**Healthcare Providers' and Deaf Patients' Perspectives
on Video Remote Interpreting: A Mixed Methods Study**

BY

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DISSERTATION

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This thesis is dedicated to my family who has kept my dream alive since my age of nine,
"I want to go to a university in America!"
Without them, it would never have been accomplished.
My dream has come true.

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Here, I would like to present my poem to you.

"Secret of Dandelion Seeds"

My dream is like a dandelion that finally blooms on a stone street.

Seeds of dandelion fell on earth.

When a seed fell on the icy road, it was too cold to settle down.

My dream was frozen.

When a seed fell on a dry road, it was too hot to settle down.

My dream was burned.

When a seed fell on a rocky road, it was too bumpy to settle down.

My dream was eaten by a bird.

When a seed fell on a side road, it was too risky to settle down.

My dream was crushed by a human's foot.

When the last seed fell on the soft road,

My dream finally grew and became blossoms.

My dream has not only one dandelion seed a piece.

My dream has now become hundreds of seeds.

They are full of my dream.

Now, give me a moment.

Watch them fly

One, two, three...

Catch them!

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LIST OF ABBREVIATIONS

ACA   Affordable Care Act

ADA   Americans with Disabilities Act

ASL   American Sign Language

DDHD   Department of Disability and Human Development

DHH   Deaf and Hard of Hearing

DRC   Disability Resource Center

HIPAA   Health Insurance Portability and Accountability Act

IRB   Institutional Review Board

LEP   Limited English Proficiency

PI   Principal Investigator

RHM   Rhetoric of Health and Medicine

SPSS   Statistical Package for the Social Sciences

UIHHSS   University of Illinois Hospital and Health Sciences System

VRI   Video Remote Interpreting

VRS   Video Relay Services

ABSTRACT

Many hospitals have popularized the use of Video Remote Interpreting (VRI), a technology that facilitates communication between healthcare providers and deaf/hard of hearing (DHH) patients in medical settings. The technology utilizes American Sign Language (ASL) interpreters by way of a computer or tablet with a webcam and Internet connection. While VRI provides prompt services for emergency care and is cheaper than in-person interpreting services, there have been several challenges with its use, such as poor connection, limited flexibility to maneuver, or small screen size, which makes it difficult to see ASL interpreters or DHH patients on the screen.

To improve VRI services, this study investigated the preferences and priorities of healthcare providers and DHH patients related to VRI and in-person interpreting. The study utilized a mixed methods approach. Data collection included a quantitative online survey for healthcare providers and DHH patients to learn about their preferences regarding VRI versus in-person interpreting, as well as qualitative in-depth interviews with healthcare providers and DHH patients.

Findings indicated that both healthcare providers and DHH patients prefer in-person interpreting for critical care to obtain effective communication, translation accuracy, trust-building, and better treatments. Despite their preferences, both groups often end up using VRI due to time demands, budget concerns, limited in-person interpreter availability, and constraints imposed by hospital administration systems.

Based on study findings, recommendations for not only improving VRI equipment, and improving healthcare communication with deaf patients include: training healthcare providers for cultural interaction; training hospital administrators and VRI companies to meet legal obligations; medical training for VRI interpreters; and training DHH patients and their families for understanding their rights.

I.   INTRODUCTION

Approximately 48 million individuals in the United States are estimated to have some hearing loss, which is the third most common physical health condition after arthritis and heart disease in the United States (Hearing Loss Association of America, 2018). Despite the high prevalence of hearing loss in this country, the reality of healthcare services for deaf/hard of hearing (DHH) patients is often poorly understood by healthcare providers (Harmer, 1999).

The Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1990 were enacted to provide legal protections for DHH patients' rights (ADA.gov, 2009). Yet, discrimination is common as healthcare providers often do not provide sign language interpreters (Reis, Breslin, Iezzoni, & Kirschner, 2004). The reasons vary: time constraints; little knowledge about the availability of professional interpreters; difficulties in arranging for interpreters; and high costs of interpreting services (Jacobs, Shepard, Suaya, & Stone, 2004).

In addition, most healthcare providers have limited understanding of the communication needs of DHH patients, and often make erroneous assumptions, such as DHH patients can lip-read, that written notes are an effective communication method, and that DHH patients have enough English literacy skills (Harmer, 1999). Due to misconceptions about DHH patients' communication preferences and additional interpreting costs, healthcare providers often tend to avoid providing a sign language interpreter (Harmer, 1999).

Due to technology development, video remote interpreting (VRI) has been popularized in clinical settings where both the healthcare provider and the DHH patient communicate through a remote interpreter (Alley, 2012). VRI is more cost-effective than the use of in-person interpreting services and is available without the need to wait for an interpreter to arrive. While an on-site interpreter charges for a two-hour minimum, VRI

charges by the minute, at a 15-minute minimum (Registry Interpreters for the Deaf Video Interpreting Committee, 2008 as cited in Alley, 2012). VRI is recommended when an in-person interpreter is not available. However, VRI is not accessible for DHH patients with visual impairments and DHH patients who have cognitive, psychiatric, or linguistic difficulties (National Association of the Deaf, 2018).

Another challenge associated with VRI is that the interpreter has a limited physical presence in the medical setting, which makes accurate translation difficult as compared to in-person interpreting, where the interpreter that has a more direct view of the setting (Kashar, 2009). Even though VRI cannot produce the same quality of in-person interpretation, many hospitals in major cities with a large deaf population are no longer hiring in-person interpreters due to the popularity of VRI (Garrett & Maryland, 2012). For example, the University of Illinois Hospital and Health Sciences System (UIHHSS), as a large urban hospital, has reduced the number of staff interpreters, and has started to use VRI as a primary accommodation for DHH patients (Y. Rodrigues, personal communication, April 8, 2016).

Given the rising popularity of VRI, hospitals need to clarify how to use this technology more effectively, by determining when and where it would be suitable to use VRI (Hedding, 2014). A healthcare provider may prefer VRI for critical treatment, but his/her DHH patient may prefer in-person interpreting. Appropriate use of VRI depends on the preferences of the healthcare providers and DHH patients, as well as the demands of the clinical situations.

Therefore, the purpose of this study is to identify and compare preferences and priorities of healthcare providers and DHH patients regarding use of VRI. The study utilizes a mixed methods approach, which combines a quantitative online survey for healthcare providers and DHH patients to learn about their preferences regarding VRI versus in-person interpreting, as well as qualitative interviews with healthcare providers and DHH patients.

Based on study findings, recommendations are made that offer solutions to interpreting

challenges for clinical situations.

II.   LITERATURE REVIEW

A.   **<u>Background</u>**

1.   **<u>Communication barriers for deaf/hard of hearing patients</u>**

Approximately 48 million individuals in the United States are identified as experiencing hearing loss. Hearing loss can affect people of all ages and can range from mild to profound. Causes of hearing loss vary and can be temporary or permanent (Hearing Loss Association of America, 2018). Regardless of whether hearing loss is mild or profound, temporary or permanent, individuals who are DHH have the legal protections and the right to accessible healthcare under the Rehabilitation Act of 1973 and ADA (ADA.gov, 2009). The Department of Health and Human Services also proposed a rule implementation for Section 1557 of the Affordable Care Act (ACA), which prohibits discrimination in health care (Cornachione, Musumeci, & Artiga, 2016).

Despite these legal obligations, DHH patients have experienced communication barriers due to unavailability of qualified interpreters, healthcare providers' lack of knowledge of cultural competency and legal obligations related to DHH patients, and patients' own limited literacy skills (Desrosiers, 2017; Harmer, 1999; Meador & Zazove, 2005). Many healthcare providers often depend on ad hoc interpreters for communicating with DHH patients. These might be friends or family members, including parents or children of DHH patients (Harmer, 1999).

