Collaboration Between Academic and Community Institutions: Elements for Establishing a Telepsychiatry Program for Perinatal Depression in a Rural Setting

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Abstract

Perinatal depression is one of the most common complications of pregnancy, but limited access to mental health services in rural areas prevents women from receiving appropriate care. While attracting mental health professionals to rural areas is difficult, collaboration between academic institutions and safety net providers can bring effective mental health services to these underserved communities through telepsychiatry. Thus far, telepsychiatry programs have proven successful in correctional facilities and in the pediatric setting, but very few telepsychiatry videoconferencing programs exist specifically to manage perinatal depression.

This study aims to explore whether an academic institution, a federally qualified health center, and a local health department can collaborate to implement a telepsychiatry program for perinatal depression. I collected perinatal depression screening data from Piedmont Health Services (PHS) at Siler City, NC, performed a literature review of telepsychiatry program implementation, and conducted in-depth structured interviews with members of the health care community who had experience as a provider or administrator in the delivery of perinatal care, mental health care, and/or telemedicine programs. Results from triangulation of these data revealed that financial feasibility including physician reimbursement and cost of equipment and network, as well as provider/workforce capacity are major barriers to implementation. Other barriers include availability of Spanish-speaking psychiatrists, and legal questions of licensing and credentialing. Facilitators include an existing relationship among these institutions and opportunities for grant funding from trusts/foundations and the government. Once we address issues that impede implementation, a telepsychiatry program for perinatal depression at Siler City Community Health Center could be established.
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Introduction

In the last two decades, mental health care has come to the forefront as a global and national issue. The World Health Organization estimates that by 2020 depression will be the second leading cause of disability for all ages \(^1\). The perinatal period places women in a particularly vulnerable position to develop depression or worsening of mental health disorders such as bipolar disorder. As one of the most commonly occurring obstetrical complications, perinatal depression affects about 10-15% of women \(^2,3,4\).

While the USPSTF previously recommended screening women for depression in the postpartum period, it published new guidelines in January 2016 to screen both during pregnancy and in the postpartum period \(^5\), highlighting the importance of this subject. With the more intense screening guidelines, greater access to appropriate mental health care should accompany a positive screen. Although effective pharmacological and pharmaco-therapeutic interventions exist to treat perinatal depression, many women do not seek treatment either because of lack of education about depression or fear of discussing mental health concerns with their providers \(^6\). In rural and underserved areas, access to mental health care is difficult and, aggravated by the stigma associated with mental health conditions, further challenges women’s ability to seek and receive effective treatment \(^7\). Untreated perinatal depression can not only have adverse effects for the mother including lower quality of life and, in severe cases, suicide, but it may also have long-lasting negative effects on the infant as well, especially because the mother-infant relationship is compromised \(^8,9,10\).

Chatham County is one of 80 rural counties in North Carolina \(^11\). In 2014, the Chatham County Health Department recognized access to mental health services as one of its Community Health Needs and established as one of its priorities to “Promote Mental Health Treatment
Furthermore, in conversation with Layton Long, Director of Chatham County Health Department in February 2016, I learned that one of his goals is to increase the collaboration between the Chatham County Health Department and Piedmont Health Services (PHS), especially since these two institutions are physically adjacent in Siler City, NC and serve the same patient population.

According to PSH data analyst Jen Cunningham, from 6/1/15 to 5/31/16 around 15% of patients at Siler City Community Health Center screened positive for depression on the Edinburgh Postpartum Depression Scale. Sixty-six percent of female patients prefer Spanish as their language. At a multidisciplinary meeting held at the Health Department in February, 2016 telepsychiatry emerged as an idea for improving access to mental health services. The idea for this master’s paper arose from the goal of meeting the needs of the Chatham County Health Department to improve access to mental health services and the need to provide perinatal psychiatric services, especially in Spanish, to patients in Siler City.

This study aims to explore the elements that would facilitate or challenge collaboration among the Chatham County Health Department, Piedmont Health Services, and UNC Medical Center to establish a telepsychiatry program for perinatal depression.
Background and Theoretical Perspective

**Telepsychiatry improves access to mental health services**

Three variables prevent people from receiving mental health care in rural areas: accessibility, availability, and acceptability. Telepsychiatry offers a solution to address many of these variables while achieving outcomes comparable to those of face-to-face care. Telepsychiatry is both an effective and acceptable method of delivering mental health services.

**Efficacy and Effectiveness of Telepsychiatry.** Studies have demonstrated that telepsychiatry not only works as a method of delivering care for various populations but also works as well as does face-to-face care. For the child/adolescent population, studies have demonstrated that telepsychiatry videoconferencing is effective in the diagnosis and assessment of various psychiatric disorders such as attention deficit and mood disorders. Similarly for veterans, telepsychiatry has been shown produce similar outcomes as in-person therapy for the treatment of depression. Further, a study found that for the treatment of Post-Traumatic-Stress-Disorder in veteran and civilian women, telemedicine and in-person psychotherapy delivery methods were comparable. O’Reilly et al. found telepsychiatry to be comparable to face-to-face encounters for consultation and short-term follow-up care. Furthermore, in a randomized trial comparing face-to-face treatment vs. videoconferencing telepsychiatry for medication management, De Las Cuevas et al. obtained no statistically significantly differences in outcome measured by Clinical Global Impressions, Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total scales between telepsychiatry and face-to-face treatment, thus supporting the efficacy of telepsychiatry.

Telepsychiatry is not only comparable to face-to-face management but may even be more effective than in-person treatment in certain populations. Adolescents who may find the
technology attractive, and patients with autism, ADHD, and chemical dependence may feel more comfortable and better respond to an interaction via technology rather than face-to-face 21.

**Telepsychiatry and accessibility.** One component of accessibility to health care is transportation 22. Telepsychiatry addresses transportation barriers by bringing services closer to where patients reside, improving patient convenience 23. Patients therefore do not have to travel longer distances to larger health centers, and Greenwood et al. 24 found that patients preferred telepsychiatry to traveling such distances. In addition, because patients do not have to travel as far, they can actually save money 25.

**Telepsychiatry and availability.** A need for knowledgeable and experienced provider care exists in rural areas 26. Telepsychiatry is able to bring provider services to rural or remote areas and address the geographic disparity and shortage of mental health providers 27.

**Telepsychiatry and acceptability.** The dominant barrier to receiving mental health care is the stigma associated with mental health conditions and accessing appropriate care, which is higher in rural than in urban populations 28. Telepsychiatry may offer a way to reduce the stigma associated with mental health illness 29. Various adult and pediatric satisfaction studies have demonstrated that patients are highly satisfied with telepsychiatry services 30, 31, 32. In addition, patients have demonstrated high satisfaction regardless of type of provider. In a patient satisfaction study for pediatric patients, Ellington 33 found high levels of parental satisfaction with telepsychiatry services delivered by an advanced practice nurse. Furthermore, Cruz et al. 34 found that in their telepsychiatry program both providers and patients found the service satisfactory. While providers may recognize the benefit of telepsychiatry for patients, however, their own satisfaction with it varies, and technical and interpersonal barriers often keep
psychiatrists from using this technology\textsuperscript{35}. This reluctance or skepticism means providers may act as the “initial gatekeepers” in providing telehealth services\textsuperscript{36}.

**Models for Telepsychiatry Implementation**

Telepsychiatry addresses various barriers and offers a myriad of benefits in improving access to mental health care, as noted above, but we have no single method for implementing a telepsychiatry program. Fortney et al.\textsuperscript{37} present the pros and cons associated with several implementation models. Next, I summarize the models presented in their study beginning with the least resource-intensive model, which has the potential to reach the greatest number of patients, and ending with the most resource-intensive model, which is the most effective but can be limited in the number of patients seen in this setting.

**Psychiatric Curbside Consultation.** This model involves curbside consultations or case reviews from telepsychiatrists. The behavioral health consultants have an open-access clinic and participate in “warm hand offs.”

**Psychiatric Consultation-Liaison.** With this model, the telepsychiatrists conduct a consultation with the patient but provides the diagnosis and treatment recommendations to the patient’s primary care provider

**Behavioral Health Consultant.** Here, off-site mental health providers are embedded in the primary care team to care for patients by connecting via telepsychiatry and participate in “team huddles”. This model follows allows for patients to receive consultation as needed with unscheduled appointments through a “warm hand off.”

**Collaborative Care.** In this model, “off-site mental health providers collaborate to manage patients enrolled in a panel including conducting virtual outreach to those who are hard
to engage in treatment” (p. 526). In this model, patients have scheduled appointments with psychiatrist but may have unscheduled appointments with Care Managers.

**Psychiatric Referral.** Finally, in this most resource-intensive model, an off-site mental health team is solely in charge of the patient’s care via telepsychiatry co-located in the primary care clinic. This model most closely resembles face-to-face interaction and faces some of the same barriers, such as limits on the number of patients who can be seen and having to cope with no-show rates.

**Telemedicine in the Obstetrical Setting**

Telemedicine is becoming a common tool in the obstetrical setting. Modalities such as videoconferencing or mobile phone technology have been used for ultrasound reading, counseling, symptom tracking, diabetes management, and postpartum depression management\(^{38,39}\).

**Telemedicine for perinatal mental health.** Thus far, few videoconferencing telepsychiatry programs have been developed explicitly to treat perinatal depression. However, studies have explored other forms of telehealth in managing postpartum depression. Ugarriza and Schmidt\(^{40}\) tested a telecare model for treating women with postpartum depression. This model provided cognitive-behavioral therapy, relaxation techniques, and problem-solving strategies through a 10-week therapy delivered via phone call. At the end of the therapy, women had significantly lower Beck Depression Inventory II scores. Baker-Ericzen et al.\(^{41}\) explored the use of the Perinatal Mental Health model, a collaborative care model for connecting patients to appropriate mental health services including telemedicine follow-up interventions, to facilitate treatment for Latina Women with perinatal depression. This care model provided participant access to a variety of community resources and participants reported high satisfaction.
Given the high incidence of perinatal depression, patients’ difficulty in accessing mental health services at larger medical centers from rural areas such as Siler City in Chatham County, and the effectiveness and acceptability of telepsychiatry, this study explores the elements that would facilitate or impede collaboration between UNC Medical Center, Piedmont Health Services, and the Chatham County Health Department to establish a pilot telepsychiatry program for perinatal depression.

Methods

I triangulated methods in order to explore the elements involved in establishing a telepsychiatry program in rural settings. First, I conducted a limited systematic review of the literature to better understand the existing recurrent themes in telepsychiatry program implementation (see Appendix A). Next, I performed in-depth structured interviews with members of the health care community who had experience as a provider or administrator in the delivery of perinatal care, mental health care, and/or telemedicine programs.

Participant selection

I used convenience, reputational, and purposive sampling to identify the right respondents to inform this study. Construction of random samples is inappropriate for studies of elite expertise and policy implementation, since randomness creates a high and inevitable likelihood of missing precisely those respondents with the most knowledge of the policy area. Purposive, reputational samples are much more likely to reach the respondents who best understand the policy in question. In this study, my key informants included both clinical providers and administrators with whom I had interacted in the exploratory phases of this project, as well as those persons my key informants suggested I contact. Participants included members from UNC Health Care, the Chatham County Health Department, Piedmont Health
Services, Community Care of North Carolina (North Carolina’s provider-owned primary care medical home network for Medicaid recipients), and East Carolina University. Because this study focuses on a telemedicine program for perinatal mental health, my sample included representative members from the perinatal care and mental health care fields, as well as administrators with decision-making power who had experience in population health and/or mental health care.

I originally invited 11 providers and administrators to participate in the interview, adding 2 more as recommended by key informants. I used a standard e-mail invitation to recruit key informants to participate in the interview. This e-mail invitation contained a brief description of my research project and request to participate in the interview. If a provider did not reply to the first e-mail invitation, I followed up with another e-mail invitation two weeks after I had sent the original message. In one instance, I followed up a third time via phone call. Two key informants did not reply to my e-mail invitations or phone call, so I interpreted their non-response as a decision to decline my interview request. A total of 11 providers and administrators participated in the interview (see Appendix B).

In-Depth Interviews

After the UNC-Chapel Hill Institutional Review Board ruled this study “not human subjects research” (IRB 16-0759), I conducted interviews in April and May of 2016. Most interviews took place face-to-face in each participant’s work office. One interview took place at the UNC Health Sciences Library, and one interview started on the phone and ended in person in the participant’s office. No others were present at the time of the interview. I used a structured questionnaire developed prior to the start of the first interview (see Appendix C). The questionnaire consisted of open-ended questions about positive and negative views of
telepsychiatry, barriers to and facilitators of telepsychiatry implementation, current community
or academic partnerships, finances, the perceived necessity of UNC involvement in
telepsychiatry, feasibility of expanding services from the UNC Women’s Mood Disorder Clinic,
patient receptivity to telepsychiatry, and feasibility of a telepsychiatry training curriculum. I
conducted no repeat interviews.

I obtained and audio recorded each participant’s verbal consent to participate in the
interview. I audio recorded each interview and made notes as participants answered each
question. Interviews lasted an average of 34 minutes: four were between 20 and 30 minutes, four
between 40 and 50 minutes, two under 20 minutes, and one over 50 minutes. I transcribed each
participant interview by listening to the audio recording twice to improve accuracy of the
transcript. I did not return transcripts to participants for comments or correction because of this
study’s time constraints and participants’ busy schedules and other obligations, but I offered each
respondent a copy of my completed master’s paper, at his or her request. At the time of this
report, my study had not reached data saturation. The key informants who did not participate in
the interview, together with additional contacts that I could not invite to participate within the
scope of this project, have valuable insight into the field of mental health and telemedicine.
Implications for this study might change after interviewing El Futuro, a bicultural and bilingual
mental health provider for the Latino population, as well as Cardinal Innovations, the Managed
Care Organization for mental health services covered under Medicaid in Chatham County.

