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Examining the Possibilities of Telehealth in Tallahatchie County

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EXAMINING THE POSSIBILITES OF TELEHEALTH IN TALLAHATCHIE COUNTY

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ABSTRACT
TARAN SANTANA CARRASCO: Exploring the Possibilities of Telehealth in Tallahatchie County
(Under the direction of Dr. Joseph “Jody” Holland)

This thesis aims to analyze Tallahatchie County and determine the feasibility of establishing a telehealth program in the county. Telehealth is an evolving aspect in the medical field that incorporates technology with healthcare. This thesis used sociotechnical theory to explain how the feasibility of telehealth could be made more likely as the technology is used over time. Through interviewing UMMC telehealth directors, Tallahatchie Wellness center workers, and citizens of Charleston, this study aims to gauge professional and personal opinions on how feasible it would be to implement telehealth into the Charleston community, as well as how positively telehealth would be accepted by the general public. Through these interviews, a broad evaluation was conducted on the likelihood of implementing telehealth in Tallahatchie County. The results of this study highlight specific needs that Tallahatchie County has, in addition to potential benefits of, and barriers to, the creation of a telehealth program in the county.

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LIST OF ABBREVIATIONS

AHRQ	Agency for Healthcare Research and Quality
ARRA	American Recovery and Reinvestment Act
CD	Cardiovascular Diseases
CDC	Centers for Disease Control and Prevention
CIRM	International Radio Medical Centre
CMS	Centers for Medicare and Medicaid Services
COPD	Chronic Obstructive Pulmonary Disease
CT	Computed Tomography (Scan)
D	Dermatology
EM	Emergency Medicine
IMBLMS	Integrated Medical and Behavioral Laboratories and Measurement Systems
IRB	Institutional Review Board
ITAM	Information Technology Acceptance Model
JCK	James C. Kennedy (Wellness Center)
MH	Mental Health
MTHA	Mississippi Telehealth Association
NASA	National Aeronautics and Space Administration
NICU	Neonatal Intensive Care Unit
PDC	Pediatric Cardiology
PROP	Pediatric Retinopathy for Prematurity
RPM	Remote Patient Monitoring
STARPAHC	Space Technology Applied to Rural Papago Advanced Health Care

TAM	Technology Acceptance Model
UMMC	University of Mississippi Medical Center

CHAPTER I: INTRODUCTION

Jimmy has lived in Sumner, Mississippi, since he was a young boy. He is now in his late sixties and lives alone in his mobile home. Jimmy started working at a local auto shop in his twenties, up until recently when his rheumatoid arthritis became so severe that he was forced into retirement. In addition to arthritis, he also suffers from chronic obstructive pulmonary disease (COPD). He was diagnosed with COPD last year after shortness of breath resulted in a trip to the emergency room. Jimmy was supposed to follow up with a pulmonologist, but unfortunately, there are no pulmonologists in the county. He would have to drive two hours to visit the closest pulmonologist. His vehicle is not reliable, and he cannot afford to pay someone else to drive him that far. Jimmy could get the healthcare he desperately needs if it were more easily accessible to him. If there was a telehealth program in his county, he could reduce his travel time from two hours to less than thirty minutes. Telehealth is a tool that could allow Jimmy to see a pulmonologist regularly, better understand his disease, and take steps to improve his quality of life.

Telehealth refers to patient medical care where the provider and patient are separated by distance (United States Congress, 2014) and communicate via technology. Telehealth originated in the 1950's, originally as landline telephone calls (Roberts-Grey, 2020), and has greatly evolved over the past several decades. Today, this technology offers the promise of connecting physician practices with patients, other medical providers, and hospitals in areas that are medically underserved (United States Congress, 2014). Telehealth is a broad term and encompasses many types of technology. It allows patients to attain a wide range of healthcare services, from simply discussing health concerns with a doctor in real time to receiving a diagnosis, to having prescriptions delivered to a patient's front door (Roberts-Grey, 2020).

Telehealth services offered in an area may look different depending on the state laws, the socio-economic status of the community, and the technology available.

The state of Mississippi historically has been ranked low in healthcare performance (Ellison, 2018) and the state has faced many repercussions due to its lacking technologies, education, and advancements. Despite this being true of traditional healthcare, Mississippi has a remarkable telehealth program, which is implemented in only a few counties. The University of Mississippi Medical Center's Center for Telehealth was founded in 2003 and has been a prominent program known across the nation (UMMC, 2019).

Mississippi is a rural state, which inevitably poses challenges to the state. Some of these challenges include low access to healthy foods, high levels of poverty, and low access to health care (Hossfeld & Rico Mendez, 2018). The quality of food Mississippians have access to is positively correlated with rates of obesity and poverty, which is positively correlated with the health status of Mississippians (Mississippi County Health Rankings, 2020). The rurality of Mississippi poses a significant threat to the health care in the state because over 50% of Mississippians reside in a rural setting but over 50% of the state's physicians are practicing in one of four urban areas (Rural Health, ND). At least part of every single county in Mississippi, including many counties entirely, are considered medically underserved (Rural Health, ND). The rurality of Mississippi results in an uneven distribution of healthcare resources and services, and puts many individuals in need (Rural Health, ND).

Rural residents are more likely to have higher poverty rates (Rural Health, ND), and that can be observed in Mississippi. The Mississippi Delta is one of the poorest regions in the United States, with ten of the counties having a child poverty rate of 50% or more (Rural Poverty, ND). In 2018, the poverty rate in rural areas of Mississippi was 6% higher than in urban areas (USDA-

ERS, 2018). Unemployment rates in the state differ depending on the rurality of regions. Unemployment in rural settings was 5.2% compared to 4.3% in urban areas (USDA-ERS, 2018). Rural per capita income in Mississippi was $35,484 in 2018 (Rural Health Information Hub, ND).

Individuals residing in rural areas are also more likely to have poorer health (Rural Health, ND). Part of this issue is due to infrastructure concerns, while part of the issue is due to health factors of residents. As of January 2020, Mississippi had 44 short-stay hospitals in rural areas and 32 critical access hospitals across the state (Rural Health Information Hub, ND). Critical access hospitals were specifically designed to assist those individuals in rural settings, and these hospitals receive cost-based reimbursement (Hayes, 2012) while short-stay hospitals are designed for smaller inpatient procedures and services. There are still several counties in Mississippi without a hospital, and last year 48% of the state's rural hospitals were at risk due to high financial concerns (Campbell, 2019). Most recently, 24% of Mississippians self-reported having either fair or poor health (Mississippi County Health Rankings, 2020). Rural residents have more preventable diseases than urban residents. Those in rural areas are more likely to smoke cigarettes, have hypertension, and be obese (Rural Americans, 2017). According to the CDC, rural Americans are more likely to die from heart disease, cancer, unintentional injuries, stroke, and chronic lower respiratory disease than their urban counterparts (Rural Americans, 2017).

The issue is that Mississippi is rural, impoverished, and ailing. Currently, there are not enough physicians in Mississippi's rural areas to tend to the residents in need of quality health care. This is a legitimate issue that affects an estimated 1,595,263 individuals residing in rural Mississippi (Rural Information Health Hub, ND). Telehealth is a tool that offers a solution to

improve the health care crisis that many of the residents in Mississippi face. Telehealth could enable individuals to have quality health care in their own counties. Individuals in rural areas could seek health care affordably and more frequently, thus improving their quality of lives.

Telehealth is a tool that has the potential to improve the healthcare status of Mississippi, specifically in rural areas where residents may not have access to a nearby physician. The Mississippi Delta region is a specific area of the state that needs attention when it comes to healthcare. This region is rural, and its residents could especially benefit from telehealth. The UMMC Telehealth currently offers some services to fourteen of the eighteen Delta counties (Telehealth Location, ND). These have been successful partnerships, and bringing telehealth into more counties and expanding upon existing programs could further benefit the health of Mississippians.

In this study, my intent is to explore the implementation of telehealth in Tallahatchie County. Using sociotechnical theory as a framework for this thesis, the research question is, what is the feasibility of implementing telehealth in Tallahatchie County? Therefore, the purpose of this thesis is to explore the implementation of telehealth in Tallahatchie County. In Chapter II, I will provide a two-part narrative, first, highlighting the sociotechnical theory and how new technologies embed into social behaviors, and second, a background narrative on telehealth. Next in Chapter III, I will describe the methodology utilized in the research. In Chapter IV, the findings from the interviews conducted will be presented. Finally, in Chapter V, I will present a discussion and conclusion.