However, 90% of DHH patients' parents or other family members are hearing, and they are often not fluent in sign languages or have limited experience with signing at home (Harmer, 1999). Furthermore, many healthcare providers have a limited understanding of DHH patients' communication needs and assume that DHH patients can make do with speechreading or written notes and have enough health literacy skills (Czerniejewski, 2012).

Together, these factors create significant communication barriers for DHH patients in healthcare settings.

2. **Impact of communication barriers on health outcomes and healthcare experiences of deaf/hard of hearing patients**

Previous studies highlight the impact of communication barriers on health outcomes and health experiences of DHH patients. For instance, DHH patients who are American Sign Language (ASL) users struggle to understand spoken English due to a lack of proficiency in written English. They are isolated from mass media and healthcare messages, and they experience lack of general knowledge about sexual health, cancer, preventive health, and cardiovascular disease (McKee, Barnett, Block, & Pearson, 2011).

Despite a growing number of deaf healthcare programs and related research internationally, DHH patients still struggle to access healthcare, even in high income countries. Previous studies have found that language barriers and disabilities have been shown to decrease the quality of care, and communication issues are associated with an increased risk of preventable adverse events, such as an unintended injury or complication caused by delivery of clinical care (Bartlett, Blais, Tamblyn, Clermont, & MacGibbon, 2008; Kuenburg, Fellinger, & Fellinger, 2016).

3. **Communication strategies for working with deaf/hard of hearing patients**

Healthcare providers need to be trained to understand the benefits and constraints of interpreting services for DHH patients' communication needs, as well as to be aware of their legal obligation to provide accommodations for communication (Harmer, 1999). Healthcare providers need to be aware of not only language barriers but also barriers experienced by DHH patients based on race/ethnicity, socioeconomic status, and gender (Harmer, 1999). Healthcare providers need to understand the Deaf culture, such as differences between spoken English and ASL, the facts that DHH patients have different types of

communication styles, and myths related to lip-reading abilities of DHH patients (Harmer,1999).

Furthermore, DHH patients use different types of visual communication, such as ASL, Pidgin Signed English, Signing Exact English, cued speech, or home signs. Some DHH patients use speech-reading and do not sign. Despite diverse communication preferences, DHH patients share common experiences in communication when interacting with healthcare providers (Harmer, 1999). In general, healthcare providers need to consider various communication strategies when working with DHH patients, such as providing appropriate interpreting services, ensuring a clear visual field, avoiding sitting in front of a bright window, talking to DHH patients without over-enunciating, and speaking to the patients directly rather than directing communication at the interpreters (Meador & Zazove, 2005).

In recent years, VRI has emerged as a popular communication tool used by healthcare providers when working with DHH patients (Desrosiers, 2017). Owing to VRI's various limitations, the National Association of the Deaf (2018) recommends that healthcare providers must provide qualified sign language interpreters and consider the use of VRI as an alternative option when an in-person interpreter is not available. However, due to technology development, VRI has become more popular because it is less expensive and makes it easy to contact an interpreter almost any time. As a result, many hospitals no longer hire in-person interpreters (Marsland, Lou, & Snowden, 2010). However, healthcare providers need to understand advantages and disadvantages of VRI versus in-person interpreting for different clinical situations.

B.   **Statement of the Problem**

1.   **Overview of video remote interpreting**

In clinical settings, VRI is offered via a laptop or tablet that healthcare providers could carry with them and connect to upon request (Alley, 2012). Advantages of

this technology include its 24/7 availability, cost-effectiveness, and usefulness for last-minute appointments (Marsland, Lou, & Snowden, 2010; Pagano, 2017).

Nevertheless, VRI has poor network issues that cause connections to fail (Belz, 2014; Hedding, 2014; Kashar, 2009). Also, VRI has visual and mobility limitations. For example, physical therapy appointments require a lot of movements that are difficult to capture on VRI (T. Alie, personal communication, March 27, 2016). Therefore, VRI cannot provide the same quality of in-person interpreting in such situations (Desrosiers, 2017; Garrett & Maryland, 2012).

Additionally, VRI is not accessible for populations who depend on visual translation, such as DHH patients who have cognitive disabilities, linguistic limitations or mental disabilities, or those who are visually impaired. For example, there have been cases of deaf-blind patients provided VRI during emergency care, even though deaf-blind individuals prefer tactile signing or using an in-person interpreter to face to face (V. Baldoza, personal communication, February 22, 2016). Specifically, VRI is not effective when DHH patients are unable to see, for example, if they are reclined on the floor or on an examination table during appointments (Rosenblum, 2015).

2.   **Overview of in-person interpreting**

In-person interpreting provides accurate and effective translation for group meetings, as well as full accessibility for any medical settings, compared to VRI (Kashar, 2009; National Association of the Deaf, 2018). Previous studies have shown that in-person interpreters provide enough communication for not only patients, but also healthcare providers (Bagchi, Dale, Verbitsky-Savitz, & Andrecheck, 2010). In-person interpreting is especially useful when providers work with patients who are children (T. Alie, personal communication, March 27, 2016).

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Still, in-person interpreting services are expensive and require advance notice to request or cancel services (Marsland, Lou, & Snowden, 2010). Hospitals are unable to request a refund for in-person interpreting services when DHH patients miss appointments, which can negatively affect a hospital's budget (E. McNamara, personal communication, April 28, 2016).

In short, in-person interpreting is believed to be more effective than VRI (Desrosiers, 2017; Garrett & Maryland, 2012). In addition, in-person interpreting is also beneficial for unique populations, such as DHH patients who are blind, those who are immigrants and use sign languages other than ASL, those who are from Limited English Proficiency (LEP) families, or those who do not sign. Thus, healthcare providers need to be aware of DHH patients' unique communication needs and the specific type of in-person interpreting they need to request to accommodate these needs, such as a certified deaf interpreter, tactile sign language interpreter, a trilingual interpreter, an oral interpreter, or a captionist (National Association of the Deaf, 2018). Furthermore, healthcare providers are often not trained on how use VRI and are unable to work with the technology (Belz, 2014; Kashar, 2009). Additionally, budgetary and other concerns have limited the availability of in-person interpreters. Therefore, VRI, despite its widespread use can often be a problem as it does not always meet patients' communication needs (Draper, 2014).

C. **Research on Healthcare Communication for Deaf/Hard of Hearing Patients**

Few studies have discussed DHH patients' healthcare communication through VRI. For example, Kuenburg, Fellinger, and Fellinger (2016) examined the topic of healthcare access for people with disabilities, particularly for the deaf population, as enshrined within the United Nation Convention on the Right of People with Disabilities. The researchers reviewed literature published between 2000 and 2015 and found that the deaf population still experienced barriers to healthcare due to communication challenges, a lack of health

knowledge, and marginalization. Of note, the researchers did not find any literature related to VRI (J. Fellinger, personal communication, September 19, 2017). One study examined the use of Video Relay Services (VRS) between German and Austrian Sign Language with the intent of developing an education curriculum for VRS interpreters (Recheis, 2014).

Kushalnagar, Harris, Paludneviciene, and Hoglind (2017) created an ASL version of the Health Information National Trends Survey and gathered information about health information seeking behaviors of DHH patients in the United States across technology-mediated platforms (Kushalnagar et al., 2017). The researchers found that some items from the survey required cultural adaptation. The researchers created a separate item bank related to DHH patients' experiences with VRI and their healthcare reflections through ASL videos posted on social networks (Kushalnagar et al., 2017). Although VRI has grown in popularity in hospitals in the United States compared to other countries, the researchers did not investigate healthcare providers' experiences when using VRI (P. Kushalnagar, personal communication, May 16, 2017). Their findings on DHH patients' health information seeking behaviors across technology platforms are not yet published.

