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Pediatric Rates of Psychiatric Emergency Department Visits and Potential Savings via Tele-Mental Health

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By

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A Doctoral Project submitted to the faculty of the Medical University of South Carolina in partial fulfillment of the requirements for the degree
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Abstract of Dissertation Presented to the
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Chairperson: Prof 1, Kit Simpson DrPH

Committee: Prof 2, Walter Jones PhD

Prof 3, Crystal Brown-Voeltz, DSW

Research suggests that visits to the Emergency Department (ED) for psychiatric purposes among youth are rising and has been identified as a public health crisis. One in five school aged children struggle with mental illness with 70% of those diagnosed going untreated which promotes academic failure, behavior challenges, dropout, and unproductivity that leads into adulthood (Bains, Cusson, White-Frese & Walsh, 2017; Grady, Lever, Cunnigham, & Stephen, 2011). Schools have been identified as an ideal place for children to receive mental health services. School based tele-mental health is noted as a beneficial treatment that if delivered on site at schools could assist with closing the gap to accessing pediatric mental health needs saving money through transportation, time missed from school or work, and lower insurance cost (Hoover, Bernstein, Lever, & Edwards, 2016). This study will evaluate the cost effectiveness of receiving school based mental health treatment instead of visiting the emergency department for care (School-Based Tele-Mental Health Services, 2015; CEDAR, 2018).

Dedication

To my mother who demonstrated and modeled tenacity, resilience, and achievement, for the love of your four daughters. My adoration and love for you can never be measured!

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1 Chapter Introduction

1.1 Background and Need

Telehealth, synchronous interaction between the patient and health provider permitting all involved to be present for videoconferencing simultaneously for instantaneous exchange of information (Gott, 2008) is a rapidly evolving medical practice used to provide quality healthcare services to those who are geographically challenged from health providers (Cenaj, 2018). This approach requires the transmission of relevant information in a variety of formats including media, text, audio, video, or still images. (Lerman, Kim, Orzinal, &Thompson, 2018). The term telehealth and telemedicine are used interchangeably, and is also referred to as; tele-psych, tele-mental, teletherapy, tele-behavior health and tele-substance abuse disorder treatment when referring to virtual psychiatric or mental health services (Hoover, Bernstein, Lever, & Edwards, 2016). In this paper, tele-mental health will be the primary term used when referring to school-based mental health and/or psychiatric services rendered through technology.

Mental health disorders in school-aged children are the most common type of disability as it promotes years of unproductivity (Bains, Cusson, White-Frese & Walsh, 2017). Bains and associates (2017) reported that among school aged children under the age of 18 years, 1 out of 5 require and receive services for mental, emotional, or behavioral health issues and of these only half receive needed services (Marrast, Himmelstein, Woolandler, 2016). Minority children who are from low-income homes and live in poverty are particularly vulnerable to mental health disorders and are less likely to have adequate access to mental health services compared to their white counterparts (Bains et al., 2017). According to Bains and associates (2017), untreated mental health conditions in school-aged children that go untreated often lead to poor academic

performance resulting in low grades, high suspension rates, school dropout, and severe behavior challenges leading into adulthood. Consequently, the need for access to quality mental health services for children is pervasive and is no longer in question (Grady, Lever, Cunnigham, & Stephen, 2011). Research has shown that the presence of school mental health programs is associated with positive outcomes such as; fewer disciplinary problems and referrals to special education programs that promote the wellbeing of the whole child thus overall resulting in a more positive school environment (Grady et al., 2011; Herman et al., 2017). Tele- mental health under the umbrella of telehealth services has been identified as an effective delivery service option that could not only meet the needs of identified students with mental health and behavioral disorders, but also potentially meet the needs of all students (Grady, et al., 2011).

The objective of this study is to evaluate recent literature on the use of tele-mental health as a treatment approach, and as a cost-effective intervention for crisis situations. Crisis are often emergencies (for the client) that is why they end up in the emergency room. This study will evaluate the rate of psychiatric pediatric emergency department (ED) visits over time across several geographic counties in South Carolina (SC) comparing demographics such as age, sex, and racial and/or ethnic groups. Data sources will include information retrieved from the South Carolina (SC) emergency department emergency room (ER) visits for the year of 2018. Cost of school based tele-mental health (TMH) will be evaluated by counties using a dataset that considers insurances such as Medicaid, uninsured, or self -pay. Additionally, TMH estimated cost will be compared to the cost of ED visits.

The National Alliance of Mental Illness (2018) (NAMI), and the Centers for Disease Control (2019) report that more than one in five school aged children struggle with mental illness. Additionally, the United States Surgeon General declared children's mental health a

national public crisis likened to a state of national emergency (Stephen, 2016). Identified issues related to children's mental health crisis include elevated rates of under identification, inadequate treatment access, unmet needs, and low-quality children's mental health services (Stephan, 2016). However, despite the need for care, research reports that 70% of children diagnosed with a mental illness do not receive treatment (Grady et al., 2011). Notably, one-half of chronic mental illnesses in children manifests by age 14, but only a mere 36% of youth affected with mental health issues will receive treatment (McGhee, 2015). Furthermore, children with unidentified and untreated mental illness reportedly do not compete at the same academic level as their peers (McGhee, 2015). Because schools are often recognized as an ideal natural setting for providing a full continuum of mental health support to youth, school-based tele-mental health has proven to be a practical means to gaining access to a variety of mental health providers, including psychiatrists and clinical mental health practitioners (Stephen, 2016; Hoover, et al., 2016).

The rate of ED psychiatric visits for youth has markedly increased nationwide (Kalb, Stapp, Ballard, Holingue, Keefer & Riley, 2019). Disparities to adequate mental health care for youth are pervasive and often include major confounding factors like; geographic location, insurance standing, economic status, and availability. In addition, disparities to care include stigma associated with mental health services including psychiatric hospitalization for children and the perception thereof from family, community, and others (Grady, 2012). According to Griffith and Christensen (2007), stigmatizing perspectives are more prevalent in rural communities than in urban areas and that stigma may be a greater barrier for those seeking care for mental illnesses in rural communities because of the intertwined nature of rural social networks and communities. Greater educational efforts are needed for mental health treatment to

become widely accepted and appreciated particularly in rural areas. Rural communities are at a disproportionate disadvantage considering distance and availability of needed services. School aged children living in rural areas and experiencing mental health issues could benefit from the convenience of on-site tele- mental health services as it provides the convenience of applicable mental health service delivery in a safe supportive environment with the ability to provide needed resources and additional care support (Hoover, Bernstein, Lever, & Edwards, 2016).

1.2 Problem Statement

Lack of access to care or inadequate pediatric community mental health treatment has resulted in the frequent us of the ED as treatment influencing the rising cost of care becoming a public health crisis (Kalb et. al., 2019; Leon et al., 2017; Pittenbarger & Mannix, 2014). Tele-mental health delivered through school systems holds the potential for helping solve this problem however, estimates are lacking for informing the development of such services in South Carolina.