Data Analysis

I selected my coding variables via a reiterative process both using general knowledge
acquired through my literature review and three transcripts deemed as “gold standards.” These
transcripts came from interviews with Dr. Stamilio from the UNC School of Medicine, Dr. Stiles
from UNC Health Care, and Dr. Saeed from East Carolina University. Furthermore, I added variables from the other transcripts, as they appeared to be common among several transcripts. Using this same logic, I deleted a priori variables that key informants did not mention, moving the data entry into an “other” category. The mission of the analysis was not to identify how many times a participant mentioned a certain variable. In this sense, I did not perform numerical coding. Instead, my goal was to identify elements and themes that emerged from informants’ responses about telepsychiatry.

Findings

Positive and Negative Views About Telepsychiatry

All participants held a generally positive view of telepsychiatry as a means to providing mental health services to remote or underserved areas. For example, Sonia Echevarria from Siler City Community Health Center, said at the end of the interview, “Well you know, you wouldn’t have chosen this topic if you didn’t know how limited these resources are, so thank you for doing this.” In the following pages, I will present respondents’ views according to the most common domains that emerged based on their responses. Access is the first domain.

Access. All participants had positive views about telepsychiatry’s ability to expand access, as presented in Table 1. Key informants’ responses fell into 4 categories: reach, patient convenience, workforce, and care delivery. Reach is the ability to provide care to patients in remote areas. Chris Raines from UNC Medical Center said, “I think it’s an excellent way to increase access for patients […] helps meet women […] where they are.” Patient convenience is another benefit to access. For example, four key informants explicitly referred to telepsychiatry as an opportunity to address transportation, travel, and time burdens to patients trying to get care.
Beyond simply having a vehicle, the expense of traveling and the time away from work to travel long distances to the caregiver are barriers to care.

Telepsychiatry also addresses the mental health workforce shortage. Andrew Clendenin from Community Care of North Carolina said, “I think the major benefit to telepsychiatry is addressing the workforce shortage.” Finally, telepsychiatry offers the opportunity to deliver care that is culturally and linguistically appropriate, as well as evidence-based, in areas that otherwise would not have access to this type of care. Alan Stiles from UNC Health Care proposed that in some parts of the country it might even arguably serve as the “primary tool for outreach for being able to provide a mental health care [service].”

**Efficiency.** Two key informants, Dr. Stamilio and Dr. Saeed, explicitly mentioned telepsychiatry as being more efficient than face-to-face interaction either by reducing the number of no-shows or eliminating the amount of time a provider has to spend traveling to a rural site. Both of these instances result in the provider seeing more patients than they otherwise would see in person.

**Efficacy and Effectiveness.** Telepsychiatry is efficacious, or comparable to in-person care, in management and treatment of psychiatric conditions. Dr. Saeed explained that studies have established that telepsychiatry works as well as face-to-face encounters and also proposed that this technology could be used to implement standardized protocols to deliver evidence-based care.

Various elements characterize the applicability or effectiveness of telepsychiatry. First, compared to other forms of telemedicine, telepsychiatry does not require the use of hands-on physical assessment, facilitating the use of this interface. In addition, software improvements have diminished technological restrictions for implementing this method of care. Next,
Telepsychiatry is versatile. Chris Raines said, “…it [telepsychiatry] can be used in multiple different arenas in providing therapy, medication management, and also providing consultation.” Telepsychiatry has also worked to improve providers’ comfort in triaging and giving brief treatment because of the knowledge they acquire from the telepsychiatry consultations, as Mr. Clendenin shared from his experience. Finally, also from Mr. Clendenin’s experience, telepsychiatry has helped to establish a culture of integration between physical and mental health.

Although telepsychiatry is widely applicable, it continues to have certain limitations. The first one is scope. According to Dr. Stamilio, telemedicine is “more narrow than face-to-face”, and thus providers not only must select patients appropriately but this technology is limited in acute circumstances. Also, an accurate patient assessment depends on the technology working well. Chris Raines noted that camera misalignment may prohibit a provider from accurately assessing eye contact, for example. Furthermore, some facilities may still lack good Internet connectivity to establish videoconferencing.

Although telepsychiatry works as well as face-to-face therapy, key informants expressed the need to preserve some form of in-person relationship. This relationship can be either with a local therapist, as Dr. Kimmel from UNC Medical Center said, or with the psychiatrist before beginning care via teleconferencing, as Layton Long from the Chatham County Health Department shared from what he has learned from meetings with other providers. Another negative aspect of telepsychiatry, according to Mr. Stinson from Chatham Hospital, is the lack of knowledge about local resources when care is delivered from afar via teleconferencing. This is particularly a problem in the Emergency Department setting where patients may receive
recommendations for discharge that they may not be able to follow because the resources are not available where they live.

**Financing.** The category of financing encompasses both positive and negative views about cost of the technology and equipment, as well as provider reimbursement. Overall, the majority of views about financing telepsychiatry were negative. First, provider reimbursement, which is dictated by third-party payers, tends to be lower for telemedicine than for face-to-face care. Next, even though facilities where the telepsychiatry is delivered can earn money by charging a facility fee, providers do not participate in this revenue. In addition, third-party payers do not cover equipment and on-going network costs. Finally, funding has both positive and negative aspects. Funding sources such as grants can provide the means to finance cost of equipment. However, as Dr. Stiles states, obtaining funding is very difficult because “hospitals and health care systems typically like to push telemedicine into a stand-alone situation,” instead of viewing it as a clinical tool.

**Patient perception and acceptability.** Key informants had both positive and negative things to say about patient acceptability of telepsychiatry, although all agreed that in their experience, patients have been receptive to telepsychiatry services. Initially patients may feel uncomfortable with the technology so it takes a “good salesperson,” as Dr. Stamilio noted, to help the patient feel comfortable standing in front of the camera. Overall, however, patient acceptability is high, as Dr. Saeed shared: “…although there’s a lot of myth and noise around that…when you look at the literature patients find it very acceptable…” In addition, if telepsychiatry is housed where the patient usually receives care, patients may feel more comfortable and relaxed in that familiar environment. Along those lines, as Chris Raines
commented, telepsychiatry can reduce the stigma because “…patients can be seen where they are instead of coming in to a Department of Psychiatry.”

**Provider perception and acceptability.** The most common negative view about provider acceptability of telepsychiatry is lack of comfort with the technology or not feeling adequately trained to provide these services. In addition, providers may be hesitant to try telepsychiatry services because they assume patients are not going to like it. According to Dr. Saeed, “…when you look at the literature patients find it [telepsychiatry] very acceptable, and if there is any resistance to the use of that, that it is typically from the provider side...”. Another concern expressed by Sonia Echevarria and Chris Raines is the ability to build rapport with patients and express sympathy, particularly around a perinatal loss. However, Chris Raines said, “…that’s quickly overcome and I have been able to overcome that with the majority of my patients.”

**Collaboration.** Two themes emerged for collaboration as a positive about telepsychiatry. First, it allows for a multi-provider approach to care by incorporating social workers or advances practice nurses who can be a part of the patient’s care where telepsychiatry is being delivered. Second, telepsychiatry can provide the opportunity for an integrative care model between institution such as the county Health Department and UNC to provide patients with the care they need. For example Dr. Kimmel said, “…it may be a good way to do more of an integrative care model and to have […] case conferences where you’re kind of going over patients…[a] perinatal psychiatrist could then talk with you and the provider over […] telepsychiatry”.

**Barriers and opportunities for program implementation**

Key informants provided barriers and opportunities for program implementation based on what they had learned from their experience and familiarity with telepsychiatry or telemedicine
programs. Many of the barriers and opportunities echoed themes from the positive and negative views of telepsychiatry. The most common barriers and opportunities were related to legalities, financing, and infrastructure. A myriad of other themes arose based on each participant’s experience, and are summarized as “other” on Table 2.

Provider Engagement. The first step in establishing a telepsychiatry program, according to Dr. Stamilio, is to decide whether the client is going to be a provider/provider groups or the patient directly. If the client is a provider group, the first barrier to overcome is to find providers willing to house the telemedicine program and to provide these services. An opportunity to engage such providers is the opportunity for them to obtain a facility fee from the third-party payer for each patient receiving telemedicine in their facility. On the other hand, finding providers who are willing to “…use this [telepsychiatry] tool as opposed to face-to-face” is also a challenge, according to Dr. Stiles. In addition, when setting up a telepsychiatry program, reaching out to providers with experience in telemedicine is an opportunity to learn from them, as Mr. Clendenin shares, and address any other barriers that may arise.

Infrastructure. Dr. Stamilio suggests that establishing connectivity is the next step after finding willing provider clients. Although Internet connectivity is still required, the connectivity does not necessarily have to be good. Unlike when telepsychiatry first started, when an expensive T1 line needed to be established, according to Dr. Saeed, now Internet connectivity is sufficient. Internet access is now readily available. New software and mobile applications are an effective alternative to the T1 line as well. Cisco software such as Jabber is able to detect bandwidth and adapt the system so that it can work even when the Internet connectivity is poor and still establish a secure connection, according to Dr. Stamilio and Dr. Stiles. Dr. Stiles further adds the importance of “…easy to use and dependable technology” because “A failure of
technology in interaction with telemedicine would sometimes drive providers away from it and will certainly interfere with patients’ acceptance of it.”

In addition to connectivity, another barrier to overcome is finding room space for the physician-provider interaction. Dr. Saeed emphasizes the need to house the interface in a location that will maximize patient privacy and avoid others from listening in. In addition, adequate IT support is needed because, as Dr. Samilio notes, “There are always glitches and problems with systems and it’s very helpful to have an IT support person that can help you at that time who is accessible at that time.” The next issue is accessing and documenting patient information. If the telepsychiatry provider and patient do not share the same Electronic Health Record system, sharing information remains a challenge. Finally, another barrier to overcome in infrastructure is to have a referral and scheduling system, particularly if the telepsychiatry institution is providing this service at various sites, as is the case with Mr. Clendenin’s experience with CCNC.

Cost. The cost of equipment for a telepsychiatry program has declined dramatically from around $20,000 to $3,000, according to Dr. Saeed. In addition, Dr. Stiles noted that using the software and mobile applications mentioned above to set up telepsychiatry is “…much less expensive to do than setting up telepresence kind of sites that used to be one of the standards for the way we have security”.

Reimbursement. Provider reimbursement remains a challenge. Although opportunities for reimbursement by third-party payers for telepsychiatry have increased over time, no universal coverage yet exists. In addition, providers receive lower reimbursement for telepsychiatry services than for face-to-face services. Furthermore, according to Dr. Stiles, the lower reimbursement for telepsychiatry poses a barrier to the program’s sustainability. Because of the
difficulties with reimbursement, Dr. Stamilio emphasizes the importance of discussing billing with third-party payers as part of the steps to establish a telepsychiatry program. An opportunity for greater financial feasibility, as Dr. Stiles suggests, is to contract providers for telemedicine from a separate entity, as is the case with UNC.

**Legalities.** Although reimbursement policies can fall under legalities, this category focuses on two additional main barriers for establishing telepsychiatry: the Stark Law and licensing and credentialing. Under the Stark Law, an entity such as UNC is not allowed to provide teleconferencing equipment such as iPads to clients without charging them. The issue that emerges is that interested clients may not be able to afford the equipment and thus may not be willing to participate. One way to circumvent this is to use grant money to fund the equipment, which can then be freely given to client entities: “So you have to use a grant, which will allow you to put equipment out there…without charging the site that is not part of the system for it” (Dr. Stiles). The other issue that arises, particularly when providing telepsychiatry across state lines, is licensing. According to Dr. Saeed, a provider must be licensed to provide care in the state where the patient resides. In addition, Dr. Saeed adds, and more specifically to Emergency Department settings, a provider must be credentialed at each hospital where the provider delivers telepsychiatry, which can be a cumbersome process.

**Other barriers and opportunities.** The final element in successfully implementing a telepsychiatry program, as Dr. Stamilio notes, is to have assistance on the receiving end: “If you are using your third party provider as your as your model you need at least …a medical assistant or some kind of nursing or nursing assistant to help with the other side.” In addition to having the administrative assistance, Chris Raines explains from her experience providing telepsychiatry that having a local social worker or psychiatrist to provide more frequent face-to-face therapy.
will give patients a sense of receiving that in-person care. In that case, the telepsychiatrists serves as a consultant for medication management. Dr. Kimmel agrees, stating, “I don’t think it [telemedicine] replaces a provider, I think it augments what local providers are doing”. The last element to implement a successful telepsychiatry program is to have a user-friendly protocol to connect to the telepsychiatrists. In Mr. Stinson’s experience, having a step-by-step guide for connecting to the telepsychiatrists has been very beneficial.

**Academic and Community Partnerships**

All key informants interviewed have standing partnerships with academic and/or community institutions, often facilitated by funding such as grants. Broadly, Dr. Saeed explains that to have a partnership a need must first exist, like-minded people must be willing to meet that need and have the interest to solve the problem at hand, funding must be available to solve that problem, and finally involved entities must figure out how to sustain the solution. Figure 1 illustrates the following academic and community partnerships.