CHAPTER II: LITERATURE REVIEW AND BACKGROUND

Telehealth is defined as "the use of telecommunications technologies to deliver health-related services and information that support patient care, administrative activities, and health education" by the AHRQ (Doarn, C., Pruitt, S., Jacobs, J., Harris, Y., Bott, D., Riley, W., Lamer, C., Oliver, A., 2014). Telehealth allows professionals in health care to provide medical services from a distance using video imaging as well as other technology (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H., 2016). Telehealth programs have been shown to be successful with managing acute infections, rapid pediatric triage within emergency rooms, and in several disciplines such as mental health, primary care, internal medicine, cardiology, and dermatology (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H., 2016). Telehealth has been rapidly evolving in the U.S over the past few couple of decades. According to one study that surveyed 1734 patients, 94-99% of patients indicated that they were very satisfied with all telehealth attributes and 33% of patients preferred telehealth to a traditional health care visit (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H., 2016). In that same study, they reported that 57% of telehealth patients indicated that their telehealth visits are equally as good as a traditional visit. To understand why the use of telehealth has become more popular over the last several decades, and understand the potential that telehealth has, it is important to be familiar with the sociotechnical theory. This theory is the framework that guides this study. I will explain this theory before describing the evolution of telehealth, as well as the current state of telehealth in rural areas and Mississippi.

SOCIOTECHNICAL THEORY

Broadband includes DSL, cable, satellite, or wireless Internet. Broadband can be utilized as an economic tool to create opportunities for businesses, non-profits, and public agencies to improve their efficiency and develop new approaches for service delivery. As more investments are made in broadband economies nationally, the digital divide gap is attracting attention by many industries who are looking for opportunities to fill this gap. This concept is important in rural communities, because these communities have vast opportunity to improve broadband in all industries, including assistance for healthcare. Compared to people in urban settings, individuals in rural communities have much less access to health care services, including physicians, hospitals, mental health resources, and counseling facilities. This reduced access to health care services is due to distance, travel time, cost, and lack of professional expertise in rural communities. Therefore, implementing technologies that reduce distance, decrease travel time, and increase access to health care services professionals in rural communities would seem like a good solution with the potential to benefit thousands. However, this solution only considers the implementation of technology as a solution. Sociotechnical theory argues that technological implementation is not that simple.

The sociotechnical theoretical perspective argues that "to improve organizational performance consideration needs to be given to optimizing both technical work processes and the social systems within the work environment" (Callen, Georgiou, Li, Westbook, 2012). This theory is utilized to demonstrate how technology influences organizational and system change. The perspective emphasizes the importance of understanding the actual technology being implemented in addition to the social perspective of user.

The Technology Acceptance Model (TAM) and Information Technology Acceptance Model (ITAM) are early information system evaluation models that can be used to predict how

useful and easy a technology will be perceived to be. TAM suggests that an individual's attitude on a technology will largely impact how that technology is perceived, and that perceived use and ease contribute of a technology is influential on one's attitude (Callen, Georgiou, Li, Westbook, 2012). In other words, for a technology to be perceived as a good technology, users need to believe that it is simple to use and will be a helpful technology, according to TAM.

While the TAM is used to predict how a technology will be perceived, the ITAM goes a step further and predicts whether or not a technology will be adopted. The ITAM suggests that a technology's adoption is based on its sophistication, available resources, requirements, capabilities, and that these things contribute to perceived usefulness and ease of use. The ITAM proposes that once a technology is adopted, it will either be accepted and utilized, rejected, or the capabilities will need to be upgraded. While both models are beneficial in predicting how technology is perceived and the likelihood of adoption based on perception, neither the TAM or ITAM consider how organizational and clinical contexts influence the success of implementation of clinical information systems and technologies (Callen, Georgiou, Li, Westbook, 2012).

In regard to telehealth, it is important to understand the aspects of the implementing technology, but one also should examine how the user relates to the technology. This is what sets the sociotechnical theory apart from these early information system evaluation models. In the case for telehealth, a user could be a patients, provider, or support staff. The sociotechnical approach aims to identify dynamics between technology and society, considering professional and cultural aspects of the social settings that technology may be used in (Callen, Georgiou, Li, Westbook, 2012). In conclusion, when contemplating implementing a telehealth program, one cannot simply acknowledge one subsystem. Rather, the technological and social subsystems complement one another, and it is crucial for optimal success of a program to recognize how

these complement each other (Van Der Zwann, 1975). Sociotechnical theory recognizes both subsets, and that is why this approach was the best framework for this study.

EVOLUTION OF TELEHEALTH

Telehealth as we know it today, includes things like flat-screens, high definition units, and healthcare professionals manning the technology. This type of telehealth has emerged over the past several decades; however, telehealth first originated over a century ago (Nesbitt, 2012). Naturally, telehealth's evolution parallels with the evolution of modern technology. In the 1830's and 1840's, the telegraph was developed, signifying a huge breakthrough in long-distance communication (Morse Code & the Telegraph, 2009). Telegraphy was used in the American Civil War to order medical supplies and provide medical care (Craig & Patterson, 2005).

The first mention of telehealth in home-based settings was in a magazine, the *Lancet,* in 1879, where it was suggested that the telephone could be used to reduce unnecessary doctor visits (Nesbitt, 2012). In 1910, a telephone was used to transmit amplified sounds from a stethoscope (Craig & Patterson, 2005).

Another large development in communication was the radio. In the 1920's, the Seaman's Church Institute of New York took this new technology and used it to give medical advice to seafarers (Craig & Patterson, 2005; Nesbitt, 2012). By 1938, five maritime nations had adopted the use of radio health services, including the International Radio Medical Centre (CIRM), which was located in Rome. From 1935-1995, CIRM aided over 42,000 patients by providing telehealth to seafarers (Craig & Patterson, 2005).

In 1924, Dr. Hugo Gernsback began to envision a device that would allow doctors to attend to patients via viewscreens remotely and even touch their patients using robots located near the patients. In a 1925 issue of *Science and Invention,* Dr. Gernsback coined this technology

the “teledactyl” and wrote that this would be developed by 1975. While the teledactyl did not make it past Dr. Gernsback’s imagination, his magazine article proves that scientists and doctors were already thinking of ways to provide telehealth to patient a century ago (Novak, 2012).

In 1947, radiographic images were first successfully transmitted via telephone lines for twenty-eight miles. For teleradiology to be successful, images must be captured electronically, transmitted, stored, and retrieved before they can be examined and interpreted remotely. In 1957 radiographic images were transmitted for five miles via coaxial cable from Hotel Dieu and Jean-Talon hospitals in Montreal, Canada. (Bashshur, R. L., Krupinski, E. A., Thrall, J. H., & Bashshur, N., 2016). As the first telehealth specialty to arise, teleradiology became influential in shaping the telehealth industry entirely (What is Telehealth, 2018). The developments in teleradiology paved the way for other technologies to emerge in health care.

The next technological development that contributed to the evolution of telehealth was the television. By the 1950’s, over a million homes had a television set (Bellis, 2019), and medical personnel began to use this to their advantage (Craig & Patterson, 2005). These personnel applied recent developments in closed-circuit television and video communications to a clinical setting (Craig & Patterson, 2005). In the late 1950’s, hospital-based telehealth made its debut when the Nebraska Psychiatric Institute and Norfolk State Hospital established a closed-circuit television link to consult with one another on psychiatric cases (Nesbitt, 2012). This system allowed communication between specialists and general practitioners, as well as education and training at both hospitals (Craig & Patterson, 2005). In the 1960s, color television began to break ground and contribute to the telecommunications field as well.

The National Aeronautics and Space Administration (NASA) contributed to the advancement of telehealth as well. After Yuri Gagarin successfully returned from his spaceflight

in April 1961, NASA medical scientists sought to understand how the human body could function in space. They were specifically concerned with how the lack of gravity would impact our circulation and respiratory systems. To address these concerns, U.S and Soviet scientists sent animals into space attached to medical monitoring systems. Using a telemetric link, these systems recorded the animal's biometric data back to scientists on Earth. Three years after Gagarin's first spaceflight, the Integrated Medical and Behavioral Laboratories and Measurement Systems (IMBLMS) program was born. The goals of this program were to keep the astronauts healthy while also conducting longer human spaceflights (Baldwin, 2020).