1.3 Research Question

What are the potential economic benefits of using school-based tele-mental health (TMH) as an intervention to prevent ED visits for mental health crisis for South Carolina?

1.4 Population

The inclusion Criteria consists of school age youth ages 5-14 with a mental health condition as a primary diagnosis who frequent the ED on a weekday during the months that school is in session. Outcome studies are targeting youth with any mental health (MH) condition who were briefly treated in an emergency department setting and discharged. Statistical analysis logistic regression model was used to examine changes in psychiatric ED visit over time. Exclusion criteria are youth younger than 5 years old, youth older than 14, and youth without a

MH diagnosis and youth with no guardian representation or consent. Other exclusions include; ED visits initiated on a Saturday or Sunday, months when school is not in session, and visits where the patient was not sent home on the day seen.

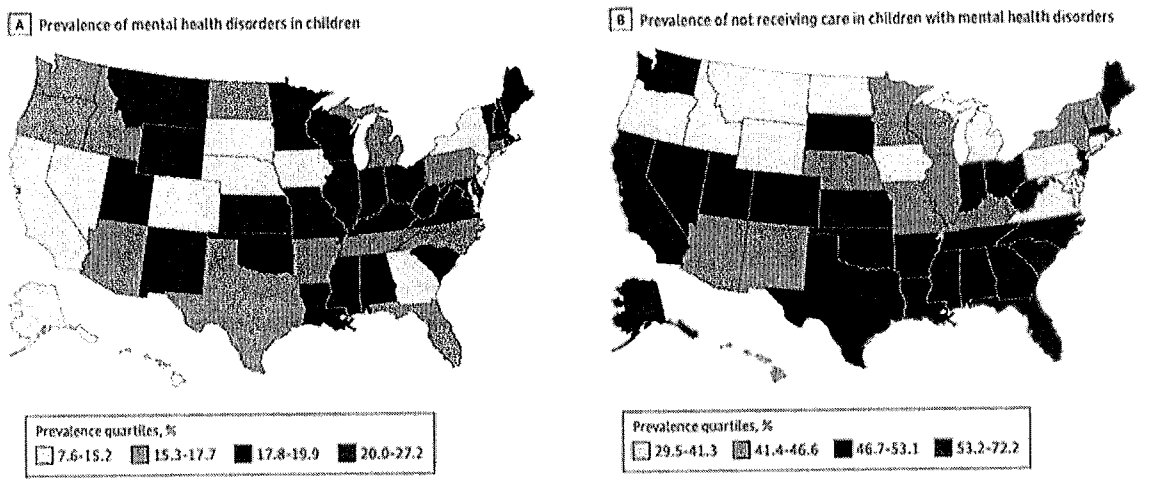
2 Chapter Literature Review

2.1 National Youth Mental Health Information and Statistics

Mental health conditions cost the United States over $193.2 billion dollars annually in lost wages with indicators that show the earlier the treatment the better the outcomes and life productivity, and obstructing a productive transition to adulthood (Whitney & Patterson, 2019; 2020). Structural barriers such as socioeconomic factors and shortages of child psychiatrists affect mental health treatment for youth, in particular minority youth (Whitney & Patterson, 2019). Cultural stigma can exacerbate the mistrust of mental health treatment thus promoting informal care from a family member, trusted community friend, or clergy (Marrast et al., 2016). In 2015, the National Institute of Mental Health estimated the total costs associated with serious mental illness to be more than $300 billion per year (Bashshur Shannon, Bashshur & Yellowless, 2016). The global cost of mental health disorders was estimated at $2.5 trillion in 2010, with a projected increase to over $6 trillion in 2020 (Bashshur et al., 2016). Bashshur and colleagues (2016), reported that 7 million children and adolescents in the US equivalent to 1 in 10 school aged youth in the United States, had a serious psychiatric disorder that required ongoing treatment. Furthermore, an estimated 1 in 6 school aged youth in the United States between the ages of 6 and 17 years will experience symptoms of a mental disorder annually (Delazizzo, Potvin, Luigi & Dumais, 2020). A startling 50% of youth with emotional or behavior disorders drop out of school (McGhee, 2015). About half of all school-aged youth between the ages of 13-18 reported having mental illness and only half of those who reported illness actually receive treatment (Marrast et al., 2016). One in 5 youth who live with mental illness reported debilitation because of the illness (2020) and nearly 8% of this population reported a suicide attempt at least once (Marrast et al., 2016). An estimated 16 percent of all children assessed as needing mental

health services actually receive mental health services. Of those receiving care, 70-80 percent actually receive this care in a school setting (CDC, 2019). Improving access to mental health services for children with behavioral and emotional disorders constitutes important policy concerns (Barry & Busch, 2008).

Figure. Prevalence of Mental Health Disorders and Mental Health Care Use Among US Youth



A, State-level prevalence presented as quartiles of at least 1 mental health disorder (ie, depression, anxiety problems, and attention-deficit/hyperactivity disorder) in the total sample of children (weighted estimate, 46.6 million).

B, State-level prevalence presented as quartiles of children with a mental health disorder not receiving needed treatment or counseling from a mental health professional (weighted estimate, 7.7 million).

(Whitney & Patterson, 2019)

Access to mental health care continues to be a concern as it perpetuates mental health as a national crisis (Stagman & Cooper, 2010). The current delivery of mental health services does not adequately meet the needs of school-aged children. One in five youth from birth to 18 is diagnosed with a mental disorder. Half of all mental disorders that carry over into adulthood start in the mid- teenage years. Of that, nearly 5% experienced serious emotional disorders (Stagman & Cooper, 2010). School aged youth from varied racial and ethnic backgrounds including those with language barriers are likely to not receive needed services as compared to white youth.

Furthermore, Hispanic and African American children in urban areas receive care at a lower percentage than their white peers (Stagman & Cooper, 2010; 2020). Rural African American children living in poverty have a higher prevalence rate of mental health disorders than their counterparts due to scarce resources particularly in rural areas (Murry, Heflinger, Suiter & Brody, 2011; 2020). School aged females receive mental health services at half the rate as male peers (Olfson, Druss, & Marcus, 2015).

Finance policies drive the quality of service as Stagman and Cooper (2010) noted the difference in treatment for children with private insurance who are less likely to receive services due to high deductibles and copays versus children with Medicaid. The Affordable Care Act is a law that includes a list of healthcare policies intended to extend health insurance coverage and treatment to millions of uninsured Americans. A primary tenet in the Affordable Care Act (ACA) is expanding access to mental health services (MUSC, 2015). The ACA afforded instrumental funding for many schools and community-based telehealth centers allocating $200 million dollars strictly for school-based operations, consenting for the building of new centers and sites (Children's Tele-Mental Health, 2018). It is the hope that this initiative with assist with closely the gap in mental health care for youth.