**UNC Health Care and Chatham County Health Department.** First, UNC Health Care has had a long-standing relationship with Chatham County, according to Mr. Long, particularly because Chatham Hospital is UNC affiliated. Chatham Hospital is currently providing telepsychiatry services in the Emergency Department through a contract with a provider group other than UNC, although UNC oversees all interaction. In the realm of perinatal health, the Health Department is currently exploring the possibility of starting a pilot project to provide ultrasound and other diagnostic work at the Chatham Hospital with patients following-up and reviewing the results at the Health Department via telemedicine with a Maternal Fetal Medicine specialist from UNC.
**UNC Health Care and Piedmont Health Services.** Piedmont Health Services (PHS) has had a strong partnership with UNC Health Care in both education and patient care. First, PHS participates in the residency training for the Department of Family Medicine. In addition, it serves as a rotation site for students from medicine, public health, pharmacy, nursing, and dentistry. In addition, PHS has already established a telemedicine program at its Prospect Hill site. This infrastructure has been used for resident training and not patient care. According to Dr. De Vries, “…we have the equipment set up but we have not actually used it as telepsychiatry, but we are set up to, and, you know, I think could envision using it…probably [in the] near future.” As for patient care, PHS has contracts with faculty UNC from various departments including Family Medicine, Pediatrics, and Social Medicine. In addition, through the Carolina Health Net Grant, PHS has partnered with UNC to find patients in the Emergency Department who need a medical home.

**Chatham County Health Department and Piedmont Health Services.** The Chatham County Health Department and Piedmont Health Services have created strong partnerships, according to Mr. Long, to avoid “working in silos independently and not achieving maximum results.” In the area of perinatal health, according to Sonia Echevarria, PHS and the Health Department participate together in the pregnancy medical home program. They also collaborate on the Care Coordination for Children (CC4C) program. The nutrition departments at PHS and at the Health Department also work closely together. According to Mr. Long, “…it makes the best use of our tax dollar resources to build strong partnerships to provide enhanced and more broadly available services through partnerships, and to see that as a core mission of the health department as a convener of those partnerships.”
**UNC Health Care and Other Institutions.** UNC’s Maternal and Fetal Medicine department is active in providing telemedicine ultrasound services at other institutions. In addition, Chris Raines provides perinatal telepsychiatric care to the Alamance County Health Department through the department of Maternal and Fetal Medicine.

**Other Community Partnerships.** Community Care of North Carolina (CCNC) has partnered with Easter Seals and El Futuro to provide telepsychiatry to about 30 primary care sites. CCNC contracts providers from these institutions to provide telepsychiatry. El Futuro is able to provide bicultural and bilingual psychiatric care. Another partnership that not only brings together the Chatham County Health Department and PHS but also the school system and other community health facilities is the Chatham Health Alliance. This organization focuses on addressing Chatham County’s health needs. Furthermore, Mr. Long said that building partnerships at the policy level is the most effective way to improve population health. Finally, all entities providing psychiatric care to Medicaid patients must interact with the local Managed Care Organization (MCO). Cardinal Innovations is the MCO for Chatham County and a few other counties (no one from Cardinal Innovations is among the interview respondents).

**Telepsychiatry Financing**

This study assessed three areas of telepsychiatry financing: funding sources, collaboration as an opportunity to finance telepsychiatry, and barriers and opportunities with the current reimbursement system for telepsychiatry.

**Funding Sources.** According to key informant responses, funding for telepsychiatry can be broadly divided into two categories: physician payment and equipment funds (Table 3). Third-party payers make up the main source of physician payment. Third-party payers include private insurance (Blue Cross Blue Shield being the main one in North Carolina), Medicaid
through the local MCO, and Medicare. For patients who are uninsured or underinsured, the patient is the main payer for telepsychiatry services. In the case of PHS at Siler City, as Sonia Echevarria told me, 42% of patients are self-pay. In addition, trusts and foundations such as the Duke Endowment and Kate B. Reynolds Foundation can help cover costs third-party payers do not cover. Commonly, they can cover around 50% of costs, according to Dr. Saeed. Third-party payers do not cover cost of equipment. Therefore, grants from the trusts/foundations mentioned above, as well as rural health grants from the government, and even the enabling legislation, can provide funding to establish a telepsychiatry program. The hospital system can also be a major funder of telepsychiatry programs, according to Dr. Stiles.

**Finance through collaboration.** Key informants described barriers and facilitators to using collaboration as a way to finance telepsychiatry programs (Table 4). First, collaboration often involves those foundations that award grants as they enter into a relationship with the grant award recipient. In addition, collaboration between institutions improves funding opportunities and creates an opportunity for these relationships. For example, only academic or hospital institutions are eligible for certain grants such as from The Duke Endowment. When community institutions such as PHS partner with UNC or Chatham Hospital to provide a service, “…we would benefit from that whereas, you know, they may not have as strong of an application without us and we would not be able to access that money without them,” Dr. De Vries explains. Similarly, the Health Department is eligible for certain federal grants from which community institutions such as PHS could not benefit unless they entered a symbiotic relationship with the Health Department.

Next, achieving a common mission also facilitates collaboration to finance telepsychiatry. Dr. Saeed explains, if an entity A’s mission benefits entity B’s “bottom line,” entity A may
request funding from entity B. In addition, if entity A helps entity B meet its mission, and entity B had received funding for its project, entity A may also benefit from that funding. For example, East Carolina partnered with North Carolina’s Area Health Education Centers (AHEC) to implement telepsychiatry as an education tool, which allowed both entities to meet their missions while using AHEC’s funding source. Next, the opportunity to pool resources and cut costs facilitates collaboration between entities. Furthermore, collaboration also allows waste elimination because by building strong partnerships, according to Mr. Long, entities can identify where services are duplicated, eliminate or reduce those duplications, and redistribute newly available resources.

Finally, collaboration may reduce provider burden and increase spread of services. When an institution such as UNC establishes a contractual relationship with a separate entity to provide telepsychiatrists, providers at UNC do not have to sacrifice seeing patients in person, which is more financially feasible than via telemedicine in today’s reimbursement environment. Dr. Stiles explains, “…we can build telemedicine programs out without having to take our providers and force them into additional work on top of their traditional work until the programs grows to a certain point that they can be seen as an appropriate alternate method for this [care delivery]…” When public and private institutions partner together either to finance telepsychiatry or provide “manpower,” Mr. Clendenin describes, disseminating a telepsychiatry program becomes more feasible.

Although several elements facilitate collaboration to finance telepsychiatry programs, two main barriers emerged. The first one mentioned above is the limited financial reimbursement, which renders telepsychiatry unappealing and financially infeasible for providers. The other barrier is limited language resources. Institutions may face a greater
challenge collaborating for a specific program when the patient population who would benefit from the program speaks a different language, such as at Siler City Community Health Clinic, and resources to address that need are limited.

**Barriers and opportunities in current provider reimbursement.** The majority of financing elements focus on barriers rather than opportunities (Table 5), illustrating the difficulty in financing telepsychiatry programs. Many of the barriers and opportunities presented echo themes already expressed above. First, Medicaid and certain third-party payers such as Blue Cross Blue Shied do reimburse for telepsychiatry and they cover a facility fee for the telepsychiatry receiving site. In fact, Dr. Stiles comments, “…Medicaid does pay for telemedicine at a better *predictable* rate than many of the private payers…” However, third-party payers reimburse for telepsychiatry at a lower rate than they do for face-to-face services, and Medicaid reimburses at a lower rate than do private third-party payers. In addition, according to Mr. Long, “Medicaid can place a lot of administrative burden on private practitioners,” which, when coupled with the higher no-show rate among the Medicaid population and lower reimbursement rates, can be frustrating for providers. Furthermore, Mr. Clendenin notes, “I think there’s […] obviously, an elephant in the room is the uninsured […] the state-funded individuals within the mental health system, how can we help address that concern.” Physician reimbursement for the uninsured and underinsured is limited.

Finally, the current fee-for-service reimbursement system may not be optimal for practicing in an integrative care mode, according to Dr. Kimmel. The difficulty lies in being able to reimburse for the primary care provider and the telepsychiatrists offering consultation services for the patient. In addition, Dr. Saeed notes that funding a support person on the patient side is challenging.
Patient Receptivity to Telepsychiatry for Perinatal Mental Health

This study did not survey patients’ views about telepsychiatry but explored patient receptivity to a telepsychiatry program for perinatal mental based on providers’ experience with telepsychiatry and with caring for the perinatal population. I presented results on general patient acceptability above. Affirming the results from the literature, key informants suspected that patients would generally be receptive to telepsychiatry for perinatal mental health.

Table 6 describes barriers and facilitators to patient receptivity. In order to facilitate patient receptivity, Dr. Stamilio suggests that providers must establish expectations with patients regarding care via this technology. Next, by incorporating telepsychiatry at patients’ regular primary care provider or perinatal care provider Mr. Clendenin explains, “I mean, I’d say that really, in general, I don’t think there is much resistance to this type of program from patients, but I would say that there would be potentially less in this perinatal depression just because […] it can be seen as a treatment of the whole person but then within, you know, the perinatal period itself.” Furthermore, a telepsychiatry program may lighten the burden on patients. Mothers are busy with a newborn and traveling to office appointments may be challenging, as Dr. Stamilio notes. In addition, Dr. De Vries notes that patients from distant sites do not like to travel to UNC because of the expense or because they do not wish to travel far “without papers.”

Finally, patients may be receptive to a perinatal mental health program not particularly because it is a pregnancy service but because it gives patients a sense of importance, especially if the services are in their native language. Sonia Echevarria says “I think providing that [telepsychiatry] resource is just another wonderful way to say, ‘Look, someone else cares, look what they are providing, you should really try to see if it helps’ and I think they would be willing to do it.”
Mr. Long noted that a barrier to receptivity of telepsychiatry would be that the patients first acknowledge that they need mental health services, and then they must be comfortable receiving that care via telepsychiatry. The issue of stigma is related to this point. Dr. DeVries explained, “I think the only barrier would be the same barrier for people with kind of accessing mental health in general, which would be potentially stigma and things like that, but I don’t think it would be worsened by the idea of telemedicine.”

**UNC Involvement with Telepsychiatry and the UNC Women’s Mood Disorder Clinic**

The general consensus from participants is that the need for mental health services is so expansive that an unmet need remains, and UNC involvement is one way to help meet that need (Table 7). One concern Dr. Saeed raised is whether efforts should be done “University by University and provider by provider,” or should a centralized effort exist instead. Helen Mikul from Siler City Community Health Center also raised the concern of availability of Spanish-speaking mental health providers from UNC, “…having Spanish-speaking therapists is really a challenge because they’re so few, and then if you are interpreting, that totally—to do telepsychiatry with an interpreter—it’s going to make it much more challenging, you know, for the trust issues, especially, for the clients…” In addition, according to Dr. Stiles, using an interpreter might challenge telepsychiatry efficacy, especially because of the importance of body language nuances and patient reactions.

The benefit of UNC involvement, particularly in Chatham County, is the potential knowledge of local resources, as Mr. Stinson notes. According to Mr. Clendenin, UNC could serve as a hub for telemedicine and research by bringing the community together, “…I think UNC and other academic institutions could easily serve as hubs for telepsychiatry, for telemedicine in general, could lead in the research and advancement of the models that are being
used and look at evidence-based models that are out there and really pull the community together…” Finally, as Dr. De Vries notes, UNC has the infrastructure to develop or employ a good technology platform for telepsychiatry.

One way this study explored UNC involvement in telepsychiatry is through the potential expansion of services from the UNC Women’s Mood Disorder Clinic to distant communities such as Siler City Community Health Center using telepsychiatry. Key informants who provided their views regarding this option agreed that it would provide patients with access to expert care from a reputable medical center, to which they would not otherwise have access. Telepsychiatry as a consultation model would also support and empower providers to address their patient’s mental health needs, “Using telemedicine as a consultation service for perinatal psychiatry will go a long way in ensuring front-line providers that they have a resource, an adequate, reliable resource, so that they will begin to feel more comfortable in asking the [screening] questions [about mental health],” Chris Raines explains.

Dr. Kimmel highlighted two barriers with expanding services from the UNC Women’s Mood Disorder Clinic. First, providers at UNC are busy with academic, research, and clinical care obligations. Adding on telepsychiatry as another responsibility for providers may compromise their time and effort in other areas of responsibility. The second issue is a particular program’s the degree of reach and how that translates into hours and level of commitment. Finally, Dr. Stiles summarizes the challenges from a broad system level, encompassing many of the themes presented thus far, “…assuming providers have capacity to do it, number one, that we have technology available that will allow them to do it at a reasonable cost and within the legal structures we have to deliver in, and thirdly that they will be able to recoup the expenses that
they are incurring about providing that care, there should be no reason that, that could not be
done and it would be extremely beneficial.”

**Telepsychiatry Training Curriculum and Workforce Capacity**

Of the eleven key informants I interviewed, seven provided responses to the question
about establishing a training curriculum for telepsychiatry and whether this would address the
telepsychiatry workforce capacity. Table 8 presents barriers and facilitators to establishing this
program. First, Dr. Saeed and Dr. Kimmel noted that a clear need for developing such a training
curriculum exists. Next, several key informants noted that learning telepsychiatry is learning to
use a new clinical tool, it is not learning a new form of medicine, which would facilitate
incorporating this method of learning into their training. Dr. Kimmel also highlighted the
realities of technology being a part of patients’ lives and pointed out that providers have the
opportunity to explore how to incorporate that into their patients’ care. Another element that
would facilitate incorporating telepsychiatry in resident training, according to Dr. Kimmel, is
that it would give residents the opportunity to be exposed to and learn from a wider variety of
patients from primary care and rural settings.