Another study in the United States examined differences in health literacy between Deaf ASL users and hearing English speakers (McKee et al., 2015). Findings of this study indicated that 48% of Deaf ASL users had inadequate health literacy, which was 6.9 times more likely for Deaf ASL users than hearing English speakers (McKee et al., 2015). The literature review reveals how VRI was understudied, and thus it would be essential to study the topic related to VRI and Deaf ASL users with limited health literacy.

Sheppard (2014) collected deaf adults' stories about their lifelong experiences with health care. The researcher found that communication barriers between DHH patients and healthcare providers resulted in patients not understanding their diagnosis or treatment, medication use, or side effects (Sheppard, 2014). These communication barriers were

attributed to healthcare providers' little understanding of Deaf culture and inadequate

communication methods, such as lip-reading or asking a family member to translate

(Sheppard, 2014).

Where Sheppard (2014) studied DHH patients' perspectives, Pendergrass, Nemeth,

Newman, Jenkins, and Jones (2017) studied the perspectives of healthcare providers.

Specifically, they examined nurse practitioners' perceptions of barriers and facilitators in

providing healthcare for Deaf ASL users. The researchers found that nurse practitioners

preferred to use sign language interpreters, but they often choose them as a last resort after the

failure of attempting all other communication methods, such as gesturing, note-writing, and

lip-reading (Pendergrass et al., 2017). The researchers concluded by highlighting the

importance of providing resources and emphasizing legal requirements for nurse practitioners

and nurse students to encourage hiring ASL interpreters when treating Deaf ASL users

(Pendergrass et al., 2017).

Overall, the literature summarized above suggests that DHH patients experience

significant communication barriers when accessing healthcare services. However, research

examining use of VRI is scant. To fill this gap in the literature, this study focuses on

comparing healthcare providers' and DHH patients' experiences and preferences for using

VRI versus in-person interpreting.

D.   **<u>Culture and Intersectionality</u>**

In addition to language needs, healthcare researchers need to be aware of culture and

intersectionality to understand the communication barriers between healthcare providers and

DHH patients beyond legal obligations. Without this understanding, healthcare researchers

are unable to fully comprehend differences in perspectives between healthcare providers and

DHH patients. Being aware of the ways in which cultural issues affect clinical encounters can

enable healthcare researchers to better understand differences of communication needs between healthcare providers and DHH patients.

1. **Culture**

a. **Definition of culture**

Culture has influenced the way in which people think and believe in relation to rituals, habits, laws, body images, sexuality, and so on. These beliefs and attitudes have also contributed to oppression and discrimination in the disabled community. Historically, society has considered disabled people as abnormal and has excluded them in education, healthcare, and family life (Charlton, 1998).

Both members of the dominant culture and the members of a minority group may each hold prejudiced attitudes toward the other (Arnold, 1983 as cited in Hamer, 1999). In other words, if healthcare providers are members of the dominant hearing culture, they may fail to recognize DHH patients as members of a minority linguistic culture. This could lead to a misconception that DHH patients are less intelligent than other hearing patients and wrongly links deafness to low intelligence (Iezzoni, O'Day, Killeen, & Harker, 2004).

Dominance of hearing culture can also contribute to communication barriers for future DHH patients. For example, 90% of deaf children are born to hearing families rooted in the dominant hearing culture. These deaf children visit their healthcare providers with their parents, and their parents and their healthcare providers have a conversation, leaving out the deaf children and excluding them from access to information. As a result, deaf children never learn how to be involved as active patients. They become passive recipients of healthcare services in adulthood (Harmer, 1999).

b. **Deaf, hard of hearing, and hearing**

The Deaf community is a heterogeneous group that includes individuals who have different degrees of hearing loss, use multiple languages, and belong to

different cultures. As a result, there is no approach for communication access that can apply to all these people from the Deaf community (Meador & Zazove, 2005).

Per the definitions of Deaf, deaf, hard of hearing, and hearing, persons referred to as "Deaf" usually belong to the Deaf community and use ASL as a primary language. Persons referred to as "deaf" or "hard of hearing" do not belong to the Deaf community, and they may prefer to use English as a primary language. Hearing persons belong to the dominant hearing community, and they may not be familiar with Deaf culture and ASL (Padden & Humphries, 2005).[1]

c.   **Cultural conflicts**

The Deaf community consider themselves as a linguistic minority group rather than a disability group; thus, their Deaf identities is grounded in the cultural perspective (Padden & Humphries, 2005). In contrast, most healthcare providers are from the hearing community, and they view deafness as a pathological disease that needs to be cured; thus, their views about DHH individuals are grounded in the medical perspective (Hoang, LaHousse, Nakaji, & Sadler, 2011). Often, healthcare providers are unaware that ASL has grammar and syntax different from English (Iezzoni, O'Day, Killeen, & Harker, 2004), and they do not recognize the differences among Deaf, deaf, and hard of hearing patients' preferred communication modalities (Hoang, LaHousse, Nakaji, & Sadler, 2011).

Because of the different perspectives, many DHH patients distrust and avoid visiting healthcare providers (Steinberg, Wiggins, Barmada, & Sullivan, 2002). Healthcare providers also feel discomfort when working with DHH patients due to limited understanding of Deaf culture (Hoang, LaHousse, Nakaji, & Sadler, 2011). Deaf, deaf, and hard of hearing patients

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[1] "Deaf" versus "deaf": the field of deaf studies is shifting on its use of D/deaf. Some scholars no longer use "D" to designate a cultural identity and a cultural way of being. Some scholars include the word "culture" when that is relevant. Source from: Kustersm, A., Meulder, M.D., & Brien, D. (Eds.) (2017). *Innovations in Deaf Studies: The Role of Deaf Scholars*. New York, NY: Oxford Press.

have experienced similar communication barriers with their healthcare providers (Iezzoni, O'Day, Killeen, & Harker, 2004).

For example, healthcare providers often resort to inadequate modes of communication, such as speech-reading, writing, or asking DHH patients to bring family members to interpret for them. Healthcare providers do not understand the importance of effective communication and tend to be concerned about the costs of interpreting services (Masland, Lou, & Snowden, 2010). Even when interpreters are available, some healthcare providers often maintain eye contact with the interpreters rather than the DHH patients (Iezzoni, O'Day, Killeen, & Harker, 2004). Both deaf and hard of hearing patients have reported that they feel as if they were not treated with dignity and respect (Iezzoni, O'Day, Killeen, & Harker, 2004; Steinberg, Wiggins, Barmada, & Sullivan, 2002).

Given the above factors, healthcare researchers need to recognize that a lack of cultural understanding is often associated with the communication barriers between healthcare providers and DHH patients.

2. **Intersectionality**

    a. **Definition of intersectionality**

Intersectionality defines the intertwined nature of gender, race, class, ability, sexuality, caste and other influences. Intersectionality has been intertwined with axes of oppression and discrimination, such as race and disability, or race and gender, or race, disability, and gender (Wilkinson, 2003). In other words, race and disability status are two axes of inequality that intersect at both individual and community levels, resulting in discriminatory experiences of racism and ableism. Individuals may experience discrimination either because of racism or ableism, or both axes of discrimination (Wilkinson, 2003).