2.2 South Carolina and Youth Mental Health

South Carolina has the poorest health in the nation as it relates to the mental health of children at 33.6% according to the United Health Foundation (CAHMI, 2017; 2020). Barriers to treatment include but are not limited to; stigma, lack of insurance and limited access to providers resulting in an increase of patients going to the emergency department for psychiatric care (MUSC, 2015; Rural Health Information Hub, 2018). Those that go untreated are often in non-

compliance with recommended and prescribed medication and have high hospital readmission (MUSC. 2015). In rural states like South Carolina, most mental health providers are crowded in urban areas, causing rural residents in need of mental health services to travel long distances for care, accruing transportation cost and childcare costs and days lost from work (MUSC, 2015). Improved mental health treatment for school aged youth requires the collaboration and investment at the state level in school mental health efforts. The state of South Carolina in collaboration with School Mental Health (SMH) has shown outstanding strides to develop meaningful partnerships between the University and community relations through marked investments in expansion and improvement of mental health services (Shapiro et al., 2020). Through these strides, South Carolina is on track to leading the way in serving as a model for creating a plan to establish school mental health practices in every school by the year 2022 (Shapiro et al., 2020). There has been notable steps in expansion and improvement in school mental health services in the state of South Carolina after significant investments however there is still work to be done considering its current mental health ranking (Shapiro et al., 2020).

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2.3 Tele Mental Health Programs

TMH is a contemporary mental health delivery method via video-based conferencing with the potential to address mental health disparities and provide additional support services particularly emergency services (Hubley, Lynch, Schneck, Thomas & Shore, 2016; Reinhardt, Gouzoulis-Mayfrank, Zielasek, 2019). TMH literature includes a broad range of systems and applications including; mental health assessments, clinical evaluations, education, treatment protocols, medication maintenance, monitoring, operating systems, modes of communication, and collaborative efforts. Research identified potential TMH operators and staff as psychiatrists,

nurses, physician assistants, psychologists, counselors, and clinical social workers with operational locations as clinics, hospitals, schools, and homes (Bashshur et al., 2016).

The increased need for unconventional psychotherapy approaches has birthed the development of virtual and technology-based interventions. Many of these interventions have proven beneficial when compared to face-to-face therapeutic approaches. South Carolina Department of Mental Health (SCDMH) in partnership with The Duke Endowment developed the SCDMH Emergency Department Telepsychiatry Program allowing rural emergency department's access to mental health care via telehealth (Rural Health Information Hub, 2018). This collaboration permitted the development of new tele-mental health programs at MUSC Health, which is closing the mental health service gap by making mental health services available virtually through Virtual Tele Consultation (VTC) with MUSC's psychiatrists called practice-based and school-based services (MUSC, 2015). MUSC's National Crime Victims Research and Treatment Center, is unveiling a new evidence-based mental health program for children at selected schools along the state's infamous I-95 South corridor, where poverty levels contend with developing third world countries (MUSC, 2015; Ferillo, 2013). In addition, in 2015, MUSC health was awarded a 600,000 Duke Endowment grant to provide school-based tele-mental health and tele-mental health services to the underserved in rural South Carolina counties (School-Based Tele-Mental Health Services, 2015). The fundamental goal was to create tele-mental health services in 15 schools in Williamsburg, Sumter, Charleston, and Bamberg counties in South Carolina. This telehealth service is intended to be used to triage students in need of mental health services and to coordinate the appropriate mental health service for individualized care (School-Based Tele-Mental Health Services, 2015). This service delivery

determines which students are appropriate for outpatient services and which students may require a higher level of care including medication management or acute residential care (Hoover, Bernstein, Lever & Edwards, 2016).

Policies involving tele-mental health, particularly in behavior health is developing and is broadening its reach into schools. Policy at the federal and state level are drivers in determining what programs will look like as institutions organize. Ultimately, participating entities and suppliers within the health policy marketplace, work to influence the actions, behaviors, and decisions of each other to further their own policy objectives (Longest, Jr., 2016). Hoover et al., (2016) suggest that federal and state policy influence the implementation of school based tele-mental health services including decisions about offering as well as the organization of tele-mental health programs. Ethical approval in participating organizations is a major factor as school boards consider best interest when determining governance (Sevean, Dampier, Spadoni, Strickland, Pilatzke, 2008; Grady et al., 2011).

Medical practices and schools affiliated with MUSC Health's VTC Program can refer youth with mental health issues for evaluation and medication management to board-certified child and adolescent psychiatrists. All program participants and providers are Health Insurance Portability and Accountability Act (HIPPA)-compliant, through secure two-way video conferencing. Psychiatrists pauses the session at an appropriate point to contact the youth's primary care physician (PCP) to discuss the case in detail as well as recommendations. Once the two have reached a consensus, the psychiatrist reconnects to the patient and explains the treatment plan (MUSC, 2015). A school social worker or school psychologist would be the primary facilitator and counselor for children identified to use tele-mental health services. The school social worker or school psychologist would also serve as the primary therapist, participant

connector, educator, and organizer for all virtual visits. The impact of policy development and implementation of school based tele-mental services is largely driven by cost/benefit ratio considering needed technology and expense to providers as well as considerations for legal ramifications (Grady et al., 2011). All mental health recorded results of screening and triage tools are subject to the Family Educational Rights and Privacy Act (FERPA) (Weist, Riddle, Quell, Massey, & Mcwhirter, 2019). Other documents including treatment plans and ongoing continuum of care notes including reviews and discharge summaries are subject to audit by the Department of Mental Health and the Department of Public Health (Weist et al., 2019). As school districts organize how their Tele-metal health department will look, it may be wise to institute quality control persons to oversee and ensure that all federal and state mandated requirements are met.

2.4 Effectiveness of Tele-Mental Health

The effectiveness of emergency Tele-Mental Health consultations has not been thoroughly studied although, one study revealed that of those seen in the ED 65% were discharged, 16% were admitted, and 19% were transferred. Out of eight participating systems that ranked effectiveness, most rated themselves as somewhat successful with patients with emergency physicians rating services as moderately succesful (Hilty et al., 2013). According to Hilty and associates (2013) a virtual psychiatric consultation can lead to a new diagnosis and/or a change in a prescribed psychotropic medication for 82% of patients seen virtually. This same report revealed that youth's perceptions regarding receiving TMH services was that their overall experience was beneficial, with many leaving appointments or services feeling empowered with having the choice of face-to-face or virtual treatment as an option. Most youth reported that they generally liked technology-based treatment, citing it as less invasive and less judgmental through

technology (Hilty et al., 2013). Access to mental health services via technology based tele-mental health appears to show effectiveness as patients report less travel time, no absences from work or school, little to no time waiting, as well as more clinical choices and control, privacy, and better outcomes considering connectedness to clinicians (Hilty et al., 2013). The benefits of stable and predictable access to psychiatric services may offset or justify start-up or other cost which includes technology, infrastructure, equipment, and trained staff (Myers & Cain, 2008). Tele-mental health may be cost effective considering travel cost, in person consultation cost, transfer to a higher level of care for evaluation, and medication maintenance adherence (Bruce, 2018; Hilty et al., 2013).