On the other hand, a barrier to implementing a telepsychiatry training curriculum is
misconceptions about technology. Dr. Stiles remarks, “We are far beyond the point where you
have to be some sort of techy computer person to be able to do telemedicine and yet much of the
medical world still views it that way.” Designing and developing the curriculum presents
another multi-component barrier. One challenge, according to Mr. Clendenin, is engaging
enough experts to develop the curriculum and include key competencies for residents to learn.
Another challenge Dr. Saeed raised, is finding participating sites to host the telepsychiatry
programs. The last challenge in curriculum development is deciding whether to make this an
option or a requirement. If it is a requirement, according to Dr. Kimmel, one would need to decide whether removing something else from the residents’ training is necessary to incorporate the telepsychiatry training curriculum. In addition, learning to deliver care via teleconferencing is not a requirement from the Accreditation Council for Graduate Medical Education (ACGME), as Dr. Saeed noted, thus limiting the number of programs that would consider implementing this into their training. Finally, liability is a barrier. Mr. Clendenin raised a concern about residents not being physically present with the patient (as is currently required of most care delivered by residents) and issues that may arise as a result of that.

At this time we are unable to determine whether a telepsychiatry training curriculum will address the workforce capacity issue and increase the number of willing psychiatrists to deliver care via videoconferencing. Dr. Saeed responds, “Well, it’s an empirical question. So I mean, probably the most accurate answer would be we don’t know because we haven’t done that.” Yet, a telepsychiatry training curriculum would expose medical students and doctors to this interface to develop their comfort level with it early on. According to Dr. Saeed, if students and residents are not exposed to using this method of delivering care in their training years, they are less likely to use it once they enter the workforce. Thus, because telepsychiatry can bring mental health care to areas that lack access, and a training curriculum has the potential to engage a greater number of young physicians in using this technology, it has the potential to address the workforce shortage issue.

Yet, the current reimbursement policy remains the main limitation. Dr. Stiles explains, “…it still comes down to the question whether or not you can, basically in the continued fee-for-service world, pay for this [telepsychiatry]. And if not, whether or not you can arrange a contract that will support the time that is necessary. So, otherwise, people are going to be driven to the
face-to-face work.” If billing could be worked out, according to Dr. Kimmel, it would be transitioning patient appointments from face-to-face at the hospital to telepsychiatry so patients no longer have to make the drive.

Finally, whether a telepsychiatry training curriculum can address the workforce capacity issue will depend on the scope and reach of the program that telepsychiatrists are serving. The scope will depend not only on the number of clinics and patient volume being served but also on the type model that is used for the program. Mr. Clendenin said, “And then I think the other consideration is to think about how much the time would need to be devoted by the psychiatrist themselves versus a collaborative care model…” As described in the background section of this paper, resource intensity and involvement by the psychiatrists varies by model type. A more consultative approach rather than direct care model would lessen the problem of providers’ time constraints. Yet, reimbursement for consultant models remains a challenge.

**Discussion**

In general, providers and administrators in this study regarded telepsychiatry positively and highlighted its many benefits. Telepsychiatry not only brings care to remote or underserved communities and addresses the workforce shortage in these areas, but it also has the potential to provide access to evidence-based care that is also culturally and linguistically appropriate. In addition, telepsychiatry not only delivers various forms of treatment but it also allows for a multi-disciplinary, integrative approach to care. While a learning and comfort curve may exist for both patients and providers, telepsychiatry has high patient acceptability. Despite the positive aspects of telepsychiatry, key informants hold a generally negative view about the cost of network creation and maintenance and reimbursement associated with telepsychiatry.
addition, a virtual encounter is not the same as a face-to-face encounter, and respondents expressed the need to still have in-person interaction in the patient’s care.

The goal of this project was to explore the elements that would facilitate or impede collaboration among UNC Medical Center, Piedmont Health Services, and Chatham Health Department to establish a telepsychiatry program for perinatal depression. As already noted, providers and administrators favor this method of delivery despite its significant challenges. Respondents are positively predisposed to this opportunity for care delivery. Next, I turn to the elements required to establish a telepsychiatry program. Because themes in barriers and opportunities overlapped, I synthesize these findings into 5 domains for telepsychiatry program implementation: technical and administrative, financial, legal, collaborative, and cultural (Figure 2).

**Technical and Administrative Domain**

The development of mobile technology and software has made setting up the required equipment and network connectivity for telemedicine much easier. In this era, Internet access is readily available in most places, although setting up a virtual connection would remain a greater challenge in remote areas that do not have access to the Internet.

Although it is much easier to set up the equipment, a physical location to hold the telepsychiatry sessions is still required even if using mobile technology. Participating sites must have the capacity to devote a room, either permanently or temporarily, to telepsychiatry communications. Although technology has become advanced, the virtual encounter is still not the same as the in-person encounter. Instances where the equipment malfunctions or is misaligned may affect delivery of care including compromising accurate clinical assessment and patient
satisfaction. Thus, having IT support is essential. A telepsychiatry program would not be able to successfully run without the necessary technological support.

Even with equipment that runs smoothly, the question about access to patient information remains a significant technical issue. In the era of the electronic health record (EHR) patient documentation is mostly electronic. However, EHR systems are generally unable to communicate with each other. Such barriers to patient documentation could further discourage providers from delivering care via telepsychiatry. In addition, if an organization provides telepsychiatry services to multiple sites, it needs to establish a sound referral and scheduling system.

**Financial Domain**

Two elements in the financial domain facilitate or impede establishment of a telepsychiatry program: cost of equipment/infrastructure and provider reimbursement for telepsychiatry services. As noted above, because of advances in technology and software, less expensive options for establishing a virtual connection exists. Organizations no longer have to invest on expensive equipment and T1 lines when tablets and software can provide a secure connection. Although equipment is less costly, it is not free. Depending on the reach of a telepsychiatry program and how many sites will use the services, the cost of equipment can add up. Although third-party payers cover a facility fee, they do not cover the cost of equipment or network. This expense must be borne either by the receiving or delivering entity. In order to facilitate purchasing equipment, grants from trusts/foundations such as The Duke Endowment and Kate B. Raynolds Charitable Trust can cover these costs, as well as additional costs in physician reimbursement. The challenge remains in acquiring these grants.
Next, physician reimbursement is perhaps the most prominent barrier to establishing a telepsychiatry program. Although an increasing number of third-party payers are covering telepsychiatry services, payment rates are lower than for face-to-face care, thus limiting the financial feasibility of providing this service. Hilty et al. highlight the challenges associated with physician reimbursement to sustain a telepsychiatry program. In North Carolina, Medicaid does reimburse for telepsychiatry. However, the Medicaid system as a Managed Care Organizations may have its own administrative and financial challenges.

Furthermore, in the current fee-for-service system, reimbursing providers in a collaborative or integrative type of model is challenging. As noted in the background and significance section, collaborative and integrative models are less resource-intensive and require less time commitment on the side of the provider, making these options more financially feasible. However, if reimbursement for these models is a challenge, then we are limited in our ability to employ them.

The last element of financial feasibility is estimating reach of the program and potential for revenue based on numbers reached. Simply speaking, under the current fee-for-service reimbursement policy, the more patients a telepsychiatrists sees, the greater the revenue. However, two issues emerge. First, if the patient load is low, cumulative reimbursement will not be robust. Second, if a high Medicaid and uninsured population is served, as in the case of PHS and the Health Department, revenue will be even lower. Although mental health emerged as a health need in Chatham County’s Community Health Needs Assessment, several key informants suggested that the next step would be to ask patients if they would be willing to have this type of service. This will address the numbers issue, but if the population is mostly uninsured, an
alterative means of reimbursement is required. Grants could finance the deficit to help the telepsychiatry program.

**Legal Domain**

Two issues emerged in the legal realm. First, the Stark Law prohibits institutions such as UNC from giving equipment to telemedicine receiving sites free of charge. For low-resource settings such as Siler City Community Health Center, receiving equipment free of cost would be incredibly beneficial. The alternative is to use grant funds for the receiving site to obtain the equipment. As I will describe below, collaboration between UNC Medical Center and PHS could facilitate acquiring such grants.

The second issue deals with credentialing and licensing. A psychiatrist who wishes to deliver care across state lines must be licensed in the receiving state. Thus, using state psychiatric services such as from UNC Health Care to other North Carolina communities would help circumvent this issue. The challenge that remains is workforce capacity. Providers at an academic center have multiple responsibilities such that they may not have the time to engage in offering telepsychiatry services. Even if they do have the time, if the patient volume is limited, it may still not be financially feasible or appealing.

**Collaborative Domain**

This study explored the current partnerships that exist among UNC Medical Center, PHS, and the Chatham County Health Department as part of assessing how these institutions could collaborate to establish a telepsychiatry program. UNC Medical Center and PHS have had a long-standing relationship and collaborate both on academics and patient care. As an affiliate hospital of UNC Health Care System, Chatham Hospital and therefore the Health Department, also collaborate closely with UNC. In turn, the Health Department and PHS collaborate to
improve patient care by maximizing use of resources. These three entities are already connected and key informants representing each viewed telepsychiatry favorably.

Given the difficulty of financing a telepsychiatry program, this study explored collaboration as a way to finance telepsychiatry programs. First, collaboration allows interested organizations to achieve a common mission while sharing funding, pooling resources, and eliminating waste to cut down costs. In addition, collaboration between academic and community institutions facilitates application and receipt of different grants such as from The Duke Endowment.

Collaboration between institutions also provides for the opportunity to reduce provider burden while providing services to the greatest number of people. One way to achieve this is through a consultation model rather than a referral model. Psychiatric Curbside Consultation and the Psychiatric Consultation-Liaison models, as Fortney et al. described, reduce burden of additional responsibilities for providers already involved in other areas of patient care such as research, as is the case at UNC. Furthermore, as Dr. Stiles pointed out, contracting from a separate entity is more financially feasible than employing providers from UNC in the current reimbursement environment.

UNC Health Care’s involvement in the collaboration to establish a telepsychiatry program has several advantages. First, as an academic center, UNC has the resources and infrastructure that other community health centers may lack to help meet a defined need. In addition, UNC is a reputable institution with expertise in many areas. Specifically, providers from the UNC Women’s Mood Disorder Clinic are experts in caring for perinatal mood disorders and they have the potential to share that expertise and empower other providers by participating in telepsychiatry.
Finally, collaboration assumes the capacity to not only share financial resources but also to share human resources. To address the issue of workforce capacity, this study explored the possibility of incorporating a telepsychiatry training curriculum for residents in order to have enough workforce to provide telepsychiatry services from UNC. Although establishing the curriculum itself is filled with logistical challenges, incorporating this training curriculum would allow residents to learn a new tool to deliver psychiatric care to patients in distant communities, which could enhance their training. In a systematic review, Sunderji et al. 51 proposed that competencies in a telepsychiatry training curriculum should be technical, collaborative/interprofessional and administrative. The potential benefit of incorporating this training curriculum is that graduating residents will be more willing to use telepsychiatry in their work, thus addressing the mental health shortage more generally. However, the realities of the current reimbursement system remain, making it less appealing to provide this type of service.

Cultural Domain

Even if the willingness to collaborate is present, organizations may still be challenged with meeting patient’s needs because of language barriers. Two thirds of patients at Siler City Community Health Center prefer Spanish as their language. As a result, finding bilingual and culturally appropriate mental health care, especially perinatal mental health care, remains a challenge that we could overcome with telepsychiatry only if we provide bilingual services. The Women’s Mood Disorder Clinic is able to provide its services with a phone interpreter, but two means of technology, videoconferencing and telephone translation, may pose a larger barrier to establishing rapport between patient and provider. Mucic 52 found that patients had high levels of satisfaction and preferred telepsychiatry in their native language to having an interpreter assist in their care.
Key informants spoke of El Futuro as currently the mental health provider for Spanish-speaking patients. We would need to explore if and how El Futuro could become a partner in providing mental health services at Siler City Community Health Center. This organization is under contract with CCNC to provide telepsychiatry to its sites. We would also need to weigh the pros and cons of providing expert perinatal mental health care via a translator or providing bicultural and bilingual mental health care without the expertise in perinatal mental health. This issue may not be generalizable to implementing a telepsychiatry program for general mental health in rural settings with no Spanish-speaking populations.

Limitations

This study has several limitations. First, I did not interview stakeholders in important entities such as Cardinal Innovations, El Futuro, the Department of Social Services, and many other providers and administrations whom key informants recommended I contact. Therefore, I can only draw conclusions from the informants with whom I did speak. However, the key informants I interviewed have extensive expertise in their field and their responses reflected findings in the literature. Another limitation is that of completeness of interviews: key informant’s varying time availabilities and area of focus meant I chose which questions to ask in the time I was allotted for any given interview. As a result, I may have missed important information not reflected in the results. Finally, even though I followed a standard protocol and question script, variability in asking the questions is inevitable in a conversational setting, and thus I may have obtained slightly different information from the respondents than if they had heard the question a different way or had been asked by a different person.
Sustainability

The issue of sustainability emerged during this study and merits attention. An important step in program planning and evaluation, under which establishing a telepsychiatry program would fall, is to think about sustainability from the start. Even if a telepsychiatry program can be successfully established through collaboration among willing parties, sustainability remains a challenge. Sustainability rests on finding a way for telepsychiatry to finance itself. Based on this study’s findings, that is hard to do.