As the Apollo program wound down, the IMBLMS program began to be restricted due NASA's funding cuts and priorities. However, the White House Domestic Council saw an opportunity to use the program terrestrially. A new program, Space Technology Applied to Rural Papago Advanced Health Care (STARPAHC) was created, and the technology generated by STARPAHC was intended to serve not only astronauts, but civilians as well. The program partnered with the Papago (now Tohono O'odham) people of Southern Arizona and collaborated with the Indian Health Service to link rural patients on the Tohono O'odham reservation with hospital in Sells and Phoenix to treat individuals remotely. NASA became unassociated with the project in 1977, but STARPAHC continued until the 1980's (Baldwin, 2020).

NASA scientists and directors began to see the value of commercializing telehealth technology and promote quicker technological development and a wider diffusion of technology. They knew this would result in lower development costs for NASA. In 1997, NASA sponsored the development of Medical Informatics and Technology Applications Consortium at Yale University, which pursued a variety of telehealth projects and created terrestrial test beds in remote locations. NASA has helped create and support many technologies that have both directly

and indirectly contributed to the spread of telehealth in the medical field over the past sixty years (Baldwin, 2020) and the Space Age in the 1960's helped funnel money into the telehealth field as NASA began their research in healthcare and telecommunications (Iafolla, 2019).

In 1964 AT&T released the picturephone, which was not very popular commercially, but it was an important advancement in the telecommunications field. It was one of the first examples of videochat, though videochat programs would not take off until thirty years later (Iafolla, 2019).

Boston Logan Airport Medical Station and Massachusetts General Hospital were linked in 1967 using a two-way audiovisual microwave circuit (Iafolla, 2019). This connection allowed airport employees to received healthcare at any time of the day by healthcare professionals at the hospital (Craig & Patterson, 2005). Dr. Jay Sanders was a resident at Massachusetts General Hospital during these efforts and he is known today as the "Father of Telemedicine." He helped expanded telehealth while serving on NASA's Biological and Physical Research Advisory Committee and he went on to found the American Telemedicine Association in 1993 (Versel, 2016.)

The late 1960's and 1970's is coined as the "golden age" of telehealth research (Iafolla, 2019). In 1969, Kenneth Bird and colleagues demonstrated and evaluated a system that allowed diagnoses to be made from remote locations. They termed this comprehension system "telediagnosis" (Bashshur, R. L., Krupinski, E. A., Thrall, J. H., & Bashshur, N., 2016). From 1971-1975, the Alaska ATS-6 Satellite Biomedical Demonstration used satellite-mediated video consultation to improve the quality and accessibility of healthcare to Alaskans residing in rural villages (Craig & Patterson, 2005). By the 1970s, a plan was established to replace all x-ray films into an electronic-based imagine system, further advancing the field of teleradiology

(Bashshur, R. L., Krupinski, E. A., Thrall, J. H., & Bashshur, N., 2016). During this decade the federal government began to fund a variety of telehealth projects and programs to provide better healthcare in rural areas (Iafolla, 2019).

In 1989, the world-wide web was invented, which was a pivotal technological advance. This same year, NASA organized the first international telehealth program when they created a Space Bridge to Armenia. This program was to provide medical care and support to the Soviet Republic of Armenia after a devastating earthquake (Iafolla, 2019). That summer, the Jewish Hospital of St. Louis was the first to see a patient successfully remotely defibrillated via telephone (Iafolla, 2019).

In 1993, the Digital Imagine and Communications in Medicine (DICOM) was created and contributed greatly to the field of teleradiology. As computers became more common, it was easier for radiologists to capture and view images from computers in remote locations (Bashshur, R. L., Krupinski, E. A., Thrall, J. H., & Bashshur, N., 2016).

Centers for Medicare and Medicaid (CMS) got involved with telehealth in 1999 when CMS began to pay for telehealth consultations in underserved, rural areas (Iafolla, 2019). Just one year later, programs and apps such as Skype begin to launch, making virtual videochat accessible to many (Iafolla, 2019).

The emergence of mobile phones and satellite communications has enabled mobile telehealth (Craig & Patterson, 2005). While the first cell phone was debuted in 1973, it took a decade before a cell phone was available to the public, though these were very expensive and not commonly owned. The smart phone was introduced in the 1980's and 1990's, but it was not until 2007, when Steve Jobs unveiled the first iPhone, that smartphones took off (Jackson, 2018). Today, 95% of Americans own a personal cell phone and 77% of these devices are smart phones

(NEJM Catalyst, 2018). These smart phones, and other smart devices have allowed huge advancements in telehealth. Mobile health, also known as mHealth, refers to applications and programs that individuals can use on smartphones, tablets, laptops, and other "smart" devices to access healthcare (NEJM Catalyst, 2018). Some of the more popular mHealth applications aid individuals in managing health conditions such as their diabetes, weight loss, asthma, smoking cessation, menstruation, and pregnancies. Smart phones also allow for real-time video chats between providers and patients and also makes remote-patient monitoring (RPM) more available (NEJM Catalyst, 2018).

In the 2000s, state legislatures and state medical regulatory boards began adopting telehealth policies, which contributed to more individuals utilizing telehealth (Ollove, 2015). By 2002, more than 85,000 teleconsultations were conducted in the United States by over 200 different programs and across 30 specialties (Craig & Patterson, 2005). In 2009, the American Recovery and Reinvestment Act (ARRA) included telehealth and stimulated the telehealth sector (Iafolla, 2019). The ARRA and the Affordable Care Act of 2010 both increased federal spending on healthcare technology and telehealth (Ollove, 2015). By 2010, the U.S was actively looking for ways to cut healthcare costs while simultaneously improving the quality of healthcare individuals received.

Since 2010, telehealth has, and continues to, rapidly expand (Iafolla, 2019). Today, acute appendicitis can be diagnosed from a mobile DICOM viewer after a CT scan has been done, there are telestroke networks available to smartphones, and teleradiology can be used to screen for tuberculous (Bashshur, R. L., Krupinski, E. A., Thrall, J. H., & Bashshur, N., 2016). Currently there are several branches of telehealth from store-and-forward telehealth that refers to technologies such as CAT scans, X-rays, and MRIs to RPM, which is further discussed below, to

mHealth (NJEM Catalyst, 2018). Today, telehealth can be located in a wide range of settings, such as clinics, community mental health clinics, dental offices, federally qualified health centers, homes, hospitals, neurodevelopmental centers, physician's office, rural health clinics, schools, and skilled nursing facilities (Luxton, 2017).

It has been observed over time that with each technological advancement, telehealth also becomes more expansive and innovative. Today, telehealth is a tool with the capability to diagnose a wide range of symptoms, illnesses, and patients. In 2020, it is projected to be a $34 billion industry (Iafolla, 2019). The "Father of Telemedicine" recently said that one day there will be no "telehealth," but we will just call it "health" as it becomes more common and integrated into our healthcare systems (Versel, 2016). This can already be witnessed, as it is now difficult to determine teleradiology from radiology since they have become so interweaved with one another (Bashshur, R. L., Krupinski, E. A., Thrall, J. H., & Bashshur, N., 2016).

TELEHEALTH IN RURAL AREAS

Telehealth has proven to be especially beneficial in rural areas and communities. Despite it being beneficial, it is often not implemented in these communities for reasons such as inadequate infrastructure, poor broadband access, state-level licensing rules, and limited third-party payment providers (Talbot, J. A., Burgess, A. R., Thayer, D., Parenteau, L., Paluso, N., & Coburn, A. F., 2019).

Rural communities often lack primary providers and medical specialists. Telehealth would allow rural residents to have access to healthcare professionals not physically available in their community. Although only 4% of Medicaid recipients nationally use telehealth, even though it has been shown that telehealth is specifically beneficial to these individuals, (Medicaid, ND). Medicaid recipients residing in rural areas are more likely to use telehealth than recipients

residing in urban areas (Talbot, J. A., Burgess, A. R., Thayer, D., Parenteau, L., Paluso, N., & Coburn, A. F., 2019).