From the viewpoint of intersectionality, DHH patients, like other minority patients, face communication barriers not only because of cultural conflicts, but also because of

additional factors such as LEP status, racial/ethnic minority, gender, socioeconomic status, and disability (DeVault, Garden, & Schwartz, 2011; Harmer, 1999). As an example, if the healthcare provider is a hearing white man and the patient is a deaf black woman, the deaf patient may feel inferior to the healthcare provider and may experience prejudice not only because of deafness, but also because of race and gender.

b.   **Limited English proficiency**

Typically, DHH patients who use ASL have lower literacy skills, and they may have been deaf since birth or early childhood and learned English as a second language. Other DHH patients may use English as a primary language, but their English may not be standard (Barnett, McKee, Smith, & Pearson, 2011; Meador & Zazove, 2005). In addition, DHH patients with low literacy skills rely on family members who are not fluent in ASL. With limited access to family conversation or no captioned televisions or radios, DHH patients experience information gaps that affect their healthcare and their knowledge of legal rights to access health information (Harmer, 1999; Steinberg, Wiggins, Barmada, & Sullivan, 2002). Because healthcare providers are unaware that some DHH patients have LEP, they believe that DHH patients are not intelligent because they use faulty English (Iezzoni, O'Day, Killeen, & Harker, 2004).

c.   **Racial/ethnic minority**

Deaf racial/ethnic minority patients are more likely than deaf white patients to experience lack of healthcare access. Furthermore, deaf racial/ethnic minority women also have the greatest difficulty accessing health services, compared to deaf white women (Harmer, 1999). These deaf racial/ethnic minority patients often find themselves having to learn and negotiate three or more languages and cultures – the culture and language in their home, the culture and language of the Deaf community, and the culture and language of the dominant hearing community (Harmer, 1999).

d. **Gender and socioeconomic status**

Particularly, deaf women have lower literacy rates, lower income and higher rates of unemployment than hearing women, which correlate with low mammography screening rates (Steinberg, Wiggins, Barmada, & Sullivan, 2002). Deaf women who use ASL also have limited access to family conversations, the media, and print materials used in healthcare communication. Thus, many deaf women are often unable to obtain or understand basic preventive care such as cancer screening, mammography, Pap smears, or hormone replacement therapy (Steinberg, Wiggins, Barmada, & Sullivan, 2002).

e. **Disability**

Patients who are hard of hearing feel ashamed, frustrated, depressed, or in-denial about their hearing loss as a disability (Iezzoni, O'Day, Killeen, & Harker, 2004). Many hard of hearing patients feel marginalized by healthcare providers because of communication barriers. Both deaf and hard of hearing patients are often asked by healthcare providers about causes of their deafness, although it does not relate to their actual health problems (Iezzoni, O'Day, Killeen, & Harker, 2004). Even though they do not consider themselves as having a disability, the rest of the world classifies "deafness" as a disability. Therefore, they live in a paradoxical world.

Healthcare researchers need to remember that DHH patients experience communication barriers not only because of deafness, but also because of additional factors, such as race, LEP status, gender, socioeconomic status, and disability.

3. **Summary**

In short, the literature review shows how language and communication affect healthcare access for people who identify as DHH. The literature also shows how cultural conflict can affect healthcare experiences of DHH patients. To clarify, language and communication are not synonymous with cultural identities, but they contribute to cultural

identities. Overall, it is important to understand how all these factors (e.g., language, communication, and cultural identities) can affect clinical encounters between healthcare providers. However, this study primarily focuses on language, communication, and issues of access and power for DHH patients. While narrowing the scope of this study was essential for feasibility reasons, insights gained from this study will nonetheless contribute to a large understanding of why DHH patients face communication barriers beyond legal obligations related to communication access.

E.   **Significance of the Study**

Due to limited budgets, many hospitals have decided to use VRI. But at the same time, hospitals need to clarify how to use VRI for different purposes – when and where it would be suitable to use VRI or not. If a DHH patient sees a doctor for non-critical care or a DHH patient wants to protect his/her privacy, the patient may prefer VRI over in-person interpreting. On the other hand, the DHH patient may prefer to use an in-person interpreter for critical care (Hedding, 2014).

Thus, this study emphasizes the importance of identifying the proper use of VRI and in-person interpreting. A healthcare provider may prefer to use VRI for one treatment, but his/her DHH patient may prefer to use in-person interpreting – or vice versa. However, few studies have investigated this issue.

The purpose of this study is to identify and compare preferences and priorities of healthcare providers and DHH patients regarding use of VRI versus in-person interpreting services. Based on study findings, recommendations will be made for appropriate interpreting solutions for specific clinical situations. These recommendations can be useful for hospitals that are interested in introducing VRI.

Despite the benefits of in-person interpreting, many hospitals have reduced in-person interpreting services and have popularized the use of VRI (Marsland, Lou, & Snowden,

2010). Sadly, there is no previous research on healthcare providers' and DHH patients'

experiences with VRI in healthcare settings. In Chicago, Mount Sinai Health System, which

has a large DHH patient population, has popularized VRI; however, they only studied DHH

patients' healthcare access in mental health and cancer screening (Orsi, Margellos-Anast,

Perlman, Giloth, & Whitman, 2007; Periman et al., 2007; Sinai Urban Health Institute, 2018).

This study will fill an important gap in the literature by investigating the perspectives of

healthcare providers and DHH patients toward use of VRI in a variety of healthcare settings.

A.   **<u>Research Questions</u>**

This study proposes five research questions:

(1) What are the perspectives of healthcare providers regarding use of VRI and in-person interpreting?

(2) What are the perspectives of DHH patients regarding use of VRI and in-person interpreting?

(3) Are there differences in healthcare provider preferences for VRI versus in-person interpreting based on critical care and non-critical care?

(4) Are there differences in DHH patient preferences for VRI versus in-person interpreting based on critical care and non-critical care?

(5) Are there differences in perspectives related to VRI and in-person interpreting between healthcare providers who primarily work with LEP patients and those who primarily work with DHH patients?

B.   **<u>Theoretical Framework</u>**

Understanding different disability studies and deaf studies frameworks is essential for healthcare researchers to examine communication barriers, issues of access, and issues of power, particularly between healthcare providers and DHH patients.

1.   **<u>Disability studies</u>**

Disability studies is an academic discipline that analyzes disability, uses multiple theories to define disability, and understands the disability experience from a variety of interdisciplinary viewpoints, such as from medical, humanities, social sciences, and cultural perspectives (Rembis, 2010). Historically, disability studies has intersected with the disability rights movements that emerged in the United States and the United Kingdom in the mid-20th century, and expanded to other countries, including Australia and Canada in the 21st

century (Rembis, 2010). Furthermore, the disability rights movements have resulted in new approaches to understand disability as a social, political, and cultural phenomenon (Linton, 1998).

Within disability studies, the predominant framework for conceptualizing disability is the social model, which is often contrasted with the medical model (Oliver, 1996). The medical model focuses on the individual with a disability as a problem, trying to fix the individual's impairment to become an able-bodied person and assimilate into the dominant society (Oliver, 1996), which is also called ableism (Wolbring, 2008). On the other hand, the social model focuses on the society as the problem because it fails to design an accessible environment for people with disabilities. The social model believes that environmental barriers result in individuals with disabilities' exclusion from full participation in the society (Oliver, 1996).

2. **Deaf studies**

Deaf studies is an academic discipline that analyzes deafness and understands the deaf experience through an interdisciplinary lens, such as anthropology, economics, geography, history, political science, psychology, and social studies (Marschark & Humphries, 2010). Historically, deaf studies began to study the lives of deaf people, learning about their culture, language, history and human rights in the United States and the United Kingdom in 1985 (Marschark & Humphries, 2010). Ten years later, deaf studies expanded to include other countries, and started to prompt the larger society to change their views and perspectives regarding deaf people (Marschark & Humphries, 2010).