Conclusion

Telepsychiatry is an effective way to provide mental health care to patients in rural areas while achieving therapeutic outcomes and patient satisfaction comparable to those of face-to-face treatment. UNC Health Care is already actively participating in bringing access to mental health services through telepsychiatry both in the ED setting and in the perinatal setting. A willing and existing partnership among UNC, Piedmont Health Services, and the Chatham County Health Department already exists. Once issues such as financial feasibility, legal implications, workforce capacity, and language requirements are addressed to ensure implementation and sustainability, a telepsychiatry program for perinatal depression at Siler City Community Health Center could be established. Patients will then have access to mental health services for a condition that is common and harmful to both mother and infant.
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## Tables

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| **Patient Perception and Acceptability** | **Acceptability:** telepsychiatry has high patient acceptability and in some cases may be more acceptable than face-to-face interaction |
|                                         | **Patient comfort:** patients may feel more comfortable and relaxed by being in familiar surrounding where telepsychiatry is housed |
|                                         | **Stigma:** telepsychiatry can reduce stigma if patients receives mental health care at their regular provider setting |
| **Discomfort:**                        | patients may initially feel uncomfortable with equipment or may misunderstand the technology and thus feel uncomfortable with a virtual encounter |

| **Provider Perception and Acceptability** | **Comfort:** providers feel more comfortable from receiving support from experts in the field via telepsychiatry |
|                                         | **Discomfort:** providers may not be comfortable with the technology or may feel they are not adequately trained |
|                                         | **Perception:** providers may think patients are not going to like telepsychiatry |
|                                         | **Rapport:** providers may have concern over the ability to build rapport and express sympathy with patients via telepsychiatry, especially because it is not the same as face-to-face |

<p>| <strong>Collaboration</strong> | <strong>Multi-provider approach:</strong> opportunity for multi-provider approach by incorporating social workers and advanced nurse practitioners into the patient’s care |
|                   | <strong>Integrative care model:</strong> physicians from the community may hold case conferences with providers at UNC for consultation on specific issues |
| Table 2. Barriers and Opportunities for Successful Telemedicine/Telepsychiatry Program Implementation |
|--------------------------------------------------|---------------------------------|-------------------------------|------------------|
| <strong>Provider Engagement</strong>                          | <strong>Opportunities</strong>               | <strong>Barriers</strong>                  |
| Provider engagement                              | Revenue from facility fee       | Providers to house telemedicine |
|                                                  | Experienced providers           | Providers to provide telemedicine |
| <strong>Infrastructure</strong>                               | Internet access readily available | Internet connectivity         |
|                                                  | Software and mobile application alternatives | Room space |
|                                                  |                                  | Required IT support           |
|                                                  |                                  | Patient information access    |
|                                                  |                                  | Referral and scheduling system|
| <strong>Cost</strong>                                         | Affordable equipment            |                               |
|                                                  | Software and mobile application alternatives |                               |
| <strong>Reimbursement</strong>                                | Third-party reimbursement       | No universal third-party reimbursement |
|                                                  | Provider contracts              | Lower reimbursement rate      |
| <strong>Legalities</strong>                                    | Provider reimbursement          |                               |
|                                                  | Stark Law                       |                               |
|                                                  | Licensing and credentialing     |                               |
| <strong>Other</strong>                                        | Availability of medical/nursing assistant and higher level provider on receiving end |                               |
|                                                  | Local face-to-face interaction  |                               |
|                                                  | User-friendly connection protocol |                               |</p>
<table>
<thead>
<tr>
<th>Provider Payment</th>
<th>Equipment Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Third-party payers</strong></td>
<td><strong>Grants</strong></td>
</tr>
<tr>
<td>Private Insurance</td>
<td>The Duke Endowment</td>
</tr>
<tr>
<td>Medicaid/MCO</td>
<td>Kate B. Reynolds Foundation</td>
</tr>
<tr>
<td>Medicare</td>
<td>The Government/Legislation</td>
</tr>
<tr>
<td><strong>Direct patient payment</strong></td>
<td><strong>The Hospital System</strong></td>
</tr>
<tr>
<td>Full payment</td>
<td></td>
</tr>
<tr>
<td>Sliding scale</td>
<td></td>
</tr>
<tr>
<td><strong>Trusts and Foundations</strong></td>
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<tr>
<td>The Duke Endowment</td>
<td></td>
</tr>
<tr>
<td>Kate B. Reynolds Foundation</td>
<td></td>
</tr>
</tbody>
</table>
### Table 4. Barriers and Facilitators to Collaboration as a Way to Finance Telepsychiatry Programs

<table>
<thead>
<tr>
<th>Facilitators</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achieving a common mission</td>
<td>Limited provider reimbursement</td>
</tr>
<tr>
<td>Pooling resources to cut down costs</td>
<td>Inability to meet language needs</td>
</tr>
<tr>
<td>Eliminating waste and redistributing resources</td>
<td></td>
</tr>
<tr>
<td>Improves funding opportunities</td>
<td></td>
</tr>
<tr>
<td>Reducing provider burden</td>
<td></td>
</tr>
<tr>
<td>Increasing spread of service delivery</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Barriers and Opportunities in Current Reimbursement of Telepsychiatry Programs

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid reimburses at a better <em>predictable</em> rate than private insurance</td>
<td>Provider reimbursement does not cover equipment costs</td>
</tr>
<tr>
<td>Third-party payers cover facility fee</td>
<td>Third-party payers reimburse telepsychiatry at a lower rate than face-to-face care</td>
</tr>
<tr>
<td></td>
<td>Medicaid places administrative burden on private practitioners</td>
</tr>
<tr>
<td></td>
<td>Limited reimbursement for providing services to uninsured and underinsured patients</td>
</tr>
<tr>
<td></td>
<td>Fee-for-service system is not optimal for integrative care models</td>
</tr>
<tr>
<td></td>
<td>Funding a local staff person at the receiving site is difficult</td>
</tr>
<tr>
<td>Facilitators</td>
<td>Barriers</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>-----------------------------------------------------------</td>
</tr>
<tr>
<td>Establishing expectations with patients</td>
<td>Patients acknowledging the need for mental health services and comfort with telepsychiatry</td>
</tr>
<tr>
<td>Incorporating mental health service into regular care</td>
<td>Stigma around mental health</td>
</tr>
<tr>
<td>Decreasing burden on patient</td>
<td></td>
</tr>
<tr>
<td>Opportunity to improve care</td>
<td></td>
</tr>
<tr>
<td>UNC Involvement</td>
<td>Benefits</td>
</tr>
<tr>
<td>-----------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Meeting a unmet need</td>
</tr>
<tr>
<td></td>
<td>Knowledge of local resources</td>
</tr>
<tr>
<td></td>
<td>Potential to serve as telemedicine hub</td>
</tr>
<tr>
<td></td>
<td>Existing infrastructure</td>
</tr>
<tr>
<td>Expansion of Women’s Mood Disorder Clinic</td>
<td>Access to expert care from a reputable medical center</td>
</tr>
<tr>
<td></td>
<td>Provider support and empowerment</td>
</tr>
<tr>
<td><strong>Facilitators</strong></td>
<td><strong>Barriers</strong></td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>An existing need for it</td>
<td>Misconceptions about technology</td>
</tr>
<tr>
<td>Involves learning a new tool, not learning new clinical information</td>
<td>Logistics of curriculum development</td>
</tr>
<tr>
<td>Involves learning a new tool, not learning new clinical information</td>
<td>Expert involvement</td>
</tr>
<tr>
<td>Involves learning a new tool, not learning new clinical information</td>
<td>Site participation</td>
</tr>
<tr>
<td>Involves learning a new tool, not learning new clinical information</td>
<td>Balancing other resident requirements</td>
</tr>
<tr>
<td>Incorporates technology into patient care</td>
<td>No current ACGME requirement for telemedicine training</td>
</tr>
<tr>
<td>Enhances residents’ experience working with patients in primary care or rural settings</td>
<td>Liability</td>
</tr>
<tr>
<td>Improves willingness to use technology and addresses physician shortage</td>
<td>Reimbursement limitations</td>
</tr>
<tr>
<td>Reach and coverage</td>
<td></td>
</tr>
</tbody>
</table>
Current partnerships among UNC Medical Center, Chatham County Health Department, and Piedmont Health Services.

Solid arrow = reciprocal relationship
Dotted arrow = relationship involving a mediator
Dotted line = moderator of a relationship
Domains in implementing a telepsychiatry program: technical and administrative, financial, legal, collaborative, and cultural
Appendix A: Limited Systematic Review

Telepsychiatry Program Implementation in Outpatient Rural Settings: A Limited Systematic Review

In the United States, about 1 in 4 adults suffer from mental health conditions ranging from mild to severe. Depression is one of the most common mental health illnesses with 1 in 20 people ages 12 and older currently reporting depression. To address the need for mental wellness, HealthyPeople 2020 has called our nation to “improve mental health through prevention and by ensuring access to appropriate, quality mental health services.” Although mental health and mental disorders have been a top priority for rural health practitioners for several years, rural communities face a significant challenge in ensuring access to mental health services due to limited accessibility, availability, and acceptability of these services.

Rural areas in the United States have faced a widespread unmet need of mental health providers, especially of those with prescription abilities (e.g psychiatrists). With advances in communications technology over the past few decades, telemedicine offers a solution to improving access to various types of health care while still promoting patient-centeredness. Telemedicine uses electronic communication such as two-way video (teleconferencing), smartphones, wireless tools, and other forms of telecommunications technology to exchange medical information between distant sites to improve a patient’s clinical health status.

Telepsychiatry, a form of telemedicine that includes the delivery of psychotherapy and pharmacotherapy services, offers a solution to providing psychiatric care to remote communities that lack mental health care providers. Telepsychiatry service models range from independent psychiatric referral services, to collaboration with the primary care provider team, to consultation for the primary care physician. Studies have revealed that telepsychiatry is as effective as the face-to-face clinical encounter and yields similar patient outcomes. Furthermore, patients are open to and satisfied with telemedicine as a form of receiving mental health care.

While several studies have looked at the effectiveness of telepsychiatry compared to the in-person interview in rural areas for specific populations such as veterans or specific conditions such as substance abuse, no systematic review has focused on program implementation in outpatient rural settings. With the shortage of mental health providers in rural
areas and the promise that telepsychiatry can address those shortages, it is imperative to study the experiences of academic and community health institutions in establishing telepsychiatry programs in order to best meet patients’ health care needs. Therefore, this limited systematic review seeks to identify lessons authors have learned on implementing telepsychiatry programs at rural outpatient settings in the U.S.

Methods

I developed and followed a standard systematic review protocol. This limited systematic review explores variables authors have identified that either impede or facilitate establishing telepsychiatry programs in rural outpatient clinics in the U.S.

Information Sources and Search

I searched PubMed and PsycINFO for journal articles limited to English language. No start or end dates were selected in order to obtain a varied sample of telepsychiatry program implementation reports. I did not contact study authors to identify additional studies but instead used article references as a source of additional articles not captured in the formal search. In addition, I did not search clinicaltrials.gov to look for unpublished studies and results because this topic looked at themes in program implementation and not at comparisons of clinical interventions. I used keywords and database-specific search terms describing intervention and setting. Keywords included telepsychiatry, telemental, videoconferencing, e-health, psychiatric, depression, rural, and community. Appendix A Table 1 contains the formal search strategy for both databases and date last searched.

Study Selection

I developed inclusion and exclusion criteria according to population, intervention, comparator, outcomes, timing, setting, and study design. Appendix A Table 2 provides a summary of inclusion and exclusion criteria. I included randomized controlled trials, nonrandomized trials, case reports, program reports, and program evaluation reports presenting lessons that rural outpatient clinics in the U.S. learned from implementing telepsychiatry services for patients. I excluded articles that focused solely on patient satisfaction with telepsychiatry, as this is a variable of patient care and not program implementation. This systematic review does not focus on human subjects but rather on institutions as the population. Further, the focus is on videoconferencing telepsychiatry as it is the closest to face-to-face encounters because of the availability of multisensory (auditory and visual) output. I limited the study timing to at least
six months of program implementation.

I first reviewed article titles and then abstracts to determine possible study inclusion. During the initial two steps, I erred on the side of inclusion. If articles did not include an abstract, I marked them as included until the full text review. As the third step, I reviewed the full text of marked articles to determine final inclusion or exclusion.

**Data Extraction and Quality Assessment**

Using a structured form, I extracted information about the institutions in charge of implementing the telepsychiatry program, the program’s setting and location, number of sites receiving telepsychiatry, telepsychiatry model and population served (adult, child, both, other, or not specified), type of provider, program duration and study design. I also extracted information about different contextual variables and lessons learned. I performed all data extraction and no other investigators were involved in reviewing for completeness and accuracy.

I assessed the study quality (i.e. internal validity) at the study rather than at the outcome level using a set of predefined criteria adapted from guidelines for appraising qualitative studies. Quality assessment included clarity of study aim, whether data collection was anecdotal and/or empirical, extent to which contextual variables are organized into domains, extent and adequacy of description of lessons learned including whether selective reporting exists, explicit or implicit discussion of the study’s generalizability, and adequacy of the conclusion. I also developed predefined criteria for rating a study as very good, good, fair, or poor to maintain consistency in rating the studies (Appendix A Table 3). Given the probability of successful programs being reported more often than unsuccessful programs, I looked for program success variability to assess risk of bias across studies.

**Data Synthesis and Analysis**

I organized lessons learned for each study as a barrier or facilitator according to the following domains: organizational capacity, equipment/network infrastructure, cost, and other. I looked for patterns or themes that emerged from each study. My summary measure was qualitative and descriptive in nature; I presented in a table a synthesis of common themes identified. Although a formal method for grading strength of evidence was not used, I defined strength of evidence based on the frequency of reported contextual variables. If a particular lesson learned was repeated across the greatest number of studies, then I considered strength of
evidence to be high. I used a step-down approach and defined strength of evidence as low for a particular theme if it was present in the least amount of studies compared to other themes.