CURRENT STATE OF TELEHEALTH IN MISSISSIPPI

Telehealth has been evolving rapidly and spreading across the state since UMMC began the program. UMMC now offers services in seventy-two cities, and several cities have multiple clinics or hospitals with telehealth access (Telehealth Location, ND). The state of Mississippi defines telehealth as "the delivery of health care services such as diagnosis, consultation, or treatment through the use of interactive audio, video, or other electronic media" (MS Code § 83-9-351 (2018). The Mississippi Telehealth Association, MTHA, was established by Governor Phil Bryant in March 2014, with a mission of creating telehealth programs and policies to improve the healthcare in Mississippi (About MTHA). According to MS Code § 83-9-351, telehealth, "must be 'real-time' consultation, and it does not include the use of audio-only telephone, e-mail, or facsimile." Health insurance providers may not charge an individual any more for a telehealth service than they would for an in-person service of the same type or value, and all health insurance providers and employee benefit plans must provide the same reimbursement rates for telehealth as they would in-person consultations (MS Code § 83-9-351, 2018). For example, if a provider or plan were to cover in-person mental health consultations, then they must also provide coverage and give reimbursements for any telehealth mental health consultations as well. Alternatively, whatever a provider does not cover for in-person consultations, they are not required to cover via telehealth. Additionally, CMS has worked to expand coverage for telehealth services, especially in rural areas (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H., 2016).

Remote Patient Monitoring Services is defined by MS Code § 83-9-353, 2018 as "the delivery of home health services using telecommunications technology to enhance the delivery of home health care." Services that fall under RPM include monitoring of weight, blood pressure, pulse, pulse oximetry, and blood glucose, medication adherence, interactive video chats, and exchange of photo images (MS Code § 83-9-353, 2018). These services can be providing by patient simply wearing electronic monitoring devices, which can transmit vitals and other data such as cardiac statistics, oxygen levels, and respiratory rates to healthcare providers (NJEM Catalyst, 2018). RPM is especially beneficial to patients with chronic diseases because it reduces the amount of travel going back and forth to physicians and specialists and it can remind patients of steps they should take to keep healthy. For example, RPM technologies may remind a patient to weigh themselves or track their blood glucose each day and measurements and data can be transmitted to physicians and providers (NJEM Catalyst, 2018). Due to the capabilities mentioned, RPM is beneficial in treating patients with chronic conditions. PRM has the potential to benefit many rural residents, as those with chronic disease account for almost 75% of all expenditures in health care (Nesbitt, 2012).

Mississippi has a strong telemedicine program across the state that was created in 2003. UMMC, located in Jackson, has been a leader in telehealth on the national stage for the last decade (UMMC Center for Telehealth Home, ND). UMMC offers the following telehealth services for children at their Jackson location: Cardiology, Child Development, Child Maltreatment Services, Emergency Medicine, Genetics, Neonatology, Neurology, Psychiatry, Psychology, Urology, Ancillary Services, Pathology, Remote Telemetry, Retinal Exams, Radiology, and Remote Monitoring of At-home Patients (University of Mississippi Medical Center, ND). Neonatologists and the newborn center use telemedicine for consultation of

neonatal patients throughout the state. Telehealth allows neonatologists to discuss impending neonatal transports, and management of neonates in community hospitals. (Telehealth, ND). The UMMC neonatology telehealth program is expanding to include physicians accepting patients post discharge and will allow for more family interaction with their babies in the neonatal intensive care unit (NICU) (Telehealth, ND).

CHAPTER III: METHODOLOGY

Understanding what telehealth is, and how it can be used, is crucial in understanding what a telehealth program in Tallahatchie County could do for residents. It is also important to understand the geographic area that this county is located and the health issues the county faces to see the need for a telehealth program. To fully explain my methodology, I will first establish the significance of the study and then detail my research design.

SIGNIFICANCE OF STUDY

To explain why it is important to study the feasibility of telehealth in Tallahatchie County, I will first give details on the current state the telehealth, and health in general, in the Mississippi Delta region and Tallahatchie County.

THE MISSISSIPPI DELTA

The Mississippi Delta is the northwest region of the state that encompasses eighteen counties (Map of the Counties in the Delta, n.d.). The Delta is rural, and is composed of small towns and agricultural land. The Delta is also the poorest region in Mississippi, as well as the region receiving the poorest quality of healthcare (Wang, Crook, Connell, & Yadrick 2017). Out of the 32 critical access hospitals in Mississippi, only 2 are located in the Delta region.

There are several contributing factors as to why healthcare is so poor in this region. First, the Mississippi Delta also has poor education (Wang, Crook, Connell, & Yadrick 2017), especially for marginalized groups. Poor education and poor health are positively correlated (Johnston, 2019), and the lack of high-quality education in the Delta contributes to the poor health of the residents in the region. Additionally, the Delta is rural, which imposes additional barriers on individuals residing in this region because of the extra traveling often needed to access things like healthcare and fresh food (Wang, Crook, Connell, & Yadrick 2017). This is an

issue that affects many Mississippians, as the Delta region spans across eighteen counties. Telehealth is especially beneficial in rural areas, like the Delta, where many individuals do not have transportation that would get them to Jackson or other larger cities surrounding the Delta.

The UMMC has already incorporated telehealth programs into dozens of counties, many of which are Delta counties. Using data from UMMC (Telehealth Locations, ND), I created figure 2, a chart of Delta Counties with any UMMC telehealth services. I included the cities where services are offered, the types of services offered (specialties), and where the services are offered.

ABBREVIATION	SPECIALTY
CD	Adult Cardiology
D	Dermatology
EM	Emergency Medicine
MH	Mental Health
PDC	Pediatric Cardiology
PROP	Pediatric Retinopathy for Prematurity
*	Alzheimer's and Dementia Care

Figure 1: Key for 'Specialties Offered' in Figure 2

COUNTY NAME	CITIES WITH TELEHEALTH	SPECIALTIES OFFERED	LOCATION OF SERVICES
BOLIVAR	Cleveland, Mound Bayou, Shaw	CD, D, PDC	clinic, hospital
COAHOMA	Clarksdale	MH	clinic, school clinic
HOLMES	Durant, Lexington	CD, D, EM, *	clinic, hospital
HUMPHREYS	Belzoni	EM	hospital
ISSAQUENA	Rolling Fork	D, EM	hospital
LEFLORE	Greenwood	CD, PDC, *	hospital
PANOLA	Batesville	MH	clinic
QUITMAN	Marks	MH	school clinic
SHARKEY	Rolling Fork	D, EM	hospital
SUNFLOWER	Indianola, Moorhead, Ruleville, Shaw	CD, D, EM	clinic, hospital
TALLAHATCHIE	Charleston, Tutweiler	CD, EM	hospital
TATE	Coldwater	MH	clinic
TUNICA	Tunica	MH	clinic, school clinic
WASHINGTON	Greenville	CD, D, PDC, PROP	clinic, family practice, hospital

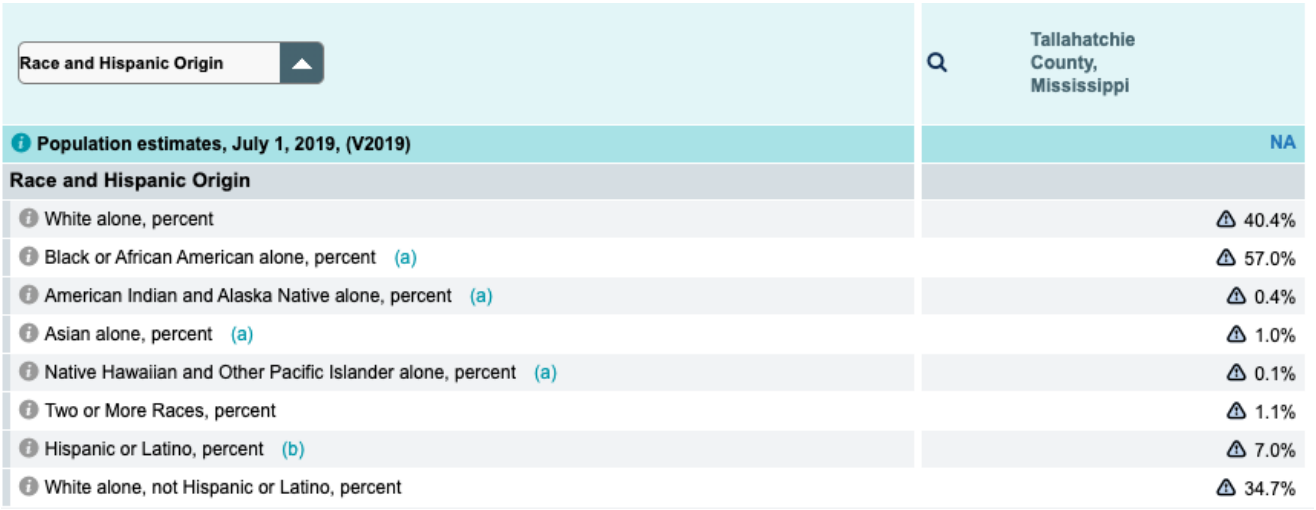
Figure 2: Telehealth Services in Delta Counties

After an initial look at this chart, it may seem like telehealth is already heavily incorporated in the Delta. However, many of these telehealth services are only offered and used in hospital settings, and services may hardly be promoted or used, as is the case in Tallahatchie County. In the next section, I will explain how Tallahatchie County has a genuine need for a telehealth program, despite being listed on this chart. Adding more specialties to current programs, creating more telehealth programs throughout the Delta, being intentional with the telehealth programs, and educating residents about the programs, could advance the number of Delta individuals who are treated.