Within deaf studies, two different perspectives of deafness are commonly understood: the pathological perspective; and the cultural perspective. The pathological perspective focuses on the amount of hearing loss and how to correct it through cochlear implants and hearing aids or by learning speech and lip-reading. This perspective emphasizes making deaf

persons become "hearing" as soon as possible because hearing is considered "normal" (McLeod & Bently, 1996). One example called audism, which was originally coined by Tom L. Humphries in 1975, is defined as a discrimination and oppression of deaf people based on the privilege of hearing individuals (Bauman, n.d.). Gertz (2007) argues that "dysconscious audism" (p. 219) weakens the Deaf identity associated with the lack of culturally deaf consciousness due to hearing people's oppression over the cure of deafness.

The cultural perspective focuses on deafness as a unique difference, and this perspective does not see deafness as being "hearing-impaired" or "disabled." Deaf persons who use ASL and belong to the Deaf community are referred to as capitalized "Deaf" persons. Deaf persons who do not belong to the Deaf community are referred to as non-capitalized "deaf" persons. Persons who can hear and are not familiar with the Deaf community belong to the hearing community (Padden & Humphries, 1988).

3.   **Adaptations and use of model combinations**

The purpose of this study is to explore both healthcare providers' and DHH patients' preferences regarding use of VRI and in-person interpreting. This study is informed by a hybrid theoretical framework that combines the social model of disability and the cultural perspective on deafness. Specifically, this study is informed by the social model of difference, proposed by DeVault, Garden, and Schwartz (2011) which "locates communication barriers during medical encounters in the interaction between embodied differences and the environment rather than the embodied difference or impairment" (p. 1).

Combining the social model of disability and the cultural perspective on deafness is critical for drawing attention to issues of access and issues of power. Within disability studies, Oliver (2004) notes that the social model of disability does not ignore concerns related to medical treatments but acknowledges that people with disabilities experience barriers due to lack of medical services in the society. In the other words, the social model helps to

understand healthcare access as barriers and issues that reside outside DHH patients due to lack of accommodations in hospitals. In this model, the solutions also exist outside DHH patients in hospitals (i.e., filing a legal complaint to hospitals for failing to accommodate their needs and providing trainings to understand DHH patients' rights and legal obligations).

Within deaf studies, the cultural perspective of deafness helps to understand healthcare access as barriers and issues from a different lens than disability studies. Specifically, understanding DHH patients' healthcare experiences as a cultural approach rather than a pathological approach, which identifies DHH patients' deafness as problems. This cultural perspective of deafness helps to recognize healthcare providers' audist attitudes (i.e., asking DHH patients to lip-read and speech) and a lack of deaf friendly design in hospitals (i.e., lacking a policy to provide in-person interpreter services for DHH patients).

Both disability studies and deaf studies scholars recognize the issues of access and the issues of power in healthcare and communication, and also in daily lives, workplaces, schools, and public areas. These issues of access and the issues of power are closely linked to the society's values. As an example of power, hospital administers decide to reduce ASL staff interpreters and popularize the use of VRI to favor economic values rather than DHH patients' communication preferences. As a result, as an example of access, DHH patients are unable to access ASL staff interpreters due to limited availability, ending up using VRI. This combined viewpoint illustrates how ableism and audism are shaped within hospital administration systems.

C.   **Research Design**

This study used a mixed methods approach. The mixed methods approach is defined as an approach that combines qualitative and quantitative methods. This approach uses the strengths of qualitative methods to overcome limitations of quantitative methods, and vice versa (Johnson & Christensen, 2016). Using a mixed methods approach allowed triangulation

of data collection methods and analysis and facilitated a comprehensive understanding of healthcare providers' and DHH patients' experiences and their preferences for VRI and in-person interpreting.

Quantitative methods involve collection of large amounts of numeric data (Johnson & Christensen, 2016). This approach uses statistical analysis to identify what variables are associated with outcomes of interest. In this study, the Principal Investigator (PI) administered an online survey to generate data that could be generalizable to healthcare providers' and DHH patients' preferences for VRI and in-person interpreting. Next, the PI focused on open-ended interviews to collect detailed viewpoints from these individuals. This was necessary, because detailed viewpoints are not well represented in numeric data collected through quantitative methods (Creswell, 2003). On the other hand, qualitative methods do not yield generalizable data (Johnson & Christensen, 2016), but they are able to represent the voices of healthcare providers and DHH patients.

In this study, a sequential exploratory design was used as a two-phase design where the quantitative data is collected first followed by qualitative data collection. Both data sets are analyzed separately, and then compared (Creswell & Clark, 2011). The quantitative data were used to test hypotheses related to preference for VRI and in-person interpreting based on critical care and non-critical care. The qualitative data explored the reasons why healthcare providers and DHH patients prefer to use VRI or in-person interpreting.

The reason for collecting both quantitative and qualitative data was to compare the preferences of healthcare providers and DHH patients using two forms of data to understand the topic more comprehensively than would be possible with either type of data collected separately (Creswell & Clark, 2011).
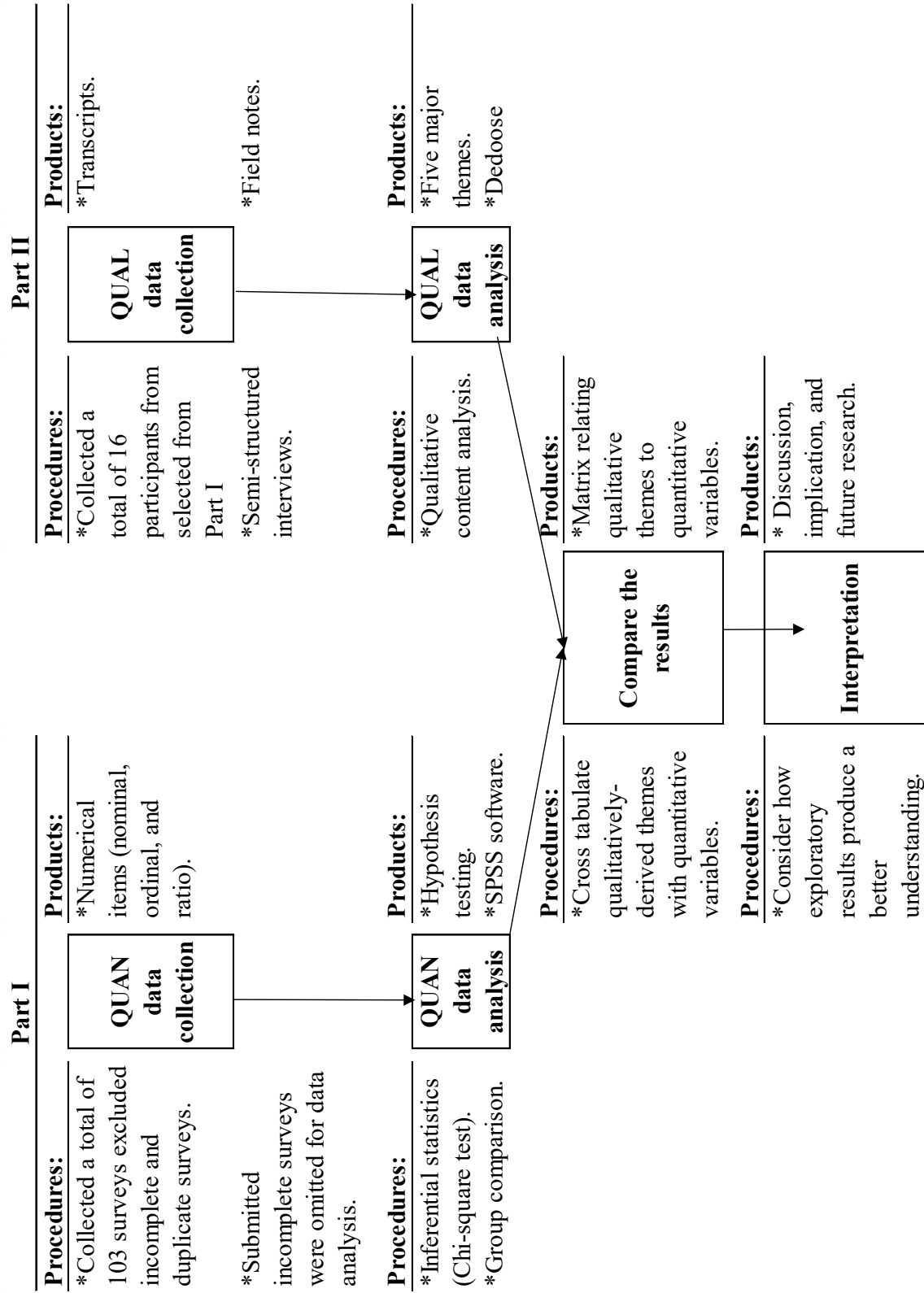
Figure 1. Sequential exploratory design

1.   **<u>Development of online surveys and qualitative interview guides</u>**

This study drew upon the social model of difference to develop the online surveys and qualitative interview guides.