**Results**

I included 12 articles reporting on 11 telepsychiatry programs (Appendix A Figure 1). I initially identified 850 articles via database search and 33 via hand searches. Of the 103 full-text articles assessed for eligibility, I excluded 25 because the intervention did not meet the predefined criteria. I excluded several other studies that did not meet the specified study design or setting. I excluded 5 articles about telepsychiatry programs not in the U.S. Appendix A Table 4 presents a summary of the study quality appraisal. Internal validity ranged from “poor” to “very good”. I assessed risk of bias across studies by looking for program success variability across studies reflected in positive and negative outcomes, as well as the lessons learned that each study reported. All studies presented were successful in implementing the telepsychiatry program for at least the duration of the study although they did report on both barriers and facilitators to program implementation. One article presented on the financial unfeasibility of telepsychiatry. Since outcomes were positive and negative, the risk of bias across studies is moderate to low. It is possible, however, that this limited systematic review does not capture certain lessons learned from programs that have not been successful in launching telepsychiatry because they have not published any reports.

I present study characteristics in Appendix A Table 5. Article dates range from 1996 to 2015. Around 64% of the studies (n = 7) had an academic center and a community center partnering to implement a telepsychiatry program. The remaining programs (n = 4) only had a community health organization leading the program. Programs location varies and includes the Southeast, Midwest, West, and Hawaii. Most studies specify how many sites were involved in their program although a few studies are not clear. The number of sites receiving telepsychiatry ranged from one to eight, with two sites being the most common. Of the eleven programs, four provided services to children alone. The remaining programs were for adults, both child and adult, or not specified. Telepsychiatry consultation models included direct service model (n = 4), consultation model (n = 4), and a combination of direct service and consultation (n = 3). Direct service refers to the psychiatrist seeing and providing clinical recommendations to the patient instead of the provider. Most providers were psychiatrist, with a couple that included advanced nurse practitioners. Program duration at the time the study was published ranged from six
months to six years. Of the twelve studies, ten were program reports, describing the development of the telepsychiatry program as well as lessons and outcomes. Two were program evaluation reports with specified performance measurements.

Appendix A Table 6 presents lessons learned from each individual study according to four domains: organizational capacity, equipment/network infrastructure, cost, and other. Since Neufeld et al. and Neufeld and Case present two articles on the same program, I combined the two articles into a single entry. For each study I present contextual variables as either barriers or facilitators under each domain. The most common facilitator under organizational capacity is to perform a community needs assessment before establishing a telepsychiatry program. Five studies report on this variable. In addition, stakeholder, physician, and administrative engagement are also common facilitators. Studies also reported that ensuring that providers and administrators have open communication, clear expectations, and appropriate comfort level facilitates establishing and maintaining a telepsychiatry program. The most common barriers to organizational capacity are lack of knowledge of existing policies and regulations, as well as difficulty orchestrating the involvement of different organization in establishing the program.

Next, few studies present lessons on equipment/network infrastructure. Instead, this domain overlaps with cost. For example, the availability of less expensive equipment and network connectivity removes financial barriers in establishing a telepsychiatry program. Another facilitator is ensuring the presence of IT support in case of video and connectivity issues, as well as providing training for practitioners to become comfortable with videoconferencing. Studies also mentioned the availability of grants as a facilitator to purchasing equipment. Two studies mention provider reimbursement as an issue. However, Neufeld and Case report greater reimbursement frequency with telepsychiatry compared to traditional service.

The “Other” domain contains variables related to effect and performance of each program. A few studies reported high patient satisfaction and improved access by eliminating travel time and decreasing wait time to see a psychiatrist. The major barrier to program performance is limited provider and patient use of the telepsychiatry program due to various reasons including stigma around mental health, inability to travel even to the telepsychiatry site, lack of knowledge about the program, lack of referral to the program by providers. Appendix A Table 7 presents a synthesis of the results as general themes and specific lessons with accompanying strength of evidence. In addition, the strength of bias was assessed based on the
frequency with which all studies reported a certain theme. Using this logic helps to assess how common or salient a theme is. Most themes have high or moderate strength of evidence with one having low and one having insufficient evidence.

Discussion

Great variability exists in the implementation of a telepsychiatry program. I grouped reported lessons learned from each study presented in this systematic review into four main domains: organizational capacity, equipment/network infrastructure, cost, and other. Prominent lessons in ensuring organizational capacity when establishing a telepsychiatry program include performing a community needs assessment, as well as engaging stakeholders, organizations, administrators and providers throughout the program implementation process. In addition, open communication and an effort to ensure providers and administrators are comfortable with the technology is important. Finally, one study raised the need to know and understand existing policies and regulations and for organizations to be willing to advocate for change if necessary. This lesson has a low strength of evidence because only one article explicitly mentioned it. However, all organizations likely need to understand current policies and regulations around implementing a telepsychiatry program. The recommendation to advocate for change, on the other hand, may be more difficult to follow and will depend on the political environment of the county or state where the telepsychiatry program is to be implemented.

Lessons in Equipment/Network Infrastructure and Cost often overlapped, but a few are specific to each domain. First, a lesson learned specifically regarding technology is the need for IT support and provider training to ensure physicians are fully supported and feel comfortable when engaging with telepsychiatry. Next, in terms of cost, only two studies mentioned provider reimbursement as an issue. However, literature reviews have reported provider reimbursement as a common issue in telepsychiatry. One study suggested that telepsychiatry offers greater opportunities for reimbursement because more patients use the service compared to traditional service. This lesson has insufficient evidence and it may not be generalizable to other programs, especially if these programs have difficulty in recruiting patients. Finally, Werner and Anderson in their 1998 article noted that implementing telepsychiatry is economically infeasible because network and equipment costs. However, since then, new technology has diminished, though not completely eliminated, cost as a barrier for purchasing equipment and implementing a telepsychiatry infrastructure.
Other lessons learned in implementing a telepsychiatry program consisted of the program’s performance and effect on the population it serves. First, very few studies reported high patient satisfaction, but as noted in the introduction, several studies have found that patients find telepsychiatry very satisfactory. In addition, studies found that telepsychiatry improves access to care because of decreased travel time or reduced wait time for an appointment. This finding is also consistent with findings from other studies. Finally, a significant barrier reported by several studies involved limited patient and provider use of the telepsychiatry program. Barriers such as stigma around mental health, patient’s lack of knowledge about the telepsychiatry program or inability to still travel to the telepsychiatry site either due to distance or poor health, and low provider referral had a negative effect on patient and provider use of this program. The stigma around using mental health services may prevent people from accessing care despite service availability. This last lesson relates to actual effect of a newly built program and its sustainability: “If we build it, will they come?” If a program is implemented in a way that does not render it sustainable, it will cease to exist. Often, challenges in sustainability include need and demand, infrastructure and workforce, funding and reimbursement, and organizational fit and alignment. In this case, a lack of patient and provider engagement into using services may translate in fewer patients seen and fewer opportunities for reimbursement, which would negatively affect a program’s viability.

This limited systematic review has several strengths. First, I followed the PRISMA guidelines for systematic reviews. I created a standard way to extract data and critically appraise the articles included in this study. Overall, the themes extracted are generalizable to other programs. Although the lessons learned came from specific programs and their context-specific experience, I found general commonalities in the different barriers and facilitators reported to distill them down to a few themes that can be applicable to most settings.

This study also has several limitations. Although I developed a pre-defined set of criteria using existing guidelines to assess quality of studies, the combination of these criteria has not been validated and is thus subjective. I also limited the systematic review to include only outpatient clinical settings, thus excluding other sites where telepsychiatry can be effective and is needed. For example, telepsychiatry has been successfully implemented at a rural women’s crisis center. As a non-clinical setting, this location may have unique barriers and facilitators to program implementation. This study does not capture these contextual factors and thus findings
cannot be generalized to non-clinical settings. Finally, I excluded studies where telepsychiatry was offered by therapists alone. This limits the generalizability of identified themes for those institutions that seek to employ a collaborative model with both psychiatrists and therapists such as clinical social workers and psychologists.

Telepsychiatry is an effective method of delivering care to rural communities. Although context-specific issues may arise when implementing a program, lessons learned by different programs serve to find common themes in potential challenges that all organizations may encounter. Establishing organizational capacity through a community needs assessment, key entity engagement and involvement, open communication, and knowledge of policies facilitates establishing a telepsychiatry program. In addition, providing network support and using alternative equipment methods to reduce infrastructure cost also facilitate implementing a program, although physician reimbursement remains an issue. While patient satisfaction may be high and telepsychiatry may increase access to mental health services, the question about whether patients and providers will use the services remains. By considering the lessons presented in this limited systematic review, organizations may be more quipped to establish their own program. The program’s ultimate success, however, will depend not only on where the program is implemented but also how the organization achieves its sustainability.

**Funding**

This review was not funded by any sources.
References


### Appendix A Table 1. Description of Search Strategy

<table>
<thead>
<tr>
<th>Source</th>
<th>Date</th>
<th>Search Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PsycInfo</strong></td>
<td>4/15/2016</td>
<td>(((TI Telemental) OR (AB Telemental)) OR telepsychiatry OR telepsych* OR (((TI teledem*) OR (AB teledem*)) OR ((TI telecare) OR (AB telecare)) OR (SU telemedicine) OR ((TI videoconferenc*) OR (AB videoconferenc*)) OR (SU teleconferencing) OR ((TI ehealth) OR (AB ehealth)) AND (depression OR depressive OR psychiatric OR psychiatry OR (SU psychiatry))) AND ((SU Health Care Services) OR ((TI rural) OR (AB rural)) OR (SU community mental health services) OR ((TI community) OR (AB community))))</td>
</tr>
<tr>
<td><strong>Appendix A Table 2. Eligibility Criteria</strong></td>
<td></td>
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<tr>
<td>---------------------------------------------</td>
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</tr>
<tr>
<td><strong>Criteria</strong></td>
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<tr>
<td><strong>Population(s)</strong></td>
<td></td>
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</tr>
<tr>
<td>Outpatient clinics: community health centers, federally qualified health centers (FQHCs), primary care clinics (can be private), or other safety net provider clinic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Academic centers in relation to collaboration with these outpatient clinics</td>
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<td></td>
</tr>
<tr>
<td><strong>Interventions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation of Telepsychiatry services; excluded if study uses existing videoconferencing services to test a psychiatric screening or assessment tool</td>
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<td></td>
</tr>
<tr>
<td>Included only real-time videoconferencing telepsychiatry; excluded all other forms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Included telepsychiatry as a direct or consultation service for patients, not as a training/education service for providers alone</td>
<td></td>
<td></td>
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<tr>
<td>Included telepsychiatry services provided by psychiatrists or nurse practitioners; excluded if only therapists/psychologists such as clinical social workers are providing services</td>
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<td></td>
</tr>
<tr>
<td><strong>Comparators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison to usual care, defined as no immediate access to mental health care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-post comparison of telepsychiatry program implementation</td>
<td></td>
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<tr>
<td>Comparison of telepsychiatry program establishment in one rural area vs. no program in a different rural area</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
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<td></td>
</tr>
<tr>
<td>Contextual variables in telepsychiatry program implementation feasibility; excluded if focused solely on patient satisfaction.</td>
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<tr>
<td><strong>Timing</strong></td>
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<td></td>
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<tr>
<td>Telepsychiatry service/program duration of at least 6 months</td>
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<tr>
<td><strong>Settings</strong></td>
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<td></td>
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<tr>
<td>Rural regions in the United States</td>
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<tr>
<td><strong>Study Designs</strong></td>
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</tr>
<tr>
<td>Included program reports, program evaluation reports, randomized controlled trials, nonrandomized trials; excluded any systematic or literature reviews</td>
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</tr>
<tr>
<td>No sample size limit</td>
<td></td>
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</tr>
</tbody>
</table>
# Appendix A Table 3. Study Quality Rating Criteria

<table>
<thead>
<tr>
<th>Quality</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very Good</strong></td>
<td>Specific study aim and goals defined; data collection is both anecdotal and empirical; contextual variables presented in various domains; full description of lessons learned with no selective reporting and related to study aim; explicit generalizability discussion; supported conclusion</td>
</tr>
<tr>
<td><strong>Good</strong></td>
<td>Specific study aim and goals defined; data collection anecdotal or empirical; contextual variables not organized into domains; full description of lessons learned with no selective reporting and related to study aim, explicit generalizability discussion; supported conclusion</td>
</tr>
<tr>
<td><strong>Fair</strong></td>
<td>Specific study aim and goals defined, data collection anecdotal or empirical, contextual variables not organized into domains; partial description of lessons learned with or without selective reporting and related to study aim; explicit or implicit generalizability discussion; conclusion is partially supported</td>
</tr>
<tr>
<td><strong>Poor</strong></td>
<td>Specific study aim and goals not defined; data collection anecdotal and vague; contextual variables not organized into domains; partial description of lessons with selective reporting; implicit generalizability discussion, conclusion is partially supported</td>
</tr>
</tbody>
</table>
### Appendix A Table 4. Quality Assessment of Studies Included in this Limited Systematic Review