TALLAHATCHIE COUNTY

One of the eighteen counties in the Delta is Tallahatchie County. It is estimated that 33.4% of the 14,000 residents in Tallahatchie County are living in poverty (U.S Quick Facts,

2018), however, 41% of the children in the county are living in poverty (Tallahatchie County, ND). 15% of Tallahatchie County residents do not have health insurance (Tallahatchie County, ND). Tallahatchie County. The demographics of the county can be seen in figure 1 below.



Race and Hispanic Origin	Tallahatchie County, Mississippi
Population estimates, July 1, 2019, (V2019)	NA
Race and Hispanic Origin	
White alone, percent	40.4%
Black or African American alone, percent (a)	57.0%
American Indian and Alaska Native alone, percent (a)	0.4%
Asian alone, percent (a)	1.0%
Native Hawaiian and Other Pacific Islander alone, percent (a)	0.1%
Two or More Races, percent	1.1%
Hispanic or Latino, percent (b)	7.0%
White alone, not Hispanic or Latino, percent	34.7%

Figure 3: Race and Hispanic Origin of Tallahatchie County (Quick Facts, 2018)

Tallahatchie County has high rates of obesity, cholesterol, and hypertension. According to the Mississippi State Department of Health, between 2011-2015, the adult obesity rate was 40.9%, the adult high cholesterol rate was 40.2%, and the adult hypertension rate was 46.6% (Tallahatchie County Health Profile, 2017). In 2019, the adult obesity rate was 44%, which continues on an upward trend (Tallahatchie County, ND). In 2019, Tallahatchie County ranked 57 out of 82 counties in health outcomes and 59 in health factors (Tallahatchie County, ND). There is a ratio of 4,710 citizens to 1 primary care provider in the county (Tallahatchie County, ND). This is a high ratio compared to the state ratio of 1,890:1 and national ratio of 1,030:1 (Tallahatchie County, ND). This high ratio puts a strain on the providers in the county and also results in many patients not being able to be seen by healthcare professionals unless it is urgent. The ratio of citizens to mental health providers in the county is 2,800:1 (Tallahatchie County,

NS), which is also alarming. In Mississippi the ratio is 630:1, and 290:1 in U.S cities that are considered “top-performing” (Tallahatchie County, ND).

Charleston, Mississippi, is a city of approximately two thousand people (U.S. Census Bureau, 2017) and is nestled in the center of the county. Charleston is important in the county because it is home to the county’s hospital, nursing home, and wellness center. Charleston and Tutwiler are the two largest cities in the county, with Tutwiler’s population only greater by approximately one thousand residents. There is also a clinic located in Tutwiler.

Currently, Tallahatchie County is listed on UMMC’s website as offering services in Charleston and Tutwiler (Telehealth Locations, ND). According to the site, the Tallahatchie General Hospital in Charleston has telehealth services for emergency medicine and the Tallahatchie General Hospital-Tutwiler Clinic offers adult cardiology services. However, according to two healthcare professionals from Charleston, only one nurse practitioner is trained to use the telehealth technology in the emergency room. When this individual is not on duty, the technology cannot be used. I also was told that most emergency cases are automatically sent to Jackson, so emergency medicine telehealth is rarely used in Charleston. I have not heard of any use of telehealth in Tutwiler, so it is likely that their cardiology services are rarely used as well.

RESEARCH DESIGN

My first step in the research design process was to collect secondary sources and existing work in regards to this project. Public Policy Leadership students Chandler Johnson and Chloe Rizk conducted a preliminary research proposal and a financial feasibility rough draft of a telehealth pilot program in Charleston, Mississippi. After reading through this work, I decided that I wanted to expand on this research and speak to community members and healthcare professionals in the area to better understand how telehealth could be incorporated into the

county. I compiled these previous works and incorporated some of these ideas into my literature review before moving forward with my own interviews.

I then submitted the Abbreviated IRB forms and received approval. I reached out to Dr. Catherine Moring, the executive director of the James C. Kennedy Wellness Center located in Charleston, MS, to find individuals to interview. I was hoping to interview up to five healthcare professionals and up to ten general citizens. She sent out an email to several of her contacts and then the possible interviewees reached out to me via email. I then set up a phone interview time with them via email. This was in compliance with the University of Mississippi's snowball sampling policy for Type 2 recruitment. My snowball sampling recruitment scripts are located in Appendix B. Dr. Moring connected me with physicians, nurse practitioners, JCK Wellness Center employees, and Charleston residents.

I arranged my interviews with some healthcare professionals through email and conducted those interviews over the phone. Some of the most commonly-asked questions that healthcare professionals responded to are as follows: what they thought of bringing telehealth into Tallahatchie County, why they believed Charleston is a good location in the county for telehealth, why they thought telehealth is becoming important in healthcare, what do workers and patients need more of, what health issues are most prevalent in the county, how they thought that telehealth would benefit their community, and what barriers they saw to bringing telehealth into the county.

To find Charleston residents to interview, I traveled to the JCK Wellness Center in Charleston. I came by one morning during the week and simply asked who might be interested in speaking to me about telehealth in person. My specific script is attached in Appendix B. I had interviewees read over the consent form and sign it before participating.

I asked citizens if they knew what telehealth was, if they thought they would use telehealth, what types of telehealth they felt would be most beneficial, what was the farthest they had ever had to travel for health needs, if they believed that traveling is an issue for residents in the county, if they saw a primary care provider in the county, if they believed residents would use telehealth, what age groups they thought would use telehealth most, how they think that telehealth would benefit their community, and what barriers they see to bringing telehealth into the county.

I had a full list of possible interview questions that I submitted to the IRB, but the questions asked depended on the individual (i.e a citizen, UMMC director, center worker) I was speaking to and how the flow of the interview was going. The types of questions asked also differ depending on the subject's personal knowledge on telehealth. The comprehensive list of questions possibly asked to interviewees is located in Appendix C.

I conducted open ended, semi-structured interviews. The interviews did not disclose any personal information, and subjects are unidentifiable in my thesis. Through these interviews, I conducted qualitative research regarding telehealth, individuals' opinions on telehealth, and the current telehealth needs. Interviews were one-on-one, conducted orally, and I typed up responses as the interviews were being conducted.

I compiled the data by inputting responses into a Google sheets form. By doing this, I separated citizen's responses from their first names, which was the only identifiable information I originally gathered. After I sorted the data into a Google sheet form, I was able to calculate the percentages of citizens that gave certain responses to questions. I analyzed the responses that I received and sought out trends.

The biggest limitations of my methodology is that I had a small sample size of individuals that I interviewed. Another limitation is that I only visited a singular site to conduct interviews with citizens.

CHAPTER IV: RESULTS

As indicated in the literature review, the Mississippi Delta has many residents living in poverty. I wanted to examine what specific issues stemming from poverty were affecting Charleston residents and what this could mean for a potential telehealth system in the county. I found that residents in Tallahatchie County are very dispersed among the county. Charleston is home to approximately 2,500 residents, while the next largest town in the county is Sumner, which has a population of approximately 1,000. The other 10,000 Tallahatchie County residents are spread out over the county in smaller communities and towns. Due to this separation, it is difficult for any community to have a sufficient population to support public infrastructure. This is why many of the county's residents have to travel out of town to grocery shop, seek healthcare, or engage in normal community activities.