In Part I of the study, the online survey questionnaires consisted of three parts regarding the participants' interpreting preferences, their recommendations for improving VRI services, and their demographic backgrounds (Appendix B). For instance, Q2 and Q3 asked about the participants' preferences related to a specific environment, critical care encounters and non-critical care encounters. Furthermore, Q4-1, Q4-2, and Q4-3 asked about the participants' social reasons why they choose a specific interpreting preference, such as "It is already set up in my clinical setting," "It is less expensive," and "It is accessible when there is limited visibility in a clinical area." Additionally, Q5 and Q5-1 asked about the participants' recommendations for improving VRI equipment with environmental factors, such as "Higher wireless speed (It is useful when a doctor's office is in a basement)" and "Adjustable lighting (It is useful when it is slightly dark in the clinical area where the patient is being seen)."

In Part II of the study, the qualitative interview questionnaires consisted of five questions related to the participants' experiences with in-person interpreting and VRI, their interpreting preference uses, and their recommendations (Appendix C). For instance, Q2 and Q3 asked to share the participants' interpreting preferences based on a specific environment, critical care encounters and non-critical encounters. The interview questionnaire also specifically asked participants to share their experiences within different clinical environments, thus helping to situate communication barriers (if any) in the interaction between environmental contingencies and embodied differences of being hearing and DHH. Furthermore, Q4 asked, "How do you decide what interpreting method is appropriate for

different appointments with your patient?" which could tap into environmental resource constraints such as interpreting availability, budget, and accessibility.

D. **Cognitive Interviewing**

    1. **Procedure**

Before collecting data, the PI adapted a cognitive interviewing technique. The technique is used to test draft questionnaires and helps to improve the questions, so that survey respondents are better able to answer questions accurately (Willis, 1994). The PI used this cognitive interviewing technique to pretest the online survey and the qualitative interview with two healthcare providers and two DHH patients. For the healthcare provider survey, the PI recruited one pre-tester with a high level of familiarity with Deaf culture and one with less familiarity with Deaf culture. For the DHH patient survey, the PI recruited one pre-tester with graduate level education and one with less than high school education. All pre-testers were 18 years or older and had experience with VRI in the past ten years.

First, the PI contacted the four participants directly via email by using the snowball sampling method, through her colleagues' introductions. When the participants agreed to participate, they completed a cognitive interviewing consent form via email, and the PI saved a transcript of email conversation as a documentation of consent. The PI scheduled cognitive interviewing with the three participants in person and one participant via videophone. For the in-person interviews, the participants were asked to pretest the online survey on the PI's laptop and to pretest the interview questionnaire. For the videophone interview, the participant received an online survey link and the interview questionnaire via email and was asked to complete both during the cognitive interviewing.

The cognitive interviewing technique involves "speaking questions aloud." In its traditional format, this technique would not be accessible for DHH patients. The DHH patients would need to "read aloud" the questions to identify errors. It is not feasible to sign or

to use an interpreter to translate in the order of questions as they appear in written English because ASL and English involve different cognitive processes. Thus, DHH patients read the questionnaires in written English and gave their feedback in ASL. In contrast, healthcare providers read the questions in spoken English and gave their feedback through ASL interpreters.

Cognitive interviewing lasted for approximately one hour. After all four interviews were completed, the PI typed a field note and revised the survey, the interview questionnaire, and informed consent form based on all four pre-testers' responses. For instance, the original plan was to conduct qualitative interviews with DHH patients, to have these interviews translated with the help of ASL interpreters, and to have the interviews audio-record and later transcribed. However, pre-testers who were DHH patients suggested video-recording the interviews and making necessary changes to the consent form. Thus, video-recording was added to the informed consent form to notify participants that the purpose of video-recording was to confirm whether translated transcripts were accurate, and the video-recordings were accessed by the PI only.

Other pre-testers who were healthcare providers suggested changes to further clarify response options for healthcare providers' positions and specializations on the online survey questionnaire. This was because the list of response options included in the original questionnaire did not match their positions or specializations. In response to this suggestion, the PI reviewed existing examples of demographic survey questions for health providers and revised the list on the online survey questionnaire. After revisions, the PI requested an amendment to the University of Illinois at Chicago's Institutional Review Board (IRB).

Pre-testers also recommended that the online survey be made available in ASL for DHH patients. Due to time and funding constraints, the online survey was not made available in ASL. As a result, it was likely the survey was not accessible for some DHH patients. As an

alternative, the online survey for DHH patients included a question asking participants whether they completed the survey independently or whether it was completed with someone's help. This is one limitation of the study, which is later discussed in Chapter V.

Finally, this study only involved exploring what participants thought and felt, and so there was minimal risk. The information from cognitive interviewing was kept confidential and was not used for data collection or data analysis. These participants were not eligible to participate in Part I and II of the study to avoid bias.

E.   **Part I: Quantitative Method**

Part I of this study used quantitative methods and involved an online survey for healthcare providers and DHH patients.

1.   **Participants**

a.   **Inclusion criteria**

This study focused on participants who had prior experience with VRI in clinical settings. Therefore, in order to be included in this study, participants had to have VRI experience in clinical settings and had to be 18 years or older. This study recruited healthcare providers and DHH patients through healthcare professional associations and deaf agencies.

1)   **Healthcare providers**

Healthcare providers were those medical professionals who had used VRI in clinical settings, were 18 years or older, and who spoke English. Healthcare providers who were recruited for this study included individuals who were authorized to practice medicine or surgery in clinical settings or to provide healthcare services under the Code of Federal Regulations (29 CFR 825.125)[2]. Healthcare providers included: physicians

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[2] *29 CFR 825.125 – Definition of healthcare provider.* (n.d.). Retrieved from https://www.law.cornell.edu/cfr/text/29/825.125

(e.g., MD, MS, DO, and Phar.D.); physician assistants; nurse practitioners (e.g., RN, LNP, and CNA); occupational and physical therapists (e.g., DPT, NCS, PT, PRPC, OTR/L, FAAOMPT, COTA, PTA, and OCS); podiatrists; clinical psychologists; optometrists; and chiropractors; dentists; clinical social workers; and pharmacy assistants. Students in health professions (e.g., interns, residents, fellows, and attending physicians) who practiced in clinical settings under supervision were also included.

2) **Deaf/hard of hearing patients**

Furthermore, DHH patients were individuals who had experienced the use of VRI in clinical settings, had a clinical encounter in the past ten years, and were 18 years or older. Additionally, DHH patients were required to be fluent in ASL and were required to have mild to profound hearing loss.

b. **Recruitment strategy**

1) **Healthcare providers**

The PI first contacted healthcare professional associations to obtain permission to forward a scripted recruitment letter via email. Upon approval, participants were recruited via mass mails sent out by the healthcare professional associations to their member list.