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<thead>
<tr>
<th>Citation</th>
<th>Study aim and design: are goals of article clearly stated?</th>
<th>Data collection: anecdotal and/or empirical?</th>
<th>Data analysis: extent to which contextual variables are categorized: diversity of domains</th>
<th>Results: extent of description, is selective reporting of all positive or all negative lessons present? Are lessons related to the article’s goals?</th>
<th>Generalizability: explicit or implicit discussion of transferability of lessons learned</th>
<th>Conclusion: Are claims supported by study findings?</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Graham, 1996</strong></td>
<td>Study aim clearly stated: to examine the challenges and opportunities presented by telepsychiatry in a rural public mental health system</td>
<td>Both anecdotal and empirical</td>
<td>Detailed description of program; categorizes contextual variables into domains in results section</td>
<td>No selective reporting. Although authors focus on challenges, they present ways to address those challenges Lessons are related to article’s goals</td>
<td>Lessons learned highly generalizable and presented in that context</td>
<td>Claims supported by study findings</td>
<td>Very Good</td>
</tr>
<tr>
<td><strong>Helm et al., 2010</strong></td>
<td>Study aim clearly stated: to highlight lessons learned about forming university-community partnership</td>
<td>Both anecdotal and empirical</td>
<td>Presents variables as community engagement and start-up phase of program</td>
<td>No selective reporting; presents both positive and negative outcomes</td>
<td>Explicit generalizability: relates lessons learned to a greater context</td>
<td>Makes unsupported claim</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Jacob et al., 2012</strong></td>
<td>Study aim clearly stated: to describe how authors established a telepsychiatry practice in rural Georgia, discuss barriers encountered establishing such a practice and the process of coordinating care with PCPs, and present preliminary satisfaction data</td>
<td>Both empirical and anecdotal</td>
<td>Reports on different contextual variables but not organized into different domains</td>
<td>Lessons learned related to article’s goals with no selective reporting: describes both challenges and successes</td>
<td>Implicit transferability of lessons learned</td>
<td>Conclusion supported by findings</td>
<td>Good</td>
</tr>
<tr>
<td><strong>Lu et al., 2014</strong></td>
<td>Study aim defined but not explicitly related to lessons learned regarding telepsychiatry</td>
<td>Both anecdotal and empirical</td>
<td>Limited contextual variables; lessons earned not organized into domains</td>
<td>Minimal description of lessons learned in telepsychiatry; no selective reporting Lessons not related to article’s main goal</td>
<td>Implicit transferability of themes</td>
<td>Conclusion supported</td>
<td>Fair</td>
</tr>
<tr>
<td>Study Aim</td>
<td>Reporting</td>
<td>Hypotheses</td>
<td>Lessons</td>
<td>Transferability</td>
<td>Generalizability</td>
<td>Conclusion</td>
<td></td>
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<tr>
<td>Myers et al., 2010</td>
<td>Both anecdotal and empirical</td>
<td>Reports on different contextual variables and categorizes into four components for successful telepsychiatry program implementation</td>
<td>Lessons thoroughly described with no selective reporting. Lesson are not explicitly related to study goals</td>
<td>Explicit</td>
<td>Lessons learned supported by results and interpreted in the context of the organization</td>
<td>Fair</td>
<td></td>
</tr>
<tr>
<td>Neufeld et al., 2012</td>
<td>Both anecdotal and empirical</td>
<td>Reports on different variables and organizes data into four domains: access, quality, outcomes, and cost</td>
<td>Thorough description of lessons learned, only positive lessons reported. Results related to study aim</td>
<td>Explicit</td>
<td>Generalizability but limited</td>
<td>Claims are supported</td>
<td>Good</td>
</tr>
<tr>
<td>Neufeld and Case, 2013</td>
<td>Empirical</td>
<td>Refers to previous article</td>
<td>Thorough description of lessons learned, only positive lessons reported. Results related to study aim</td>
<td>States</td>
<td>Generalizability is difficult to determine without further study</td>
<td>Claims are supported</td>
<td>Good</td>
</tr>
<tr>
<td>Shore and Manson, 2005</td>
<td>Purely descriptive and anecdotal</td>
<td>Explores various contextual variables and organizes data into 6-stage model for implementing telepsychiatry</td>
<td>Four-stage model of program implementation and challenges thoroughly described with no selective reporting. Results related to article’s aim</td>
<td>Explicit</td>
<td>Generalizability may be applied to other rural communities</td>
<td>Claims supported by study findings and further research suggested</td>
<td>Very good</td>
</tr>
<tr>
<td>Sulzbacher et al., 2006</td>
<td>Purely descriptive and anecdotal</td>
<td>Various contextual variables explored and organized into domains</td>
<td>Lessons thoroughly described with no selective reporting.</td>
<td>No explicit</td>
<td>Generalization</td>
<td>Formal conclusion lacking</td>
<td>Fair</td>
</tr>
<tr>
<td>Toperczer, 2011</td>
<td>Purely descriptive and anecdotal</td>
<td>Limited contextual variables, not organized into domains</td>
<td>Lessons and experiences thoroughly described.</td>
<td>No explicit</td>
<td>Generalizability</td>
<td>No formal conclusion but overall comments supported by findings</td>
<td>Fair</td>
</tr>
<tr>
<td><strong>Ulzen et al., 2013</strong>&lt;sup&gt;49&lt;/sup&gt;</td>
<td>Aim clearly specified: to describe the partnership between a community-based rural mental clinic and an academic health center to provide telepsychiatry services in rural Alabama and discuss lessons learned</td>
<td>Purely descriptive and anecdotal</td>
<td>Explores various contextual variables and organized data into different domains including needs assessment, cost, administration, and policy</td>
<td>Thorough discussion of lessons with no selective reporting; discusses both successes and challenges, especially with leadership change at mental health partner organization halfway through program. Related to study aims</td>
<td>Explicit generalizability: project could be used as model for expansion into other rural primary care settings</td>
<td>Conclusion supported by findings and does not overestimate long-term effects</td>
<td>Very Good</td>
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</tr>
<tr>
<td><strong>Werner and Anderson, 1998</strong>&lt;sup&gt;50&lt;/sup&gt;</td>
<td>Aim clearly stated: to study the feasibility of implementing a telepsychiatry system and offer an analysis of economic issue and system problems encountered</td>
<td>Data collection both anecdotal and empirical</td>
<td>A few contextual variables explored organized into two domains: cost and collaboration.</td>
<td>Thorough description; reports only on negative outcomes. Results are related to article’s goals</td>
<td>Explicit generalizability: justifies use of telepsychiatry in unusual circumstances where money is not a barrier</td>
<td>Conclusion supported by findings</td>
<td>Good</td>
</tr>
<tr>
<td>Author</td>
<td>Program Institutions</td>
<td>Service Delivery Setting (Location)</td>
<td>Number of sites</td>
<td>Telepsychiatry model (population served)</td>
<td>Provider</td>
<td>Program Duration</td>
<td>Study Design</td>
</tr>
<tr>
<td>-----------------</td>
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</tr>
<tr>
<td>Graham, 1996</td>
<td>Southwestern Virginia Health Institute</td>
<td>Rural mental health centers (Rural sections of Appalachian southwester n Virginia)</td>
<td>2</td>
<td>Direct service/follow-up care (discharged hospital patients)</td>
<td>Psychiatrist</td>
<td>3 years</td>
<td>Program Report</td>
</tr>
<tr>
<td>Helm et al., 2010</td>
<td>Community Health Clinics on islands of Maui, Molokai, and Hawai’i</td>
<td>University of Hawai’i Department of Psychiatry’s University of Hawai’i Rural Health Collaboration</td>
<td>Unclear</td>
<td>Direct service and consultation-liaison models (Children, Adolescents, and Adults)</td>
<td>Psychiatrist</td>
<td>10 months</td>
<td>Program Report</td>
</tr>
<tr>
<td>Jacob et al., 2012</td>
<td>Georgia Partnership for Telehealth (GPT)</td>
<td>Emory University School of Medicine</td>
<td>Not specified</td>
<td>Consultation model (Children)</td>
<td>Psychiatrists</td>
<td>At least 1 year</td>
<td>Program Report</td>
</tr>
<tr>
<td>Lu et al., 2014</td>
<td>Oregon Mental Health Initiative</td>
<td>None</td>
<td>8</td>
<td>Direct service (Adult/Veteran)</td>
<td>Psychiatrists, Nurse Practitioners, Psychologist, and Social Workers</td>
<td>4 years</td>
<td>Program report</td>
</tr>
<tr>
<td>Myers et al., 2010</td>
<td>Seven partner sites in 4 Pacific Northwest states: Olympia, Wenatchee, Yakima, Longview, Aberdeen, Ketchikan, Naselle</td>
<td>Rural community-based outpatient clinics associated with regional VA hospitals (Oregon, Washington, Idaho)</td>
<td>7</td>
<td>Direct service and consultation models (Children)</td>
<td>Psychiatrists and Psychologist s</td>
<td>6 years</td>
<td>Program report</td>
</tr>
<tr>
<td>Neufeld et al., 2012</td>
<td>Indiana Rural Health Association (IRHA) in collaboration with several</td>
<td>Community mental health center: Otis R. Bowen Center for</td>
<td>2</td>
<td>Direct service (residents of Indiana)</td>
<td>Advance practice nurse</td>
<td>13 months</td>
<td>Program evaluation</td>
</tr>
<tr>
<td>Neufeld and</td>
<td>Indiana Rural Health Association (IRHA) in collaboration with several</td>
<td></td>
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</tr>
<tr>
<td>Study</td>
<td>Partner Organizations</td>
<td>Provider Locations</td>
<td>Program Duration</td>
<td>Model</td>
<td>Provider Type</td>
<td></td>
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<tr>
<td>Case, 2013</td>
<td>partner organizations</td>
<td>Human Services, Inc. (Indiana)</td>
<td></td>
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</tr>
<tr>
<td>Shore and Manson, 2005</td>
<td>The Department of Veterans Affairs, The Indian Health Services and local tribal health services</td>
<td>University of Colorado Health Sciences Center American Indian and Alaska Native Programs</td>
<td>3</td>
<td>Direct service and consultation models (Native American Adult Veterans)</td>
<td>Psychiatrists</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>University of Colorado Health Sciences Center American Indian and Alaska Native Programs</td>
<td>Local clinics (Northern Plains American Indian Communities in North Dakota, South Dakota, and Wyoming)</td>
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<tr>
<td>Sulzbacher et al., 2006</td>
<td>Children’s Hospital and Regional Medical Center (CHRMC)</td>
<td>University of Washington Medical Center</td>
<td>Not specified</td>
<td>Consultation model (children/peds)</td>
<td>Psychiatrists</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Local community health center or tribal health center (Five states of the Pacific Northwest: WA, WY, AK, MT, ID)</td>
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<tr>
<td>Toperczer, 2011</td>
<td>CarePartners of Georgia (a community-based behavioral healthcare provider)</td>
<td>None</td>
<td>2</td>
<td>Direct service model (children)</td>
<td>Psychologist s and Physicians</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Clinics in rural communities (rural Georgia)</td>
<td></td>
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</tr>
<tr>
<td>Ulzen et al., 2013</td>
<td>West Alabama Mental Health Center</td>
<td>The University of Alabama School of Medicine Tuscaloosa Campus</td>
<td>1</td>
<td>Consultation model (children/adults ) and provider/staff training/education</td>
<td>Psychiatrists and Family Medicine Physicians</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mental health center (rural Alabama)</td>
<td></td>
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</tr>
<tr>
<td>Werner and Anderson, 1998</td>
<td>Community mental health center (CMHC)</td>
<td>Michigan State University</td>
<td>1</td>
<td>Consultation model (does not specify patient population)</td>
<td>Psychiatrist</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mental health center (rural county in Michigan)</td>
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<tr>
<td>Study</td>
<td>Organizational Capacity</td>
<td>Equipment/Network Infrastructure</td>
<td>Cost</td>
<td>Other</td>
<td></td>
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<tr>
<td><strong>Barriers</strong></td>
<td></td>
<td><strong>Facilitators</strong></td>
<td><strong>Barriers</strong></td>
<td><strong>Facilitators</strong></td>
<td><strong>Barriers</strong></td>
<td><strong>Facilitators</strong></td>
<td><strong>Barriers</strong></td>
</tr>
<tr>
<td><strong>Graham, 1996</strong></td>
<td>Professional skepticism about whether telepsychiatry works</td>
<td>Nurse on patient’s side facilitates intervention</td>
<td>Patient safety</td>
<td>High equipment cost</td>
<td>Grants for hardware purchases</td>
<td>Questions over provider-patient relationship development</td>
<td>High patient satisfaction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Specialized network connection charges</td>
<td>Provider reimbursement</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Helm et al., 2010</strong></td>
<td>Community needs assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Limited patient participation in psychiatric care</td>
<td>Community engagement to obtain referrals</td>
</tr>
<tr>
<td></td>
<td>Key stakeholder engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Stigma surrounding mental illness and research</td>
<td></td>
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<tr>
<td></td>
<td>Awareness of cultural context and history</td>
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<tr>
<td></td>
<td>Integrated telepsychiatry model serves wider range of patients</td>
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<tr>
<td><strong>Jacob et al., 2012</strong></td>
<td>Needs assessment</td>
<td></td>
<td></td>
<td>Video and connectivit y issues</td>
<td>IT support</td>
<td>Limited referral by primary care providers</td>
<td>High patient satisfaction</td>
</tr>
<tr>
<td></td>
<td>Obtaining credentialing from referral sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lack of publicity about program</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Provider discomfort with understanding consultation model</td>
<td></td>
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<tr>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>High no show/cancellation rate (58%)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>Need to modify recommendations based on</td>
<td></td>
</tr>
<tr>
<td>Source</td>
<td>Access to Multidisciplinary Care Requires Involvement and Support from Medical, Technical, and Administrative Professionals</td>
<td>Available Resources</td>
<td>Telehealth Saved Patients 1,089,037 Miles of Travel in One Year</td>
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<tr>
<td>Lu et al., 2014</td>
<td></td>
<td>Variables such as distance from clinic, prohibitive medical conditions, and competing work schedules still kept patients from accessing services</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Myers et al., 2010</td>
<td>Interested Psychiatrists in Exploring New Ways to Reach the Underserved</td>
<td>Clearly Identified Stakeholders Who Can Collaborate with Each Other and Make Good Use of Telepsychiatry</td>
<td>An Advocate for Services in the Local Community</td>
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<tr>
<td></td>
<td></td>
<td>Stable Administration That Values Telepsychiatry for Patients and Primary Care Providers</td>
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</tr>
<tr>
<td>Neufeld et al., 2012</td>
<td>Use of Existing Network Connection</td>
<td>Grant Funds</td>
<td>Improved Access: Shorter Wait Time to First Appointment Compared to Traditional Service</td>
<td></td>
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</tr>
<tr>
<td>Neufeld and Case, 2013</td>
<td></td>
<td>Improved Reimbursement: Billable Time 20-30% Points Higher Compared to Traditional Service</td>
<td>Improved Quality: Follow-up Appointments Available Sooner</td>
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<td></td>
<td></td>
<td></td>
<td>Combination</td>
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</tbody>
</table>