Charleston is fortunate to have the James C. Kennedy Wellness Center, which was made possible largely by a donation by Mr. James Kennedy. It is a beautiful facility, and it allows the community to have access to wellness programs and physical activities, as well as education about their health. The JCK Wellness Center is a fitness facility with a track, free weights, cardio equipment, weight machines, classrooms, a multipurpose room, and an outdoor walking path. Aside from physical health services, they also offer health coaching, diabetes teaching, massage therapy, personal training, chronic disease management, outpatient therapies, weight loss and weight management, childhood weight loss, adolescent strength and conditioning, and lymphedema treatments. They also offer programs and classes such as those on diabetes management and prevention, nutrition and wellness, cooking, and healthy habits. These add-ons have additional fees, but the Wellness Center is very affordable. It costs $20 a month for senior citizens, active military, and law enforcement, and $30 a month for a standard individual

membership. It costs an additional $10 a month per family member, but no family ever has to pay over $50 a month. Additionally, they offer financial aid for those in need.

The JCK Wellness Center is attached to the town's nursing home and is in close proximity to the Tallahatchie General Hospital and the Charleston Rural Health Clinic. This allows them to work with nursing home residents and patients from the hospital, often recovering from recent surgeries, on their health. The JCK Wellness Center has a well-equipped room where individuals who have had outpatient surgery or procedures can participate in physical and occupational therapy. The Center is also home to a group for those with mental health needs that meets every Monday through Friday to socialize. Vans will even pick up the members of this program if they do not have transportation themselves. The JCK Wellness Center is significant in Charleston because it is taking active steps to improve the health and wellness of not just Charleston, but all of Tallahatchie County.

The JCK Wellness Center opened in January 2016. The executive director of the center, Dr. Catherine Moring, said that since they have been open for four years now, they have sorted out the small hiccups that inevitably come with any new facility. She said that the center runs smoothly and she feels like things are going well. She stated that she has great staff and team, and they are always looking to improve the center. Funding is always a moving target for her, as the monthly membership fees only cover so much of their operating costs. She expressed that health behaviors, such as healthy eating and maintaining a constant exercise routine, are difficult for many citizens to keep constant. Since these behaviors are often hard to maintain, it creates an ebb and flow of members each month, which results in different amounts of monthly membership fees coming in.

Dr. Moring gave me great insight into the county, issues the residents face, and the possibility of telehealth here. According to her, the most prevalent health issues in the county are mental illnesses, diabetes, and obesity. Depression runs rampant in the county, but they also see individuals with anxiety, bipolar disorder, and some schizophrenia. Sleep disorders often go undiagnosed, but she said that insomnia and sleep apnea are fairly common too. Since Charleston is located in what may be called a food desert, a geographic area which is low income and has low access to healthy, fresh foods (Food Access Research Atlas Documentation, 2019), it is not surprising that the county obesity rate is almost 50% (Tallahatchie County Health Profile, 2017). These high obesity rates lead to other health issues such as diabetes, inflammation, hypertension, and heart disease as well.

When I spoke to citizens in Charleston, I wanted to first gauge their current knowledge of telehealth, understand their perspective of their community, and hear their opinions of telehealth and how to improve the overall health in the county. 83% of my interviewees were female and 17% were male. 58% of respondents were white and 42% of my respondents were black. 25% of respondents were between 34-48 years old, 42% were between 49-64, and 33% were between 65-78. No respondents were younger than 35 or older than 74 years of age.

75% of interviewees were not familiar with the term telehealth, and none of the interviewees had ever used any form of telehealth. However, every citizen I interviewed said that they would try telehealth at least once if it were offered in Tallahatchie County. This finding aligned with results from a previous study where nearly 100% of patients indicated that they would “definitely” or “probably” use telehealth for themselves and recommend telehealth to others (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H., 2016). The main reasons respondents said they would use it were because it would be quicker,

more accessible, and cheaper compared to normal healthcare. Only 50% of the residents I interviewed have a primary care provider in Charleston, and half of those residents see a nurse practitioner as their main provider. The other residents stated that they either travel to Oxford or Grenada to see their regular doctor. From Charleston, it is an hour drive to Oxford and a forty minute drive to Grenada. Other residents said that they do not have a primary care provider, but instead visit the Charleston Rural Health Clinic or go to the emergency room at Tallahatchie General Hospital when they get sick.

100% of interviewees told me that transportation was a major issue in Charleston, and the older residents especially had difficulty finding transportation. When I asked citizens, what was the farthest they had to drive to meet their healthcare needs, the most common responses I received were Memphis, Jackson, and New Orleans. These drives are one and a half hours, two hours, and almost five hours from Charleston respectively.

When I asked who would most benefit from telehealth, the most common answer I received was older generations. It was stated by multiple interviewees that having a telehealth program in Charleston would be beneficial to these older individuals because it would be easier for them to find a ride to the Wellness Center, Charleston Rural Health Clinic, or the local hospital, versus somewhere out of town. 38% of respondents stated that they felt telehealth would be better than traditional healthcare services, while the other 62% of respondents said that they believed telehealth would be at least equivalent to traditional healthcare services. 100% of interviewees said that they believed telehealth would be beneficial to the residents of Tallahatchie County.

I communicated with Kyle Brewer, the administrator for the UMMC Center for Telehealth, via email to better understand the financial aspect of implementing a new telehealth

program in a rural area. He said that telehealth services can vary greatly based on the type of service and the size of the organization. To determine startup costs, the number of providers and services desired for the program must be established. He also told me that operating costs would primarily consist of technology and people, which include, but are not limited to: computers, laptops, software licenses, internet, telehealth technicians, clinical providers, clinical support staff, and business administrators. Salaries for these healthcare professionals depend on the type of service and experience of the individual. He said that an annual salary for a telehealth technician is roughly $45,000 to $75,000.

I also wanted to know how they prepare employees to work with telehealth technology. Mr. Brewer told me that they have a training course for UMMC providers where they learn how to use the video equipment. They also work with providers to define workflows and expectations. He indicated to me that this training was one-on-one, so that providers can take time to ask questions and fully understand the technology.

The total cost of implementing a telehealth program depends on which side of the service model you are and the services delivered. The telehealth service provider incurs many expenses to provide the service by staffing clinicians and support staff. The receiving provider usually pays a monthly, annual, or per encounter fee for the telehealth services. This would only be based on the volume, or expected volume, of use of the system. Overall, he said that it mainly comes down to money to invest, and one of the largest challenges in financing a rural program is that rural hospitals typically have less money to invest. He did say that rural areas have decent access to grant money to help pay for telehealth services. Mr. Brewer told me that Tallahatchie County could invest in building their own program, but this would be expensive, and not

feasible. He said that using an existing program to partner with, such as UMMC, to offer telehealth services to their patients would be a much more feasible option.

POTENTIAL BARRIERS

The first barrier to telehealth that I came across was that many of the residents I spoke with did not know what telehealth was. If telehealth were to be implemented in the community in the near future, steps would need to be taken to educate the community on what telehealth is, the purpose of bringing it into the community, and how it can benefit the residents. One resident suggested that the Wellness Center host workshops that would allow residents to see first-hand how telehealth can benefit them. Another resident said, “I think people will always be hesitant about what they don’t know, and probably half the people would try it and the other half of people just won’t care to mess with it. It doesn’t matter if it’ll help them or not, if they don’t understand it they won’t come.” Education was also mentioned as a barrier, and one resident told me that the more educated an individual is the more likely they will come to the Wellness Center and take steps to improve their health. They said the same people who care to come work out and eat right would be the same people who would use telehealth, but this tends to be the more educated individuals in the county.

Based on my conversations with citizens and one of the healthcare professionals, I realized that interpersonal barriers have a strong influence on the health of individuals. Tallahatchie County is a predominantly black county, but all of the healthcare professionals I interacted with were white. After speaking with citizens, I learned that most healthcare professionals in the county are white, or at least this is their perspective. One black citizen told me, “some of the (black) folks around here just don’t feel very comfortable getting help with their health because they feel like they might not be listened to or get brushed off.” This same

citizen also told me that it is often seen as “weak” in the black community to be sick or have to go to the doctor, especially for black men. Another citizen told me that many adults are either too busy or do not have the finances to go to a doctor. This individual said, “Many people have to choose between a day of work or a doctor appointment. They have to put food on the table for their family, they don’t have time to be going to urgent care or seeing somebody (healthcare professional).” This ideology would certainly contribute to the health of the citizens in the county, as it results in individuals not seeking healthcare. In Figure 3, structural and interpersonal barriers found in a previous study are listed. I felt like many of these barriers are also affecting citizens in Tallahatchie County, specifically poverty, rurality, racism, low prioritization of disease, gender socialization, and medical distrust.