In addition, the PI visited UIHHSS, health colleges, and Center for Clinical and Translational Science to post the study flyers in their clinics and offices. Interested participants were provided a link to the online survey via email. The survey took no more than 10 minutes to complete. In addition to the above recruitment strategy, snowball sampling was also used. The PI asked her colleagues to pass on the recruitment letter to their colleagues who had experience with VRI.

Snowball sampling is a non-probability sampling method and is an alternative approach to collecting samples which are rare and difficult to find (Dudovskiy, 2016). This

method is considered useful for recruiting hard-to-reach populations, and it is cost-effective. On the other hand, this method has limitations, such as sampling bias, ethical concerns, and no guarantee about representativeness of the sample (Dudovskiy, 2016).

<div align="center">

2) **Deaf/hard of hearing patients**

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The PI approached the administrators at UIHHSS to help with recruitment, but they were unable to disseminate the recruitment letter to DHH patients due to the Health Insurance Portability and Accountability Act (HIPAA) policy. Therefore, the PI posted the study flyers in waiting areas at UIHHSS, health colleges, and deaf agencies. The PI also contacted local deaf agencies to disseminate the recruitment letter via email and Facebook. In addition to the above recruitment strategy, snowball sampling was also used. The PI asked her colleagues to pass on the recruitment letter to their colleagues who had experience with VRI.

<div align="center">

c. **Size**

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One hundred and three respondents completed the online survey, including 36 healthcare providers who had primarily worked with LEP patients, 26 healthcare providers who had primarily worked with DHH patients, and 41 DHH patients. Incomplete and duplicate surveys were omitted from data analysis. A sample size of 103 enables 99.9 % power to detect an effect size of 0.5 using a chi-square test (Statistical Decision Tree, 2018).

<div align="center">

2. **Procedure**

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The survey was administered individually to each participant using Qualtrics, a Survey Platform that can be used to construct surveys, distribute surveys to respondents, and report on survey results. Qualtrics is convenient for collecting anonymous data, and the data are automatically recorded as grouped data in a Statistical Package for the Social Sciences (SPSS) file for statistical analysis.

When participants received the link to the Qualtrics survey, the first item in the survey was the informed consent form. Participants were instructed to read the form in entirety, and then asked to select either "Yes, I agree to participate in the survey" or "No, I do not agree to participate in the survey." Once they consented to participation, the survey questions followed. If they did not consent to participate, they were able to move forward in the study.

3. **Data collection**

    a. **Questionnaire**

The questionnaires consisted of three parts. Part 1 asked about participants' preferences for VRI and in-person interpreting based on critical care and non-critical care. Part 2 asked about their ideas for improving the quality of VRI services. Part 3 asked demographic background questions. Part 1 and Part 2 were developed by the PI. Part 3 was adapted from sample demographic questions used in existing survey. Questions included in Part 1 and Part 2 were similar for healthcare providers and DHH patients; however, questions in Part 3 were designed to fit healthcare providers' and DHH patients' demographic backgrounds. In sum, the survey for DHH patients included 15 questions and the survey for healthcare providers included 16 questions (Appendix B).

    b. **Compensation**

Participants who completed Part I (online survey) of the study only were not compensated for their time. Only participants who completed both Part I (online survey) and Part II (semi-structured interviews) were compensated for their time.

4. **Research ethics**

    a. **Data management**

Responses from completed surveys were automatically recorded and stored in the PI's Qualtrics account which was password-protected. The data were transferred

into Microsoft Excel spreadsheet to be used with SPSS software (Version 25.0) for statistical analysis.

b. **<u>Informed consent</u>**

This study requested a waiver of documentation of consent and an alternate consent for the online survey. The act of completing the survey was regarded as consent. The PI did not ask permission from each individual respondent before contacting them with the survey, because it was not feasible to get written consent from all survey participants.

c. **<u>Subject confidentiality</u>**

The PI safeguarded the privacy and confidentiality of participants. Data collected via Qualtrics was downloaded and saved in a password-protected folder stored on the university's secure server. Only the PI has access to the electronic data and any paper forms were stored in the PI's locked filing cabinet.

d. **<u>Risks, benefits, and safety</u>**

Because the online survey only involved investigating what participants thought and felt, there was minimal risk. If the participants felt uncomfortable answering any of the questions, they were able to stop at any time with no penalty for withdrawing prematurely. The participants were provided the PI's, the faculty advisor's, and the IRB's contact information if they needed further debriefing. The PI would report any unanticipated problems according to IRB policy at the time of the potential unanticipated problem.

A possible risk of this research was a loss of privacy or confidentiality. Subject participation in the online survey involved risks like a person's everyday use of the Internet. Therefore, confidentiality was maintained to the degree permitted by the technology used. This study did not directly benefit its participants.

e. **Data quality control and quality assurance**

The PI was responsible for evaluating the data quality. Autonomous decision making was facilitated by specifying that participation in the survey was voluntary and by making respondents aware of the associated risks and benefits.

5. **Data analysis**

Table I presents the definitions of variables used in data analysis. The demographic background of healthcare providers and DHH patients included: gender, race/ethnicity, and state residency; all were measured as nominal variables; educational status, hearing levels of DHH patients were measured as ordinal variables; and age and employment were measured in years and represented as ratio variables. The questionnaire for healthcare providers also included questions related to their professional title (e.g., physician, student, etc.) and area of specialization; both were measured as nominal variables. Summary tables were created to display the number of observations, and the number and percent per category for nominal variables.

Moreover, SPSS software (Version 25.0) was used for statistical analysis for hypothesis testing. My original plan was to test for differences in VRI preferences based on area of healthcare providers' specializations and DHH patients' literacy levels by running a logistic regression model. However, the small sample size precluded those analyses and therefore my hypotheses were simplified. Thus, a chi-square test was used to examine associations between attributes within groups (Lane, 2018).

Hypothesis 1: There is no difference in healthcare providers' and DHH patients' interpreting preferences for critical care encounters. Both DHH patients and healthcare providers who work with DHH patients prefer VRI during critical care encounters.

Analysis: *Q2_ CRT_HP × Q2_CRT_DHH*

Hypothesis 2: There is no difference in healthcare providers' and DHH patients' interpreting preferences for non-critical care encounters. Both DHH patients and healthcare providers who work with DHH patients prefer VRI during non-critical care encounters.

Analysis: *Q3_NCRT_HP × Q3_NCRT_DHH*

Hypothesis 1 and *Hypothesis 2* were examined using chi-square tests to compare healthcare providers' and DHH patients' interpreting preferences based on critical care and non-critical care encounters.

Hypothesis 3: There is no difference in interpreting preferences for critical care encounters between healthcare providers who primarily work with LEP patients and healthcare providers who primarily work with DHH patients. Both healthcare providers who primarily work with LEP patients and healthcare providers who primarily work with DHH patients prefer VRI during critical care encounters.

Analysis: *Q2_ CRT_HP(LEP) × Q2_CRT_HP (DHH)*

Hypothesis 4: There is no difference in interpreting preferences for non-critical care encounters between healthcare providers who primarily work with LEP patients and healthcare providers who primarily work with DHH patients. Both healthcare providers who primarily work with LEP patients and healthcare providers who primarily work with DHH patients prefer VRI during non-critical care encounters.

Analysis: *Q3_NCRT_HP (LEP)× Q3_NCRT_HP(DHH)*

Hypothesis 3 and *Hypothesis 4* were examined using chi-square tests to compare two groups of healthcare providers' interpreting preferences based on critical care and non-critical care encounters.