While research has shown that on -site school based virtual care as empowering to youth it is imperative to note the importance of confidentiality. Virtual visits would dismiss the need for local hospital involvement and provide a smoother transition to a higher level of care if needed (Baker, 2012). If school districts offered on-site (TMH) services, parents may be more apt to permit their children to receive recommended psychiatric care and medication management due to established rapport, confidentiality, and convenience (Grady et al., 2011). Many parents may be hesitant to allow their child to receive care in a local hospital setting for fear of being identified by community members or extended family who work in the hospital who may judge or inform others. Tele-Mental health in schools would provide convenience for parents who have challenges taking time off work or for parents who have transportation challenges. Research reports the socioeconomic benefits to patients, families, health providers and the health system, including enhanced patient-provider communication and educational opportunities for all involved in the tele-health experience (Ryu, 2012). Research also shows that children living with mental health disorders who receive TMH services are at a greater advantage

for psychological balance as well as improvement in behavior and improvement in academic grades versus children with mental health disorders who go untreated (Grady et al., 2011). Research further report the socioeconomic benefits to patients, families, health providers and the health system, including enhanced patient-provider communication and educational opportunities (Ryu, 2012).

2.5 Tele-Mental Health Program Structure

Tele-Mental Health services operational sites is foundationally established by a psychiatrist or a clinical service provider, to determine if services are warranted by establishing; need, feasibility, and sustainability (Myers & Cain, 2008). Structural supports may look different in some schools depending on the available qualified staff. The collaborative involvement of pertinent clinical professionals is imperative, as it proves valuable with having supports in place that may be needed after and/or during the virtual experience. Advantages to providing school based on-site services for youth in schools include creating and maintaining a natural setting with known clinicians known clinicians that would be able to coordinate needed therapeutic and maintenance treatment with a psychiatrist who may need to prescribes medication (Myers & Cain, 2008). Myers and Cain (2008) suggests that the inclusion criteria for school based TMH services may include but are not limited to youth having an established mental health diagnosis and attends a specific school or school district and has an individualized education plan (IEP) in place. A school clinical social worker or school psychologist who provide school based therapeutic services will serve as the school facilitator for Tele-Mental health services, coordinating telehealth appointments, manning technology equipment, the administration of bio-psycho- social assessments, and a team member of the multidisciplinary team (Grady et al., 2011). This school-based facilitator would also be responsible for securing an optimal location

for privacy. This space should be large enough to accommodate the student and clinician and when applicable to a parent or additional professional support if needed.

2.6 South Carolina Mental Health Services for Teens

South Carolina Department of Mental Health (SCDMH) reports servicing 30,000 youth annually. Services may include individual, group, and family therapy with a trained therapist, psychiatric medical assessments with a Psychiatrist or Nurse Practitioner, supportive nursing services, crisis intervention, and care coordination by a clinical social worker. The state of South Carolina has several established programs such as, 16 community-based outpatient clinics accessible to youth, and three licensed hospitals statewide (SCDMH, 2020). SCDMH has a community tele-psychiatry program that provides psychiatric treatment services to SCDMH patients throughout South Carolina since August 2013.

2.7 Role of Schools

School based mental health services has been heralded as an effective strategy for identifying and treating a greater number of youth with mental health issues (Grady et al., 2011). School-based mental health services are an example of successful collaboration between mental health and education for the benefit of servicing the whole child (Bains et al., 2017). The collaboration of mental health services with school-based mental health are purposed to address the mental health disparities of children and adolescents who otherwise would not receive needed mental health care (Bains et al., 2017). The President's New Freedom Commission report on Mental Health, released by the Surgeon General, stated that schools are a major and effective setting for improving services and delivering mental health care to children (Grady et al., 2011; Hoover et al., 2016). The presence of school mental health programs is associated with positive

outcomes such as; improved school atmosphere, fewer disciplinary and referrals to special education programs, which promotes the wellbeing of the whole child (Grady et al., 2011). Beyond meeting the needs of identified students with mental health and behavioral disorders, school- based tele-mental health services can meet the needs of all students as improved mental health conditions school wide which produces an overall positive school environment (Grady et al., 2011).

School districts across the country may benefit from investing in developing a relationship with an established hospital with a Tele-mental health Dept. to better meet the behavior health needs of identified youth in need of mental health care. Children in crisis who visit their local community hospital sometimes sit in the local hospital unmedicated and without their psychiatric needs being met (Baker, 2012). If school districts develop a relationship with a hospital's tele-mental department, youth can receive services on site at their local school the same day and the same hour that symptoms present thus providing timely mental health or psychiatric care and recommendations. It is recommended that school districts organize a team that consists of behaviorists and those who work in information systems to become educated in the nuances of tele-mental health and all of its components. Select staff should understand the functions of communicating via tele-mental health including all processes of tele-mental health including safety protocols and sharing virtual communication for referrals and/or additional services (Mahmoud, Vogt, Sers, Fattal, & Ballout, 2019).

The school district's technology team would be responsible for understanding electronic health record (EHR) data sharing as well as becoming current in cyber-security and encryption coding and acceptable use policy which would provide confidentially and compliance with HIPPA laws (Langarizadeh et al., 2017). Information will no longer be comprised of data

exclusive to education but will also consist of sensitive BH records which in part is covered under the code of federal regulation policy in the 42nd rule (42 CFR Part -2 policy) that protects mental and substance abuse records (McCarthy, Rieckmann, Baker, & McConnell, 2017). School-based tele-mental health services has proven to be a practical means to gaining access to a variety of mental health providers, including psychiatrists and clinical mental health practitioners (Stephen, 2016; Hoover et al., 2016). School staff such as school psychologist, school counselors, psychiatrist, or school social workers often provide therapeutic support for students mental health needs particularly for those identified with a mental illness or those identified with social, emotional or behavior challenges (Stephen, 2016; Hoover et al., 2016). Schools are recognized as an ideal natural setting for providing a full continuum of mental health supports to youth. When providing therapeutic services in schools it is imperative to have access to an interdisciplinary mental health team in order to deal with the various concerns that may affect students. Examples of other disciplines that can be represented on a schools multidisciplinary mental health team include nursing and occupational therapy however, it is vital to note the importance of on-site school therapeutic connection is nurtured and maintained by the facilitating therapist (Herman, Cho, Marriot & Walker, 2017).

Nationally, there are over 2000 school-based health centers, of that, sixty-nine percent are housed in underserved and low- income schools where the majority of them have a mental health provider (Bains et al., 2017). Stagman & Cooper (2010) suggest that over 3.1 million youth receive some form of mental health treatment or counseling for emotional or behavior health challenges. An additional 12 percent of school age youth receive mental health services in an education setting. Nearly 3 percent receive mental health services in a medical setting. This is a great indication that a percentage of youth can access services at some level however, most

children and youth with mental health problems remain challenged with access to care and would greatly benefit from receiving needed mental health services virtually at school (Stagman & Cooper, 2010).