Theme	Subtheme
Structural barriers	
Poverty	Unemployment/underemployment
	Lack of health insurance/lack of money for co-pays, medication
	Choosing between bills, co-pays, or medication
	Apathy
Rurality	Lack of public and private transportation
	Lack of Medical Specialists
Insurance restrictions	Restricted treatments/medications
	Wait times for treatment approvals
Medical guidelines	Guidelines constantly change/cycle
	Guidelines could limit individualized patient care/clinical judgement
	Economic Influences
Racism	Feeling disrespected
	Apathy
Interpersonal barriers	
Fear	Stigma of illness
	Fear of severity of illness/death
	Fear of medication and side effects
Prevention of disease is low priority	Care taking/family provider responsibilities
	No need to seek healthcare as long as physical ability is not impacted
Gender and gender socialization	Seeking healthcare is a feminine attribute
	African American men are socialized to be "macho"
	African American men do not discuss personal health issues
Medical distrust	Kickbacks from pharmaceutical/insurance companies dominate physician's provision of care
	Feeling that healthcare provider is impersonal/uncaring/does not listen

Figure 4: Structural and Interpersonal Barriers to Healthcare (Connell, C. L., Wang, S. C., Crook, L., & Yadrick, K., 2019)

There are also financial barriers to implementing telehealth in Charleston. Telehealth has a large startup cost. After speaking with Kyle Brewer, I found that more research will need to be done to find the initial startup costs of implementing a telehealth program in Tallahatchie County. The start up costs include costs such as machinery, other technology, cost of building space, and hiring staff. The operating costs of a telehealth program should also be considered. These costs include the costs of high-speed internet, salaries for any technicians needed, and physician fees for services. There are certainly grants that could be applied for to assist in covering these fees, as well as donations could be made. Finances would need to be established before continuing forward with a telehealth program.

Billing is another financial barrier that must be considered and determined before implementing a telehealth program. It is not an issue when telehealth is connecting patients to UMMC in Jackson via a UMMC telehealth center, because the billing is all done through UMMC. However, the Tallahatchie General hospital, the Charleston Rural Health Clinic, and the JCK Wellness Center are not associated with UMMC. This means that there would have to be a partnership between one or all of these institutions, and UMMC, which leaves a question of who does the billing. If a Charleston resident comes into the JCK Wellness Center for a service, would the Wellness Center bill the resident or would UMMC bill the resident? The UMMC physician will expect to be compensated, yet the Wellness Center will be providing the telehealth equipment and assisting the patient during their visit. Also, if the Wellness Center is not billing, then they are not making money, which would inhibit them from providing telehealth services in the future. Yet, both UMMC and the Wellness Center cannot bill the patient, as that becomes costly for the patient. The billing situation is certainly something that will need to be determined before starting up a program.

POTENTIAL BENEFITS

There are also significant benefits to establishing a telehealth program in a rural area like Charleston. The quickest route from Charleston to UMMC is 142 miles, and over two hours to drive. Individuals who may not have reliable transportation, or access to transportation at all, are not able to get to Jackson when they need to see a specialist. These individuals could now have access to healthcare in their own county.

Even though telehealth has large startup costs, there is potential for savings after the technology has been implemented. The more that telehealth technology is used, the cheaper costs will be. This can be explained by the theory of technology diffusion, which essentially states that

as technology is created, people will become more familiar with and accepting of the technology. Over time, it takes less-skilled individuals to work the technology as it becomes more familiar. When this occurs, more units of the technology will be ordered and used (Mukoyama, 2003). As telehealth becomes more accepted and used in the community, services could potentially be made more affordable to citizens.

This would make it beneficial to citizens in the county without insurance. A factor that has been identified as a significant predictor of a patient's preference for telehealth over a traditional health care visit is whether or not a patient has insurance. Those without health insurance are 20% more likely to prefer telehealth than those with health insurance (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H. (2016).

Telehealth could also help address the high numbers of preventable hospital stays in Tallahatchie County. Through remote patient monitoring, physicians could reinforce treatment adherence, which is crucial to maintaining stable health and preventing unnecessary hospital stays (Pros and Cons of Telehealth, 2018.) Hospital costs average around $4,000 per day, and the average hospital stay costs an individual $15,000 (Fay, ND.) For the majority of the residents in Tallahatchie County, these hospital bills are devastating, especially for those who are uninsured. Reducing the amount of hospital stays of residents in the county could take financial burdens off of many of these individuals and their families.

Telehealth would also be beneficial in addressing the mental health issues and behavioral and mood disorders in Tallahatchie County. Dr. Catherine Moring told me that some of the biggest health issues in the county are mental illnesses. In one study, it was found that out of all telehealth users, despite urban or rural residential status, mood disorders were the most common reason for seeking telehealth services (Talbot, J. A., Burgess, A. R., Thayer, D., Parenteau, L.,

Paluso, N., & Coburn, A. F., 2019). This is most likely due to the shortage of psychiatrists in the U.S, especially when it comes to geriatric and adolescent psychiatrists (Bashshur, R., Shannon, Bashshur, N., & Yellowlees, 2016). Telehealth could help address depression, bipolar disorders, attention deficit disorders, anxiety, and other mood disorders in this county, which would result in an increase in the quality of life for many residents residing in this county.

It would be a great benefit to the citizens of Tallahatchie County to be able to speak with and have access to specialists. Jan Maddux, the Charleston Nursing Home administrator, told me that it would be beneficial for her, her staff, and their patients to be able to speak with specialists in Jackson because they do not have any specialists in the area. Frankie Tartt, the director of the Charleston mkural Health Clinic, expressed similar concerns and said that the patients coming into the clinic would especially benefit from a cardiologist and a pulmonologist. Telehealth would allow these rural residents to have interactions with specialists in Jackson that otherwise many of them are not able to see. Dr. Moring also said that access to specialists would greatly benefit the residents in this county. She said that the closest OB/GYN is at least an hour away, so women seeking pre- and post-natal care must travel for their female healthcare needs. She also said that many women in the area could benefit from hormone specialists as well. Every healthcare professional I spoke with, as well as many community members, told me that diabetes was one of the largest healthcare issues in Tallahatchie County. Having access to an endocrinologist would be beneficial for patients with diabetes. Dr. Moring said she has seen many individuals with poorly managed blood sugar, and that these individuals have had little-to-no education on how to manage their diabetes properly. Kyle Brewer said that telehealth can help the patients at a smaller hospital receive specialist care from a larger hospital, such as UMMC in

Jackson. He told me that he has not only seen telehealth reduce the length of stays in the hospital, but he has seen it save lives several times.

Another benefit to telehealth is that it has the capacity to provide patients access to healthcare during weekends, holidays or other times when typically healthcare is inaccessible. In one study, over a third of telehealth visits occurred during times such as those aforementioned (Polinski, J. M., Barker, T., Gagliano, N., Sussman, A., Brennan, T., Shrank, W. H. (2016).

Fix this conclusion paragraph I asked every individual I interviewed if they felt like a telehealth program in Tallahatchie County would be beneficial, and they all said "yes." The community members and healthcare professionals that I spoke with understand that telehealth could make healthcare more accessible to community members. The financial barrier is the largest threat to implementing a telehealth program; however, the technology can become affordable for the community. These barriers and benefits must be considered when determining the possibilities of telehealth in Tallahatchie County.

LIMITATIONS TO THE RESEARCH

I only interviewed Charleston citizens who were at the JCK Wellness Center the one weekday I visited. While monthly membership is fairly cheap, 33.4% (U.S Quick Facts, 2018) of Tallahatchie County is in poverty. Therefore, many individuals who may especially benefit from telehealth were likely not at the JCK Wellness Center. Had I asked people who were walking down the street in Charleston, I may have gotten some different responses. Another limitation that I take responsibility for, but believe it is not significant enough to skew my results, is that I interviewed a total of twelve people: eight citizens of Charleston, three healthcare professionals from the county, and one professional from UMMC for my main data sources. Although I

believe that it is sufficient enough to provide representative results, some may think that twelve is too little for a thorough analysis.