**Table Notes:**
- Lu et al., 2014: Access to multidisciplinary care requires involvement and support from medical, technical, and administrative professionals.
- Myers et al., 2010: Interested psychiatrists in exploring new ways to reach the underserved.
- Neufeld et al., 2012: Use of existing network connection.
- Neufeld and Case, 2013: Improved access: shorter wait time to first appointment compared to traditional service.
- Improved quality: follow-up appointments available sooner.
<table>
<thead>
<tr>
<th>Shore and Manson, 2005</th>
<th>Resource constraints</th>
<th>Needs identification to identify target population</th>
<th>Infrastructure survey to assess existing technological, organizational, and programmatic infrastructure</th>
<th>Partnership organization to determine potential involvement and interaction of local organizations with telepsychiatry clinics</th>
<th>Structure configuration</th>
<th>Pilot implementation</th>
<th>Solidification</th>
<th>Local member to act as liaison to obtain local community support</th>
<th>E-mail updates facilitated ongoing communication and maintained clinics engaged</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coordinating and working with multiple organizational systems</td>
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<tr>
<td></td>
<td>Complying with bureaucratic rules and regulations</td>
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</tbody>
</table>

<p>| Sulzbach er et al., 2006 | Building telepsychiatry model on existing system of outreach clinics facilitated physician | Location of equipment to ensure privacy | Telehealth technician to provide | Lack of provider reimbursement | Periodic in-person meetings between telepsychiatrists and patient and provider |
| <strong>Toperczer, 2011</strong> | Engagement | Step-by-step tutorial to ensure provider comfort using videoconferencing technology and interface. Meetings with service providers to clarify roles expectations and responsibilities. Pilot case with telepsychiatrists and IT support available to ensure comfort. | Hands-on demonstrations of interface functions like controlling the distant camera, adjusting exposure, recognizing problems. | Opportunity for collaboration among families and providers. |
| <strong>Ulzen et al., 2013</strong> | Providing enough political advocacy to address existing policies, which may not support telemedicine. It is important to understand existing policies regarding reimbursement and advocate for changes, if necessary. | Community and academic needs assessment to find areas that overlap. Open and consistent communication to coordinate scheduling appointments, reimbursement issues, care, maintenance and running of equipment. Conducted. | Dedicated room for telemedicine. Provider reimbursement. | Grant funding and Medicaid/Medicare reimbursement. Use of grant funds to pay for dedicated staff person at local community site as well as consulting physicians and psychiatric fellows and continuing education for staff helped with. Prescription recommendations made to PCP not directly to patient. | Successful because no need for physical assessment. Decreased travel time to clinic. Eliminated 6+ month wait for initial assessment for children. |
| Werner and Anderson , 1998 | Time commitment of convening organizations such as academic, community, and private if relationship does not already exist | Community health needs assessment | Privacy, security, and legal and jurisdictional issues | The cost of equipment (installation, set up, maintenance, technical support, etc.) for the community mental health center is almost twice as much as for the university. Physician and social worker reimbursement | Accountability and capacity building for rural site |</p>
<table>
<thead>
<tr>
<th>Themes</th>
<th>Strength of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Organizational capacity</strong></td>
<td></td>
</tr>
<tr>
<td>Performing a community needs assessment before starting a telepsychiatry program</td>
<td>High</td>
</tr>
<tr>
<td>Stakeholder, organization, administrative, and provider recruitment and engagement</td>
<td>High</td>
</tr>
<tr>
<td>Open communication and effort to ensure provider and administrative comfort with technology</td>
<td>Moderate</td>
</tr>
<tr>
<td>Knowledge of existing policies and regulations and willingness to advocate for change, if necessary</td>
<td>Low</td>
</tr>
<tr>
<td><strong>2. Equipment/Network Infrastructure</strong></td>
<td></td>
</tr>
<tr>
<td>IT support and provider training</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>3. Cost</strong></td>
<td></td>
</tr>
<tr>
<td>New options in equipment and network infrastructure reduces cost of network</td>
<td>Moderate</td>
</tr>
<tr>
<td>Provider reimbursement is an issue</td>
<td>Low</td>
</tr>
<tr>
<td>Telepsychiatry allows for greater instances of reimbursement compared to traditional service</td>
<td>Insufficient</td>
</tr>
<tr>
<td><strong>4. Other</strong></td>
<td></td>
</tr>
<tr>
<td>High patient satisfaction</td>
<td>Moderate</td>
</tr>
<tr>
<td>Improved access to care because of decreased travel time or reduced wait time for appointment</td>
<td>Moderate</td>
</tr>
<tr>
<td>Limited use of telepsychiatry program use because of barriers such as stigma around mental health, lack of knowledge about program, inability to access telepsychiatry site, and low provider referral to telepsychiatry</td>
<td>High</td>
</tr>
</tbody>
</table>
Appendix A Figure 1. Summary of Evidence Search and Selection

Records identified through database searches (n = 850)
  PubMed: 442
  PsycINFO: 408

Records identified through other sources (n = 33)
  Hand searches of reference list: 33

Records screened (n = 649)

Duplicates removed (n = 234)

Full-text articles assessed for eligibility (n = 103)

Excluded (n = 546)
  Full-text articles excluded (n = 91)
    Wrong Population: 12
    Wrong Intervention: 25
    Wrong Outcome: 13
    Wrong Setting: 17
    Not Rural: 8
    Mixed Rural and Non-rural: 4
    Not U.S.: 5
    Wrong Study Design: 21
    Wrong Publication: 3

Programs included in qualitative synthesis (n = 11) [articles 12]
### Appendix B: Key Informants

#### Appendix B Table 1. List of Key Informants

<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abigail De Vries, MD</td>
<td>Medical Director, Piedmont Health Services</td>
</tr>
<tr>
<td>Alan Stiles, MD</td>
<td>Vice President for Network Development and Strategic Affiliations, UNC Health Care System</td>
</tr>
<tr>
<td>Andrew Clendenin, MSW</td>
<td>Director, Behavioral Health, Community Care of North Carolina</td>
</tr>
<tr>
<td>Christena (“Chris”) Raines, LNP</td>
<td>Perinatal Psychiatric Nurse Practitioner, UNC OB-GYN</td>
</tr>
<tr>
<td>David Stamilio, MD</td>
<td>Professor, Maternal and Fetal Medicine, UNC School of Medicine, Medical Director, UNC Hospital Prenatal Diagnosis, Medical Director, Obstetric Telemedicine</td>
</tr>
<tr>
<td>Helen Mikul, CNM</td>
<td>Midwife, Siler City Community Health Center, Piedmont Health Services</td>
</tr>
<tr>
<td>Warren (“Keith”) Stinson, RN</td>
<td>Nursing Director, Emergency Preparedness Coordinator, Emergency Department, Chatham Hospital</td>
</tr>
<tr>
<td>Mary Kimmel, MD</td>
<td>Assistant Professor, UNC Department of Psychiatry, Medical Director, Perinatal Psychiatry Inpatient Unit</td>
</tr>
<tr>
<td>Layton Long</td>
<td>Health Director, Chatham County Public Health Department</td>
</tr>
<tr>
<td>Sonia Echevarria</td>
<td>Lead Care Manager, Siler City Community Health Center, Piedmont Health Services</td>
</tr>
<tr>
<td>Sy Atezaz Saeed, MD</td>
<td>Professor and Chairman, Department of Psychiatry and Behavioral Medicine, Chief of Psychiatry, East Carolina Brody School of Medicine, Director, North Carolina Statewide Telepsychiatry Program (NC-SteP), Director, East Carolina University Center for Telepsychiatry and e-Behavioral Health</td>
</tr>
</tbody>
</table>
Appendix C: Structured Interview Protocol

Collaboration Between Academic and Community Institutions: Elements for Establishing a Telepsychiatry Program for Perinatal Depression in a Rural Setting

Tatiana Acosta
The University of North Carolina at Chapel Hill

Information Sheet

IRB Study # IRB 16-0759

Consent Form Version Date: April 6th, 2016

Principal Investigator: Tatiana Acosta
UNC-Chapel Hill Department: Public Health Leadership Program

Faculty Advisor: Sue Tolleson-Rinehart PhD
UNC-Chapel Hill Department: Assistant Chair for Faculty Development, Department of Pediatrics; Co-Associate Director, HC&P MPH, SPH; Adjunct Professor of Political Science

Advisor Phone #: (919) 843-9477
Advisor e-mail: suetr@unc.edu

Study Contact telephone number: (980) 253-7095
Study Contact email: tatiana@email.unc.edu

[Interview Script with Fact Sheet and Consent Form]

Hello, my name is Tatiana Acosta and I am a student in the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill. I am also a medical student at the East Carolina Brody School of Medicine between my third and fourth years. Thank you for taking your time to speak with me today.

As I mentioned in my first message to you, for my master’s degree, I am conducting research on the collaboration between academic and community institutions. Specifically, I am exploring how the Chatham County Health Department, Piedmont Health Services (PHS), and UNC Medical Center can collaborate to establish a telepsychiatry program for perinatal depression.
I am interested in learning your views on telepsychiatry, and the collaborations and partnerships that make these programs more able to improve access to mental health services for perinatal depression. My faculty advisor is Sue Tolleson-Rinehart, who is a faculty member in the UNC Department of Pediatrics in the School of Medicine as well as the School of Public Health.

I hope to publish the results of my research. I plan to devote my career to women’s health, and I want to become involved in promoting access to services for perinatal mental health problems. This project will serve as a starting point for my long-term career goals.

In this interview I will be asking several open-ended questions about your professional experience. I will only ask questions about your professional views and activities. The interview will last between 20 to 40 minutes depending on what you wish to tell me and how much time you can spare. I will be recording the interview with a digital recorder to make sure I have an accurate depiction of what is said during the interview. I will inform you when the recording is on and off, and you are welcome at any time during the interview to request to speak off record. If at any time before, during, or after our conversation you wish to end the interview early or withdrawal your responses altogether, I will honor your request and delete the recording. After our conversation I will transcribe the interview. I will be storing both the audio recording and the transcription on my password-protected computer and Dr. Tolleson-Rinehart will also keep copies on a secure server, just to preserve the integrity of the research.

Your participation is completely voluntary and you may refuse to participate or withdrawal from my research at any time. You can contact me at any time at atatiana@email.unc.edu or (980) 253-7095, or you can reach my faculty advisor Sue Tolleson-Rinehart at suet@unc.edu or (919) 843-9477.

This study has been granted an exemption by the Institutional Review Board at UNC and you can reach them at (919) 966-3113 or IRB_subjects@unc.edu.

[Consent]

I will now ask your permission to interview and record your response.

Do you wish to participate in the interview?

___ Yes       ___ No

Do you consent to be audio recorded during the interview? I will inform you when the audio recording begins and ends, and may you request to have the recorder stopped at any time during the interview.

___ Yes       ___ No

Because you are an expert in your field and your opinion is very valuable to advancing the field of access to mental health services, your name gives extra credibility to the research. Do you
consent to having your name included in the final results? If you choose to remain anonymous, you will only be identified in a way such as “a community physician” or “an expert in health policy”. Again, I plan to publish the results of my research in an academic journal in the future.

___ Yes  ___ No, I wish to remain anonymous

And do you consent to have direct quotes used along with your name?

___ Yes  ___ No

Finally, once my research is complete, would you be interested in a follow-up email from me with a description of my final results and analysis?

___ Yes  ___No

Participant Name_______________________ Date________________

Time: __________

[Interview Questions]

1. Telepsychiatry is talked about more and more as one way to address shortages in mental health services. I’d like to begin by asking your views, both positive and negative, of the use of telepsychiatry.

   [For those who are already engaged in any forms of telemedicine]: What insights has your experience in telemedicine given you about how telepsychiatry can work?

   (follow-up) Can you tell me what you’ve learned about implementing these programs? What made them successful or unsuccessful?
   [probe for both barriers and opportunities (systems perspective)]

2. Now I’d like to learn about your current partnership with other community or academic institutions. How do you collaborate with other institutions?

3. Next, I have a few questions about finances and collaboration:

   First, who do you think are likely to be the major funders of Telepsychiatry programs?

   How do you see collaboration as an opportunity to finance telepsychiatry programs?

   And what about physician reimbursement for telepsychiatry services? What kinds of barriers and opportunities do you see in current reimbursement policies?
4. Is there a place or need for UNC involvement in telepsychiatry services, or are others already doing all that can be done for now?

5. How receptive will patients be to a telemedicine program for perinatal mental health?

*(follow up)*: do you think that since it is a pregnancy service it would be more appealing?

6. In your opinion, how feasible would it be to expand services from the UNC Women’s Mood Disorder Clinic to distant communities using a telepsychiatry program?

7. Based on your experience training and hosting students, residents, and fellows, how easy or hard do you think it would be to create a telepsychiatry or telemedicine training curriculum for psychiatry residents and fellows?

*(follow-up)* Would a program like this provide enough workforce to sustain telepsychiatry programs?

8. I’m just about done! Are there other providers or administrators with whom I should be speaking who can give me other insights?

9. Thank you! Is there anything else you’d like to tell me?