2.8 Information Systems and Technology

Tele- mental health services offer a modern technology approach to effectively and efficiently providing access to psychiatric services in schools (Grady et al., 2011). However, predicted technology challenges may arise which include but are not limited to; equipment competence or failure, internet connection accessibility, and security and/or firewall systems challenges (Grady et al., 2011. Benefits include; faster coordinated provider exchange and communication, patient access and education, clinical data integration into an existing EHR system, convenience, and accessibility (Mahmoud et al., 2019). An Electronic Health Record (EHR), an electronic version of a patient's medical history that is maintained by the provider over time, and may include all of the key administrative clinical data relevant to that persons care under a particular provider. An EHR includes demographics, progress notes, problems, medications, vital signs, past medical history, immunizations, laboratory data and radiology reports (Rizer, kaufman, Sieck, Hefner & McAlearney, 2015). Cost and reimbursement of tele-mental and resistance to virtual care via technology remain prevalent despite promising evidence-based results (Mahmoud et al., 2019). Information systems regarding data sharing of those receiving behavior health care is highly controversial and incongruent with CFR-42 confidentiality and HIPPA laws. What behavior health information merges with the electronic health records system and who this information is shared with remains a challenge (Mahmoud et al., 2019). Information exchange is a critical component in the effective use of telemedicine as it

provides the exchange of valid critical information for diagnosis, treatment, medication, compliance, and relevant patient information needed for best care.

3 Chapter Methodology

3.1 Population and Data Source

This study aim is to identify school age youth ages 5-14 with mental health conditions identified by the matching diagnostic code according to the Diagnostic Statistical Manual fifth edition (DSM-5), along with the appropriate ICD code for hospital billing records. Charges recorded for visits on de-identified billing data for EDs in SC for 2018, with patients' age aggregated by 5-year age groups, and no dates other than indicators of month and weekday or weekend service to preserve confidentiality. Documentation for ED visits will be classified based on specified demographics such as; age, gender, race, insurance type, and condition. This study identified the number of ED visits for psychiatric disorders by county in the state of South Carolina within the last 10 years. The visits are further dissected to determine which youths are seen in the ED and subsequently discharged home, hospitalized, or referred for a higher level of care. We will determine if the youth who are sent home could have been treated in a school setting virtually through Tele-Mental health. Based on severity and discharge status, this study will evaluate which admissions could have been avoided through Tele-Mental Health.

3.2 Current Procedural Technology (CPT) and ICD 10 Codes

In 2017, Current Procedural Terminology (CPT) published a new modifier or scale and a new appendix related to telemedicine services. These services may be reported in various ways according to the provider, depending on the payer and state regulations. While the Centers for Medicare and Medicaid Services (CMS) have recognized telehealth services for quite some time, the launch of the CPT infrastructure has facilitated its recognition to private and public payers (2020). Virtual providers must submit insurance claims for tele-mental health services using the appropriate CPT code for the behavioral health service along with the tele-mental health

modifier GT, which is used in Medicaid billing to indicate the synchronous service rendered through telecommunications. The GT modifier is added to the CPT code to inform the insurance company that the service was provided via tele-mental health at an approved telehealth site. Per CMS, by coding and billing the GT modifier with a covered tele-mental health procedure code, the provider is certifying that the client/patient was present at the time of service. The CPT code coverage varies by insurance type (SCtelhealth). For this study, we studied the Children's Hospital Association data set containing all ICD-10 diagnosis codes for mental health conditions. South Carolina Medicaid fee schedule for telehealth was used with the assumption that the mean ED visit payment to charge ratio for SC is 25%.

CPT Codes for Psychiatric and Mental Health Services via Mental Health

Description	Procedure Code	Modifier	Staff Level	Payment Rate	Insurance Type
Psychiatric Diagnostic Evaluation without Medical Services - Comprehensive Diagnostic Assessment	90791	AH HO	Licensed psychologist Master's Level	$224.63 $153.94	Commercial Commercial
Initial Evaluation	90801			$87.36 $171.45	Medicaid Commercial
Psychiatric Diagnostic Evaluation with Medical Services	90792	AF AM SA	Physician/Psychiatrist Physician Team Member (PA) (APRN)	$445.00 $221.82 $201.74	Commercial
Mental Health Comprehensive Assessment-Follow-Up	H0031	AH HO	Licensed Psychologist Master's Level	$112.32 $76.97	Medicaid

Behavioral Health Screening	H0002	AH	Licensed Psychologist	$18.72	Medicaid
Medication Management	H0034	AF	Physician/Psychiatrist	$24.29	Medicaid
				$50.35	Commercial
		HP	Doctoral Level MD	$26.61	
		AM	Physician Team PA	$12.09	
		SA	APRN	$11.30	

https://sctelehealth.org/Resources/BillingAndReimbursementInfo

(Myers, Valentine & Melzer, 2007; 2020)

Insurance requires provider to classify individuals experiencing mental illness. In addition, the identification of specific symptoms, the utilization of the International Classification of Diseases Tenth Revision (ICD 10) codes are used. Furthermore, all records must have a mental health diagnosis for identification and billing purposes (2020).

3.3 Data Used

Data used in this research included all SC bills for school age youth ages 5-14 with a mental health diagnosis who had an ED. Variables used for selection included demographics such as age in years at the time of the ED admission, gender, race, and insurance status. Clinical severity is defined as a psychiatric condition.

Descriptive bivariate and categorical variables for pediatric ED visits as well as pediatric Tele-Mental is compared by using chi-square. Statistical analysis logistic regression model examined differences in psychiatric ED visits for patient groups. Cost of emergency care is

estimated from recorded charges and compared to the cost of Tele-Mental Health services to determine if Tele-Mental Health could prove cost effectiveness in lieu of an ED visit.

3.4 Data Analysis

Data used in this study was drawn from all-payer discharge records for South Carolina by county for the year of 2018 from the Comparative Effectiveness & Data Analytics Research Resource Department (CEDAR) core at the Medical University of South Carolina (MUSC) in the spring of 2021. Mental health visit type was coded based on ICD-10 codes meeting the criteria published by the Children's Hospital Association. ED billing data were extracted from files of all ED visits for SC for 2018 and payment per visit were estimated based charges for the visit. Visits not meeting the inclusion criteria for age, diagnosis or visit complexity were excluded. Patient demographics, mental health visit type, estimated payments, and corresponding tele-health payment were described using means and percentages. Results were displayed in tables and figures.

4 Chapter Results

4.1 Findings

We found a total of 1,514 South Carolina ED visits for Pediatric Mental Health Conditions in 2018, January through May and September through November, weekdays only. These were all for brief visits where the patient was discharged home the same day, and included only children age 5-14,. Both sexes, all races, and all insurance types and uninsured patients were included.

