely to create shortages elsewhere. Training additional psychiatrists is advisable but takes years. It should be noted as well that increasing the number of psychiatrists may not guarantee access; social and economic realities such as crime, real estate considerations, and other factors may result in some Ward 7 and 8 neighborhoods being inhospitable environments for practices.

***Recommendations***

A critical evaluation of the SHIGA and a look at the policy alternatives raise several recommendations to maximize the benefit of the SHIGA and correct some of its shortcomings. First, in the event that the grant award process becomes competitive, the Council should publish a rubric of criteria by which awards will be decided (e.g. if specific high-need schools will be given priority), and these criteria should be made public. In addition to promoting transparency, this information may permit more effective provider-school partnerships, resulting in more effective use of resources.

It may also be beneficial to standardize the telehealth equipment for use in the SBHC sites. The DHCF and Department of Health could collaborate to select a few options of equipment models that are both cost effective and meet technical specifications. Doing this would help eliminate some uncertainty regarding startup and maintenance costs. The technical specifications should meet the recommendations of the American Academy of Child and Adolescent Psychiatrists, who suggest bandwidth and resolution capability to permit adequate physical assessment of the patient (for abnormal movements, lesions, etc.) and to reduce pixilation, lag, and loss of audiovisual quality, which have been shown to interfere with therapeutic alliance patient satisfaction.[43] For maximum benefit, technologies should include remote access for parents, either by secure phone line or website, to circumvent the need for parents to be present at the school or physician site.

Additionally, a great deal of burden falls on the provider to staff, equip, and maintain the telehealth site. While the grant may be expected to cover these costs, the provider is nonetheless tasked with providing the majority of time and labor. If the $400,000 grant total does exceed the

costs, as projected in the Results section, it may be appropriate to award the provider practice with a financial bonus as incentive to participate in a program that may otherwise prove daunting and inconvenient for providers.

Data obtained from the initial SBHC's should be used to improve the award amount, and to determine if $400,000 can be stretched further, or if a higher grant amount is needed.

Finally, if the initial program is successful, a long-term plan incorporating initiatives similar to that seen in Massachusetts in the MCPAP would be of great benefit to the District of Columbia. Empowering PCP's to manage psychiatric conditions appropriately and effectively could significantly reduce the burden of need in DC children and ease the effects of the shortage of child and adolescent psychiatrists. Similar results may be achieved in the future by allowing providers to partner with Community Health Centers (CHC's) to broaden the reach of the program; notably, such partnerships may allow for telehealth centers to be established with much lower startup costs. Similarly, it may be useful to address whether the SBHC's established under the Act might qualify as FQHC's and therefore be eligible for federal funding and other benefits that might mitigate the burden of cost to the District government.

## CONCLUSION

The high burden of mental illness continues to be a problem in the United States, and mental illness in the pediatric population in particular has been shown to have far-reaching consequences. Access to child behavioral health services is at near-crisis level in communities nationwide, exacerbated by a national shortage of child and adolescent psychiatrists and

structural barriers to care. Effective solutions are likely to remain elusive, as the shortage of child and adolescent mental health providers is projected to continue well into the future.

School-based telehealth offers a promising solution to bypassing many of the obstacles preventing adequate mental health treatment in D.C. youth. In addition to obviating many barriers to care, it has proved efficacious in providing good health outcomes, improving grades, and can be profitable for practitioners. The School Health Innovations Grant Act represents a novel solution to providing access to behavioral health services to children with minimal disruption to their daily lives and can be expected to be a cost-effective solution, although uncertainty regard cost-effectiveness is a major drawback. If expanded, this program and others like it hold great promise for improving access to care, eliminating health disparities, and lowering health care costs.