CHAPTER VI: CONCLUSION

It is suggested that four standards must be met before telehealth can be successfully adopted: a positive link with a policy level sponsor; successful structural integration; cohesive, cooperative groups; and integration at the level of professional knowledge and practice (Zanaboni & Wootton, 2012).

More research is needed before a telehealth program could be implemented in Tallahatchie County, specifically, more research on the financial side of things is required. The billing situation must be sorted out between UMMC and the entity providing telehealth. The start-up costs would need to be calculated, once it was decided what kinds of services would be offered and how many employees would be hired. Once this is all done, I suggest a cost benefit analysis be conducted to examine the net benefits that would be produced by implementing a telehealth program.

Based on my findings, both the qualitative data and the previous existing data, I conclude that it would be socially feasible to establish a telehealth program in Charleston. I believe this because Charleston is centrally located in the county, and home to the Tallahatchie General Hospital, the nursing home, and the JCK Wellness Center, it would be beneficial to implement a telehealth program here. Healthcare professionals at the hospital, nursing home, and wellness center all indicated that telehealth would be beneficial to them. It would need to be decided where the program would be housed, or if it would be possible for all three to have access to telehealth.

While the finances of implementing Telehealth are still undetermined, I do believe that it is feasible to incorporate telehealth into Tallahatchie County. I believe this because it has been done in Sunflower County, which is similar to Tallahatchie County in rurality, socio-economic status, and health issues. This is a successful program, and I believe that the Sunflower County

telehealth program can be an example for other Delta counties that are looking to implement a telehealth program. Every single healthcare professional and citizen that I spoke to from Tallahatchie County expressed to me that they believe a telehealth program could greatly benefit their community. While finances may be a concern, there are grants available for under-resourced counties, such as Tallahatchie County. There is already an existing telehealth hub, UMMC, that the county could partner with and UMMC offers dozens of specialists that the residents of Tallahatchie County currently do not have access to.

I believe that the most difficult aspect of this implementation will be starting up the program. Once it is up and running, I think that it is very likely that a telehealth program will be successful in the county. This telehealth program would benefit residents from all over Tallahatchie County, as well as surrounding counties. A telehealth program here could potentially benefit the health of thousands of residents.

CORONAVIRUS INFLUENCE

I was in the midst of conducting interviews for this thesis when the novel coronavirus-19 began to affect the United States. For weeks, many people were at home rather than working, and the University of Mississippi switched to online classes for the duration of the spring 2020 semester. Due to this, I had to exclusively conduct phone interviews after my one site visit to the James C. Kennedy Wellness Center in Charleston. COVID-19 temporarily brought our lives to a halt, and I felt like parts of this thesis was altered due to the virus. In my last month of working on this thesis, I began to see a surge in telehealth across the nation. As we were advised to social distance from one another, telehealth offered a way to safely connect physicians and patients. I am confident that COVID-19 will result in telehealth being used more frequently as we move forward.

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APPENDICES

Appendix A - IRB Forms & Approval

Appendix B - Snowball Sampling Script

Appendix C - Interview Questions

APPENDIX A - attach IRB application and approval

APPENDIX B

Taran Carrasco
IRB Application
Snowball Sampling Script

I coordinated with Dr. Catherine Moring, the director of the James C. Kennedy Wellness Center in Charleston, MS, to find participants to interview. For Charleston citizens, I plan to go to the Wellness Center and simply ask wellness center members if they would be interested in speaking to me about telehealth. This is my script for these interviews:

" Hi, my name is Taran Carrasco, and I am an undergraduate student at the University of Mississippi. I am working on my senior thesis and trying to collect information about telehealth in Tallahatchie County. Would you be interested in doing a brief interview? I have an information sheet you can read over, and then let me know what you decide. You are in no way obligated to participate, this is strictly voluntary."

For health professionals in the area, Dr. Moring said she would reach out to her contacts on my behalf, cc me on the email, and then if they are interested, they can reach out to me to schedule an interview. This will be meeting the Type 2 requirements, as indicated by the snowball sampling policy. This is the script I plan to have her email out:

"_____,

I hope this email finds you well. Taran Carrasco is an undergraduate honors student at the University of Mississippi working on her thesis regarding the potential and need for telehealth in Tallahatchie County. She is looking for several community healthcare professionals to interview to discuss the possibilities of telehealth in Tallahatchie County, how they think that telehealth could benefit the county, why they think telehealth is becoming important in healthcare, and what barriers they see to bringing telehealth into the county, and overall get their professional perspective on telehealth in Mississippi. Would you be willing to schedule a quick phone interview with her? She anticipates the interview taking no longer than 20 minutes. If so, she is copied on this email and you can reach out to her directly to schedule. We both really appreciate your consideration in this important endeavor and hope you will be willing to participate, though it is completely voluntary.

Dr. Catherine Moring, PhD, RDN, BC-ADM, CDE, MCHES"

APPENDIX C

Taran Carrasco
IRB Application
Interview Questions

I have listed all possible questions we may ask someone in an interview. However, we will not ask all of these questions to each interviewee.

CHARLESTON CITIZENS:

- What is your name?
- Do you know what telehealth is?
    - If the subject replies "no," the interviewer will briefly explain what it is.
- Based off of that definition, do you think that you would use telehealth?
- Has your past experience with telehealth been positive or negative?
    - Why?
- Are you currently using telehealth in any way?
- What types of telehealth (skype, apps, interactive websites, etc.) do you believe would be most beneficial in Tallahatchie County?
- Where does your current physician live?
- What is the farthest you have ever traveled for healthcare purposes?
    - How do you make this commute?
- Would you want your center to utilize telemedicine or would you prefer to drive to a
- doctor in Jackson?
- Do you believe residents in Tallahatchie County would use telehealth?
    - Why or why not?
- Why do you believe some residents in Tallahatchie County would not like telehealth?
- How effective or useful would you say the wellness center is currently?
- What do you want from your local wellness center?
- What are some ways that you would use telehealth in your life?
- Do you have children?
    - If so, would you use telehealth for your child?
- Are you a caretaker of a relative other than a child?
    - If so, would you use telehealth for your relative?
- What age groups do you believe would most likely interact with telehealth?
- How do you think that telehealth can impact Tallahatchie County?
- Do you feel like telehealth is better/worse than traditional healthcare in any way?
    - Why and in which ways specifically?
- What are some challenges you see that may arise when trying to expand telehealth into Tallahatchie County?
- Do you believe Tallahatchie County would benefit from telehealth?
    - Why or why not?
- Do you have any additional comments?

HEALTHCARE PROFESSIONALS IN THE AREA

- What is your name?

- What is your job title?
- What is your association with the Tallahatchie Wellness Center?
- How would say the current center runs?
- What do you think about bringing telehealth into Tallahatchie County?
- Do you think that the Wellness Center is the best place to house the telehealth system?
- Why do you think Charleston is a good location in the county for telehealth?
- Why do you think telehealth is becoming important in healthcare?
- Would further telemedicine be more useful or more confusing?
- What are some needs that both workers and patients need here?
- How well-equipped is the current staff with technology?
- How satisfied are you with the current progress of the center?
- What health issues are most prevalent in Tallahatchie County?
- How do you think that telehealth would benefit this community?
- What barriers do you see to bringing telehealth into the county?
- Are there any additional comments or concerns that you have?

UMMC TELEHEALTH EMPLOYEES

- What is your name?
- What is your job title?
- What are the initial start-up costs of telehealth services?
- What are the operating costs of telehealth services like the cost of high speed internet?
- Is a technician needed, if so what is their salary?
- What are the physician fees for a telehealth service?
- Do you have an estimate of travel expenses to a physical location like a hospital for medical services for patients in rural Mississippi?
- Is there an estimate for travel expenses of physicians to rural Mississippi?
- Does the implementation of telehealth reduce hospital stays and by how much?
- How much would you estimate is the total cost of implementing a telehealth program?
- What are challenges that rural areas face than urban areas do not in regards to financing telehealth?
- Were there any changes to the fixed costs over time?
- “Did the patients using telehealth services have less follow up appointments or hospital stays than those who did not?
- Which telehealth program would you say is the best first step for establishing
- telemedicine in a new area?
- How does UMMC go about growing the telehealth program to remote hospitals?
- What is needed to start up a new telehealth program in Tallahatchie County?
- How much, in total expenditures (money and time), did implementing this telemedicine
- system take?
- How did you train doctors to be able to use the new telehealth technology program?
- Are there any additional comments or concerns that you have?