TABLE 1: PATIENT POPULATION DEMOGRAPHIC

1,514 Pediatric Patients that Briefly Visit the ED for MH	
Age Group:	
5-9	352 (23%)
10-14	162 (77%)
Sex:	
Female	731 (48%)
Male	783 (52%)
Race:	
Black	615 (41%)
White	741 (49%)
Other	158 (10%)
Insurance Status:	
Medicaid	952 (63%)
Commercial	283 (19%)
Uninsured	85 (6%)

Table 1 displays the demographics of the pediatric patients seen in the ER for mental health purposes. The ages of the population range between 5-14 which is classified as lower to middle range along with the percentage of the perspective age groups visiting the ER with the majority (77%) of ED visits as children age 10-14. Gender is described as either male or female and distinguished by the frequency and percentage of ED visits by both sexes with a slightly higher proportion of the visits by males at 3%. Race is classified as Black, White, or other along with the frequency and percentage of ER visits distinguished by the differences of race. Most visits were by White children (49%), but 41% of the visits were by Black children, which is higher than expected from their proportion in the SC school-aged population which is 34%.

Lastly, the insurance status of each patient is identified as paid by either Medicaid, Commercial, or uninsured along with the combined frequency of visits and percentage based on insurance status with 63% of children as Medicaid beneficiaries and 6% as uninsured.

Table 2: Frequency of Mental health disorder categories observed in the eligible ED visits for SC

Mental Health Disorder Group		
Mental Health Disorder Group	**Frequency**	**Percent**
ADHD	115	7.60
Anxiety Disorders	148	9.78
Autism Spectrum Disorder	28	1.85
Bipolar and Related Disorders	8	0.53
Depressive Disorders	288	19.02
Disruptive, Impulse Control and Conduct Disorders	293	19.35
Feeding and Eating Disorders	1	0.07
Miscellaneous	96	6.34
Motor Disorders	8	0.53
Neurocognitive Disorders	17	1.12
Obsessive-Compulsive and Related Disorders	2	0.13
Personality Disorders	11	0.73
Schizophrenia Spectrum and Other Psychotic Disorders	5	0.33
Sexuality and Gender Identity Disorders	2	0.13
Somatic Symptom and Related Disorders	5	0.33
Suicide or Self-Injury	255	16.84
Trauma and Stressor-Related Disorders	232	15.32

The diagnosed mental health disorders of the children who had brief visits in the ED varied and were listed by name along with the combined frequency and percentage of each type of mental illness. Children diagnosed with Disruptive, impulse control and conduct disorders are seen in the ER more than other mental health diagnosis (19.35%), depressive disorders at (19%), suicide and self-injurious at (17%), trauma and stressor related disorders at (15%), anxiety disorders at (10%), attention deficit

disorders at (10%), miscellaneous disorder's at (6%), autism spectrum disorder at(2%), neurocognitive disorders at (2%), and all other mental health disorders under (1%).

Table 3: Estimated Mean and total annual payments for 1,514 psychiatric ED visits for SC children based on charges and expected payments if school telehealth visits were substituted and paid by Medicaid tele-health payment rates for FY 2021

Visit Type	Payment per Visit Mean (SD)	Total Estimated Payment per Year for 1,514 Visits
ED Visits for children with psychiatric conditions	$427 (328)	$647,683
Estimated payments for school telehealth visits are paid by Medicaid rate	$101 (range $80.29-$122.50)	$153,580

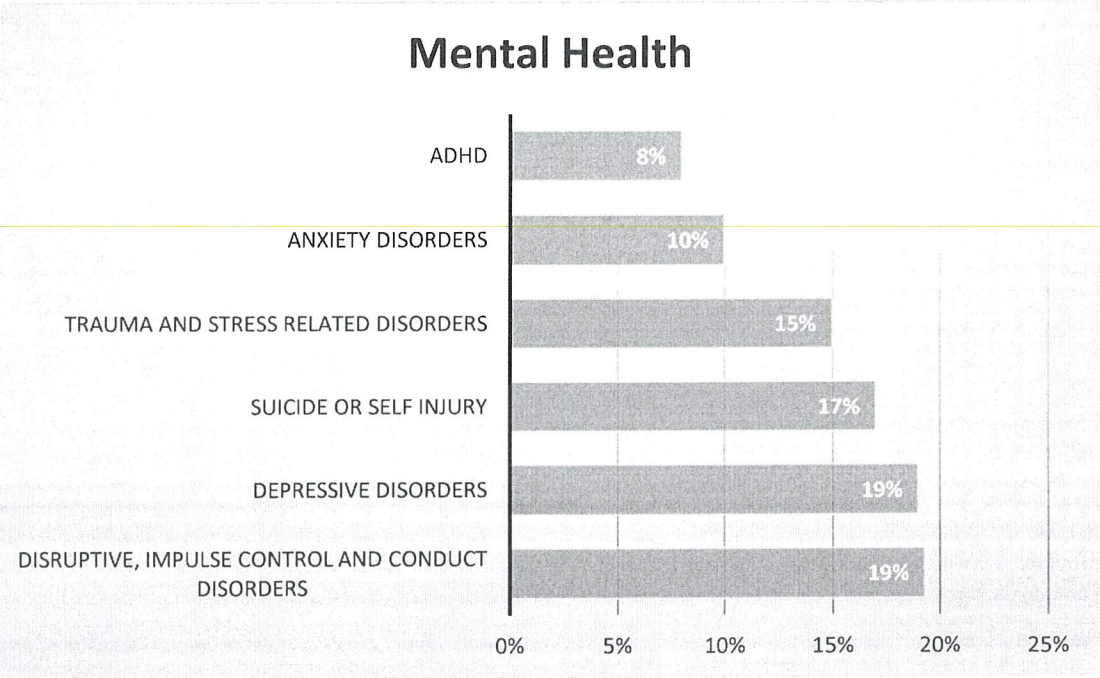
We estimated the difference in charges for ED visits using mean values of moderate ED visits compared to Tele-Mental Health visits for moderately complex visits. This table shows the cost per ED visit to be a mean $428 dollars (SD $308)compared to a Tele-Mental Health visit categorized as paid by Medicaid ranging from $80.29 to $122.50 (2021 Fee schedule) for a mental service mean of $101 dollars. Estimated mean potential savings difference of $327 if tele-mental was used in lieu of the ED.