# REFERENCES


1. Barnett JC and Berchick ER *Health Insurance Coverage in the United States: 2016.* Washington, DC*:* U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau; 2017:2. Available at: https://www.census.gov/content/dam/Census/library/publications/2017/demo/p60-260.pdf. Accessed Sept 5, 2018
2. Owens P.L., Hoagwood K., Horwitz S.M. Barriers to children's mental health services. J. Am. Acad. Child Adolesc. Psychiatr. 2002;41(6):731–738.
3. Young TL, Ireson C. Effectiveness of school-based telehealth care in urban and rural elementary schools. Pediatrics. 2003; 112(5):1088–1094.
4. Brink R. *Improving the Children's Mental health System in the District of Columbia*. Washington, D.C. Children's Law Center. 2012:8. Available at http://www.childrenslawcenter.org/sites/default/files/attachments/resources/Improving%20the%20Children%27s%20Mental%20Health%20System%20in%20the%20District%20of%20Columbia%20-%202012%20Report.pdf . Accessed Sept 5, 2018
5. Stagman S, Cooper JL. *Children's Mental Health: What Every Policymaker Should Know* New York*:* National Center for Children in Poverty; 2010:4. Available at http://www.nccp.org/publications/pdf/text_929.pdf Accessed Sept 7, 2018
6. Dodge KA, Bierman KL, Coie JD, Greenberg MT, Lochman JE, McMahon RJ, Pinderhughes EE. Impact of early intervention on psychopathology, crime, and well-being at age 25. American Journal of Psychiatry. 2015;172(1):59–70.
7. Beers L, Godoy L, John T, Long M, Biel MG, Anthony B, Mlynarski L, Moon R, Weissman M. Mental Health Screening Quality Improvement Learning Collaborative in Pediatric Primary Care. Pediatrics 2017: Dec;140(6)
8. Health Resources & Services Administration. HPSA Find. https://data.hrsa.gov/tools/shortage-area/hpsa-find . Accessed September 7, 2018
9. Anita Chandra et al., *Health and Health Care Among District of Columbia Youth* RAND Health, 2009:21 Available at https://www.rand.org/pubs/technical_reports/TR751.html . Accessed Sept 21, 2018
10. Annie E. Casey Foundation, Kids Count Data Center, https://datacenter.kidscount.org/data/map/6747-population-by-age-group-by-ward?loc=10&loct=21#21/any/false/870/838/13833/Orange/ . Updated December, 2017. Accessed September 21, 2018.
11. Findling RL, Stepanova E. The Workforce Shortage of Child and Adolescent Psychiatrists: Is It Time for a Different Approach? J Am Acad Child Adolesc Psychiatry. 2018 May;57(5):300-301
12. Grady BJ, Lever N, Cunningham D, Stephan S. Telepsychiatry and school mental health. Child Adolesc Psychiatr Clin. 2011;20:81–94
13. Stephan S, Lever N, Bernstein L, Edwards S, Pruitt D. Telemental Health in Schools. Journal of Child and Adolescent Psychopharmacology. 2016;26(3):266–272
14. Kieling C, Baker-Henningham H, Belfer M, Conti G, Ertem I, Omigbodun O, et al. Child and adolescent mental health worldwide: evidence for action. Lancet. 2011;378(9801):1515–25.
15. Fazel M., Hoagwood K., Stephan S., Ford T. Mental health interventions in schools in high-income countries. Lancet Psychiatry. 2014;5(1):377–387.
16. New Freedom Commission on Mental Health, *Achieving the Promise: Transforming Mental Health Care in America. Final Report*. DHHS Pub. No. SMA-03-3832. Rockville, MD: 2003: 60. Available online at: https://govinfo.library.unt.edu/mentalhealthcommission/reports/FinalReport/downloads/FinalReport.pdf . Accessed Sept 26, 2018