5 Chapter Discussion

5.1 Results

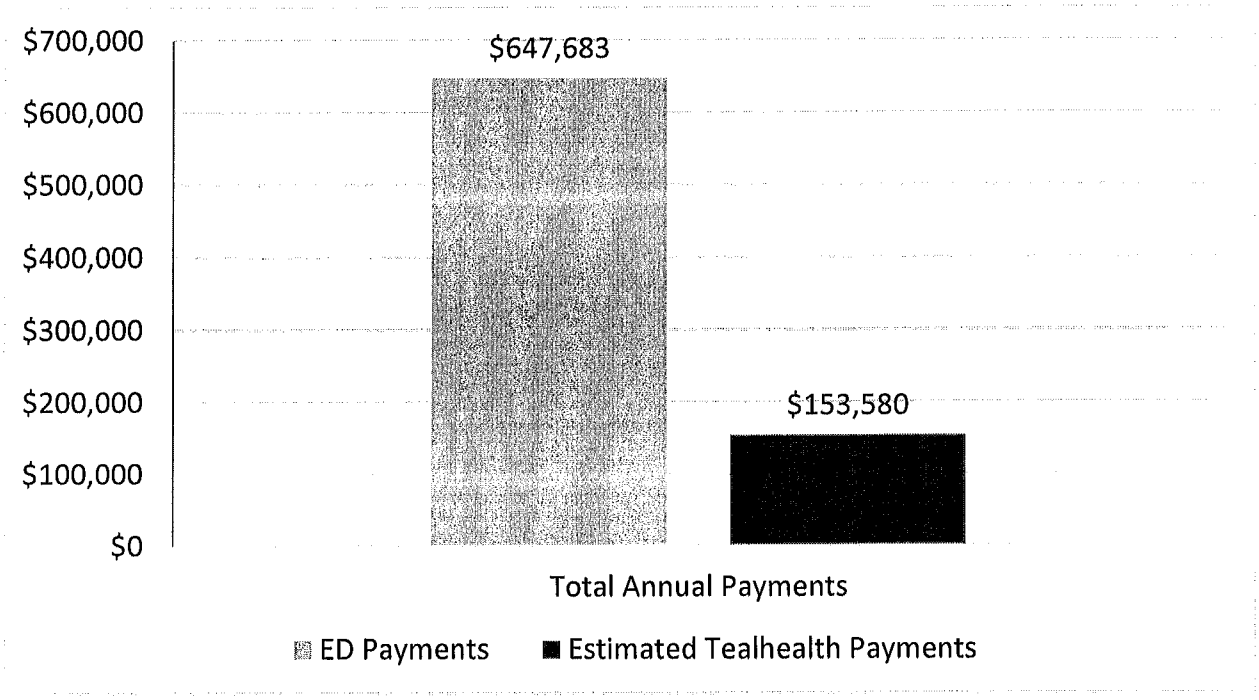
Data was selected for analysis only for weekdays and the months that school is traditionally in session in the state of South Carolina. School breaks and weekends were excluded. In this research, the results for mental health conditions seen in the ED are conditional because we were conservative in choosing conditions. In our conservative estimate, we found that middle-aged schoolchildren ages 10-14 visit the ED for mental health challenges at a 50 % greater rate than younger schoolchildren ages 5-9. Males visit the ED at a higher rate than females but only slightly higher at 3%. When considering race, black children who receive mental health care in the ED at a rate of 41% compared to white children at a rate of 49%. Although the percentage for white children appear larger than black children, this can be attributed to the overrepresentation of black children in this data and underrepresentation of white children as black children represent only 30% of children in the state of South Carolina. This data clearly showed that there are racial access issues in managing black children in South Carolina outside of the ED. A much higher proportion of black children must go to the ED for mental health care due to the lack of access to adequate mental health care in their cities and communities. Children of other races are combined in data and are underrepresented, receiving care in the ED at 49%, which is extremely low considering representation. Children with Medicaid visit the ED for mental health at a significantly higher rate than those with commercial insurance or uninsured at 63%. Those with commercial insurance receive care at a rate of 16% and the uninsured at 6%.

Figure 1: ED visits for top six diagnosis from least (ADHD) to most (Impulse Control) likely seen.



Research showed that disruptive, impulse control and conduct disorders as the number one mental health disorders seen in the ED by children at a rate of 19.3%. Depressive disorders ranked second at a rate of 19% while suicide and self-injurious behaviors rated third at 17%, trauma and stress related disorders ranked fourth at 15%, and anxiety disorders were seen at 10% and ADHD at 8%. All other mental health disorders were seen at under 2%.

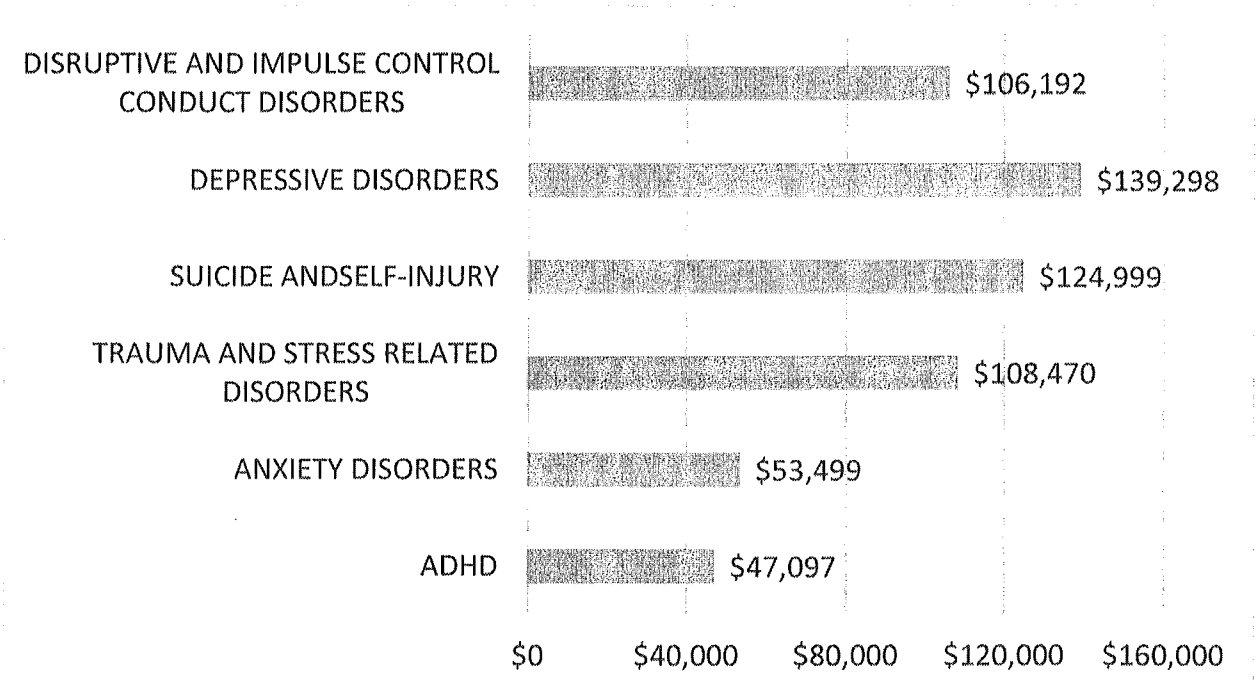
Figure 2: Total estimated insurance payments for SC pediatric ED visits in 2018 and estimated payments that would be expected if care were delivered by tele-mental health with payments as indicated by the SC Medicaid Fee Schedule for CPT codes 99213 or 99214.