17. Hodgkinson S, Godoy L, Beers LS, Lewin A. Improving mental health access for low-income children and families in primary care setting. Pediatrics. 2017;139(1)
18. Bardach E. *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving*. Fourth. SAGE Publications; 2012.
19. DeWitt JS. Fiscal Impact Statement – School Health Innovations Grant Act of 2017. Government of the District of Columbia, Office of the Chief Financial Advisor. http://lims.dccouncil.us/Download/37818/B22-0232-Fiscal-Impact-Statement1.pdf Published November 1, 2017. Accessed August 22, 2018
20. DC Council. Code 38C. Telehealth Reimbursement. Code of the District of Columbia website https://code.dccouncil.us/dc/council/code/titles/31/chapters/38C/. Accessed 9/22/2018
21. Center for Connected Health Policy. State Telehealth Laws and Reimbursement Policies. Spring 2018. Available online at http://www.cchpca.org/sites/default/files/resources/50%20STATE%20FULL%20PDF%20SPRING%202018%20-%20PASSWORD.pdf . Accessed September 30, 2018.
22. Hilty DM, Ferrer DC, Parish MB, Johnston B, Callahan EJ, Yellowlees PM. The effectiveness of telemental health: a 2013 review. Telemed J E Health. 2013; 19: 444– 454
23. Council on School Health. School-based health centers and pediatric practice. Pediatrics. 2012;129(2):387–393
24. Guo JJ, Wade TJ, Pan W, Keller KN. School-based health centers: cost-benefit analysis and impact on health care disparities. Am J Public Health. 2010;100(9):1617–1623
25. Adams EK, Johnson V. And elementary school-based health clinic: can it reduce Medicaid costs? *Pediatrics*. 2000;105(4 part 1):780-788
26. Key JD, Washington EC, Hulsey TC. Reduced emergency depart- ment utilization associated with school-based clinic enrollment. J Adolesc Health 2002;30:273-8.
27. Soleimanpour S, Geierstanger SP,Kaller S, McCarter V, Brindis CD. The role of school health centers in care access and client outcomes. *Am J Public Health.* 2010;100(9):1597-1603
28. Our schools. District of Columbia Public Schools website. https://dcps.dc.gov/page/our-schools . Accessed October 4, 2018
29. D.C. Public Charter School Board website. https://www.dcpcsb.org. Accessed October 4, 2018
30. Strolin-Goltzman J, Sisselman A, Melekis K, et al. Understanding the relationship between school-based health center use, school connection, and academic performance. Health & social work. 2014;39:83–91.
31. Walker SC, Kerns SEU, Lyon AR, Bruns EJ, & Cosgrove TJ (2010). Impact of school-based health center use on academic outcomes. Journal of Adolescent Health, 46(3), 251–257.
32. QuickFacts, District of Columbia; Virginia. United States Census Bureau website. https://www.census.gov/quickfacts/fact/table/dc,va/PST045217 . Accessed October, 2018
33. McDermott KW, Stocks C, Freeman WJ. Statistical Brief #242. Healthcare Cost and Utilization Project (HCUP). August 2018. Agency for Healthcare Research and Quality, Rockville, MD https://www.hcup-us.ahrq.gov/reports/statbriefs/sb242-Pediatric-ED-Visits-2015.jsp . Accesses October, 2018
34. Luhby, Tami. $12,000 for a bee sting? Emergency room visits get even pricier. CNN website. https://money.cnn.com/2018/03/19/news/economy/emergency-room-er-bills/index.html . Published March 19, 2018. Accessed October, 2018.
35. McConnochie KM, Wood NE, Herendeen NE, Ng P, Noyes K, Wang H, Roghmann KJ. Acute illness care patterns change with use of telemedicine. Pediatrics 2009;123:e989–e995
36. McConnochie KM, Wood NE, Herendeen NE, tenHoopenCB, Roghmann KJ. Telemedicine in urban and suburban childcare and elementary schools lightens family burdens. Telemed J E Health. 2010;16(5):533–542

37. Natafgi N, Shane DM, Ullrich F, MacKinney AC, Bell A, Ward MM. Using tele-emergency to avoid patient transfers in rural emergency departments: An assessment of costs and benefits. *J Telemed and Telecare* 2018, Vol. 24(3) 193–201
38. US. Department of Labor, Bureau of Labor Statistics website. Occupational Employment Statistics, May 2017 Occupation Profile. https://www.bls.gov/oes/current/oes_stru.htm . Updated March 30, 2018. Accessed Oct 22, 2018.
39. CPI Inflation Calculator. U.S. Bureau of labor Statistics website. https://www.bls.gov/data/inflation_calculator.htm .
40. School Profiles Home – Find a School. District of Columbia Public Schools website. http://profiles.dcps.dc.gov . Accessed 11/1/2018
41. Strauss JH and Sarvet B. Behavioral Health Care For Children: The Massachusetts Child Psychiatry Access Project. Health Affars. 2014; 30(12):2153-2161
42. Knopf A. School-based telehealth brings psychiatry to rural Georgia Knopf, Alison *Behavioral Healthcare;* Jan/Feb 2013; 33(1):47-48
43. Clinical Update: Telepsychiatry With Children and Adolescents. J Am Acad Child Adolesc Psychiatry2017;56:875-93

## BIOGRAPHICAL SKETCH

This capstone was completed by Dr. Robert West. Rob earned his Bachelor of Arts degree in Psychology from North Carolina State University in Raleigh, NC, followed by his Doctor of Medicine at University of Kentucky College of Medicine, in Lexington, KY. His Master of Public Health Degree focused on Population Health Policy and Management. Dr. West practiced a resident pediatrician for two years in Norfolk, VA for two years before changing his career focus to mental health and continues to follow a professional interest in mental health policy. Following graduation, he intends to pursue a residency in preventive medicine. He is interested in working to develop and implement evidence-based mental health policy.