This research is remarkable in its findings as it showed significant differences in pay rates comparing a brief ED stay to a tele-mental health visit. All numbers are based on Medicaid as the primary payer. Research showed that the price of a hospital stay would payout around $428 compared to a tele-mental health visit at $101. Cost for brief mental health ED visits would cost Medicaid almost 650 thousand dollars annually versus potential tele-mental health visits costing around 150 thousand dollars annually. Overall annual cost for brief Tele-mental Health delivered through school for students age 5-14 could reduce payment by Medicaid and other insurers by close to $500,000 annually. This amount does not include savings associated with parents' time

off work, transportation to ED, and disruptions to family life from needing to seek emergency care.

Figure 3: Estimated Total Annual ED Payments by Diagnostic Category



Depressive disorders estimated the highest annual ED pay at nearly 140 thousand dollars with depressive disorders estimated with the second highest ED pay as suicide and self-injurious disorders ranking and nearly 125 thousand dollars. Trauma related disorders estimate at 108 thousand dollars and Disruptive and impulse control conduct disorders at 106 thousand dollars.

5.2 Limitations

Limitations to this study were inclusive to school aged youth age 5-14 only who lived in the state of South Carolina. Commercial insurance and those who were uninsured, data descriptors were estimated at Medicaid rates for this study. School Tele-mental health training, setup and infrastructure was not included in cost estimates. The ED data used were limited by

lack of CPT coding details, estimates may be higher or lower if data that includes CPT billing codes are used.

5.3 Future Research

This study highlighted the mental health crisis of children diagnosed with a mental illness and in need of mental health care. High cost paid by Medicaid to provide care to children who visit the ED for mental health care can be decreased if care is given through school based Tele-Mental Health. Future research should include next steps to what a comprehensive plan could look like to provide Tele-Mental Health Services in every school in the state of South Carolina. The South Carolina Department of Mental Health (SCDMH) in partnership with The Duke Endowment developed the SCDMH Emergency Department Telepsychiatry Program. This program has already made great strides and is working to narrow the mental health service gap by making mental health services available virtually through Virtual Tele Consultation (VTC) with MUSC's psychiatrists called practice-based and school-based services sadly, a large percentage of children across the state go untreated (MUSC, 2015). Barriers to mental health care should be included in future research that include access, transportation, stigma, tele-mental health equipment cost, training, and a need for qualified and culturally sensitive and diverse psychiatric and mental health clinicians in diverse areas.

5.4 Conclusion

Tele-mental health is a constantly evolving science, as it incorporates new advancements in technology and responds and adapts to the changing health needs and circumstances of society at large. Tele- mental health services offer a modern distance technology approach to effectively and efficiently providing access to psychiatric services in schools (Grady et al., 2011). Predicted

technology challenges include but are not limited to; equipment competence, EHR sharing, equipment failure, internet connection accessibility, and security and/or firewall systems challenges (Grady et al., 2011; Griffiths & Christensen, 2007). Further, by making clinical mental health and psychiatric care in schools more accessible through technology, tele-mental health can offer better opportunities to provide a multidisciplinary team approach to school based mental healthcare through connecting psychiatrists and other mental health specialists with educators and supporting family members and the community. (Stephen, 2016; Hoover et al., 2016).

The emergence of school-based mental health and tele-psych services offer a multidisciplinary approach giving way to include student evaluation, treatment protocols, and education, not only for the client but for families and educators alike (Grady et al., 2011). School based Tele-mental health services creates the possibility for increased effectiveness and productivity, while striving to maintain client and parent satisfaction and promoting student choices in accessibility (Stephen, 2016). South Carolina school systems should explore the feasibility of obtaining permission for telehealth service for all children. The most common point of entry into tele-mental services is through education with more than 60% of school aged youth receiving psychiatric services at school (Hoover et al., 2016). Students who receive school based psychiatric care receive follow-up care more at an increased rate versus 13% of students who receive traditional community based mental health treatment. Access to services through schools increases the likelihood of compliance, decreased stigma, education, school wide outreach, familial collaboration and support, and greater probability for improved mental health status (Hoover et al., 2016). Some studies have found that some young people are more honest and prefer to share more information using technology than they would in person (Hoover et al.,

2016). Due to the shortage of qualified mental health service personnel such as psychiatrist and licensed clinical mental health personnel.

Behavior health stigma associated with mental health services and psychiatric hospitalization serve as barriers for children who are in desperate need of care (Grady et al., 2011). Significant barriers include but are not limited to the cost of tele-mental health equipment, maintenance, staff training, and transportation related services essential for tele-mental health (Ryu, 2012). Furthermore, communication barriers between the provider and parent, lack of availability, wait times, insurance coverage, transportation scheduling, and cost (Hoover et al., 2016). This is a discouraging issue for local policy makers and health providers. One possible reason for this is that tele-mental health has not yet demonstrated its value in cost-effectiveness or in access and quality comparable to customary health service delivery methods. The impact of barriers extends beyond accessing treatment. They remain rooted as substantial dividers to treatment engagement, participation, and adherence to treatment recommendations (Hoover et al., 2016; Ryu, 2012).

Over time, web-based videoconferencing could alter both patient and psychiatric expectations around care. Patients may come to expect mental health to be accessible in their own or chosen environments and at their own choice of time and convenience. Parents and youth alike may also expect to have a more active role in treatment with more diverse selection of choices. Psychiatrists and clinical mental health practitioners may expect patients to be proficient in taking a more proactive role in managing their own treatment including all aspects of technology. These expectations could contradict with current expectations in provider and recipient relationships and expectations thereof designed by health care organizations around the current workflow and working routine of psychiatric care. (Shore, 2015).

Finally, school-based Tele-Mental health services promote the bundling of resources and needs while eliminating travel costs and logistics, which makes much-needed psychiatric care available. (Shore, 2015). School-based Tele-Mental services is predicted in rural communities to assist with closing the gap of much needed child mental health care. Rural areas have become inundated with increased students identified as in need of mental health services. These students are either identified as emotionally or behaviorally disabled, presenting with severe symptoms. Families look to the school district for identifying, assessing, and treating mental health disorders in their children, as the school has become the primary source of support and care for a large percentage of the school's population. With increased participation in special education services, particularly for students identified with severe emotional and behavior disorders, Tele-Mental Health is highly anticipated as a breath of fresh air and remedy to many.

Results of this research showed that it would be economically significant if children in the state of South Carolina were able to exchange reoccurring yet brief ED visits for mental health conditions for a school based Tele-Mental Health visit. This research showed that the potential savings if seen virtually could save Medicaid $50 million dollars annually considering the cost of brief ED visits $327 more than that of a Tele-Mental Health visit. This researcher recognizes that not all ED visits are appropriate for Tele-Mental and must be considered case by case and determined by the appropriate professional. Medicaid and other payers should collaborate with schools to implement coverage for tele-mental health services to reduce the need of use of ED visits for this type of acute pediatric care. Tele-Mental health services has become identified as a creative solution to bridging the gap and ensuring psychiatric school based on-site mental health services to children in a natural familiar setting (Grady et al., 2011).

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