A statistician in the College of Applied Health Sciences was consulted for data analysis. After quantitative data analysis was completed, the PI conducted qualitative content analysis and compared quantitative and qualitative findings.

TABLE I

VARIABLE AND DEFINITION

Variable	Definition and Response Options	Type of Variables
Q4_HP	Healthcare providers' preferences (1 = Video remote interpreting, 0 = In-person interpreting)	Nominal
Q4_DHH	Deaf/hard of hearing patients' preferences (1 = Video remote interpreting, 0 = In-person interpreting)	Nominal
Q2_CRT_HP	Healthcare providers' preferences for critical care (1 = Video remote interpreting, 0 = In-person interpreting)	Nominal
Q3_NCRT_HP	Healthcare providers' preferences for non-critical care (1 = Video remote interpreting, 0 = In-person interpreting)	Nominal
Q2_CRT_DHH	Deaf/hard of hearing patients' preferences for critical care (1 = Video remote interpreting, 0 = In-person interpreting)	Nominal
Q3_NCRT_DHH	Deaf/hard of hearing patients' preferences when non-critical care (1 = Video remote interpreting, 0 = In-person interpreting)	Nominal

The study omitted other variables (Telephone interpreting, No preference) and used dummy variables (1 = Video remote interpreting, 0 = In-person interpreting) for data analysis.

F.   **Part II: Qualitative Method**

Part II of the study used a qualitative approach by conducting in-depth interviews with healthcare providers who primarily worked with both LEP and DHH patients, and DHH patients who completed the online survey. The purpose of Part II was to expand upon the quantitative findings.

1.   **Participants**

a.   **Inclusion criteria**

Participants were: (a) healthcare providers who had experience with VRI in clinical settings, were 18 years or older, and spoke and read English; (b) DHH patients who had experience with VRI in clinical settings in the past ten years and were 18 years or older.

b.   **Selection strategy**

1)   **Healthcare providers**

Participants were recruited for Part II of the study at the same time as Part I of the study. Those participants who were interested in Part II of the study entered their email addresses or phone numbers on the online surveys in Part I. After online survey collection, the PI listed the interested participants' contact information and recorded their demographic characteristics in a spreadsheet, particularly, state of residence and gender. This information was used to target the participants who were from Illinois and to set up an equal proportion of male and female participants.

2)   **Deaf/hard of hearing patients**

Participants were recruited for Part II of the study at the same time as Part I of the study. Those participants who were interested in Part II of the study entered their email addresses or phone numbers on the online surveys in Part I. After online survey collection, the PI listed interested participants' contact information and recorded their

demographic characteristics in a spreadsheet, particularly, state of residence and gender. This information was used to target participants who were from Illinois and to set up an equal proportion of male and female participants.

c. **Sample size**

In qualitative research, sample size is usually determined by data saturation. According to Latham (2018), a sample size of 12 to 15 participants is a minimum for most qualitative interview studies and works very well when the participants are homogeneous. For this study, recruitment of 12 healthcare providers and 12 DHH patients would have been adequate to achieve data saturation. However, due to limited timeframe and funding constraints, the PI decided to recruit at minimum 10 healthcare providers and 10 DHH patients.

After reviewing the participants' demographic backgrounds, the PI contacted 12 healthcare providers who were Illinois residents, including six males and six females. Four participants did not respond to the invitation. As a result, the PI was able to recruit eight participants, including two males and six females.

For DHH patients, the PI reviewed participants' demographic backgrounds and contacted 11 DHH patients who were Illinois residents, including five males and six females, in addition to one DHH patient who was a Wisconsin male resident. Four participants who were Illinois residents withdrew from participation. As a result, the PI was able to recruit eight participants, including four males and four females. The PI did not track data saturation for adequacy of the data sample. This was a limitation of the study.

2. **Procedure**

Participants who completed the online survey in Part I were asked to enter their email addresses if they would also like to participate in Part II of the study. Interested participants were asked to provide their email addresses at the end of the online survey, and

their email addresses were automatically recorded on the PI's Qualtrics account. Interested participants were contacted via email and were provided a screening questionnaire to confirm their eligibility for qualitative interviews. Eligible participants were scheduled for an interview appointment to be completed in person, via videophone, Skype, or Google Docs.

Upon arrival to the interview location, Department of Disability and Human Development (DDHD) Room 216 or healthcare providers' offices, participants read and signed an additional informed consent form for participation in qualitative interviews. When participants were unable to interview in person but were available by videophone, Skype, or Google Docs, participants were asked to read, sign, and send a scanned copy of the informed consent form via email prior to the interview appointment. During the interview, they were asked open-ended questions about their preferences for VRI and in-person interpreting. The participants could opt out of any questions or stop the interview at any time.

3.   **<u>Accommodation</u>**

Accommodations for Part II of the study were provided by Disability Resource Center (DRC) and Academic Computing and Communication Center. During interviews with healthcare providers in person and via Skype, the PI used an ASL interpreter team to facilitate communication. Audio-recording was also used for transcription. When one participant was available in the late evening, the PI completed the interviews using Google Docs. The document created later became a transcript of the interview. The in-person and Skype interviews took approximately 20-30 minutes, and the Google Docs interview took 45 minutes.

During the interviews with DHH patients, the PI used an ASL interpreter team, audio-recording, and video-recording for translating content from ASL into spoken English. Audio-recorded files were transcribed, and the accuracy of transcription was checked by reviewing video-recordings. The PI interviewed DHH patients via videophone in the DDHD Room 216,

which provided a large screen for videophone (videophone has a face-to-face chat system, which is like Skype) and a space to set up a video-camera to record the interviews on the screen. The videophone interviews took approximately 20-30 minutes.

After each interview, the PI typed field notes, and then contacted DRC for support with transcribing audio-recorded files, which were de-identified. When the PI received transcripts for DHH patients, she reviewed the video-recorded files to double-check the transcripts for accuracy and correction. Only the PI accessed the video-recorded files to protect participants' confidentiality.

4. **Data collection**

    a. **Interview questionnaire**

    The interview questionnaire was semi-structured and asked about participants' preferences for VRI and in-person interpreting for critical care and non-critical care (Appendix C).

TABLE II

INTERVIEW QUESTION

Q#	Question
Q1	Please describe your experiences with video remote interpreting and in-person interpreting during healthcare appointments.
Q2	If you see a patient (or a doctor) for critical treatment, which interpreting method would you prefer to use?
Q3	If you see a patient (or a doctor) for non-critical treatment, which interpreting method would you prefer to use?
Q4	How do you determine what interpreting method is appropriate for different appointments with your patient (or your healthcare provider)?
Q5	What are your suggestions or ideas for improvement of video remote interpreting?

b.   **Compensation**

All participants who completed both Part I and Part II were given their $25 Target gift cards.

5.   **Research ethics**

a.   **Data management**

Data from Part II of the study were collected in the form of audio-recordings, video-recordings, transcripts, and field notes. All data were saved on the PI's Box account which was password-protected. Only the PI had access to this folder.

b.   **Informed consent**

The participants were presented with an additional consent form. The PI asked the participants to read the consent form and ask any additional questions. Participants were asked to sign and date the consent forms. The consent forms were electronically scanned and saved on the PI's Box account, and any paper forms were stored in a locked filing cabinet to which only the PI had access. Original documents were retained by the PI and electronic copies were shared with participants via email.

c.   **Participant confidentiality**

Participant confidentiality for Part II was maintained through coded data. The transcripts were replaced by code identifiers and were stored in the PI's Box with password protection. Only the 16 participants who completed Part II were linked to their responses from Part I. Data from participants who only completed Part I of the study remained anonymous. The information was stored on a server within the university control that no one had access to besides the PI. Access was password-protected, and any paper forms were kept in the PI's locked filing cabinet.

d.   **Risks, benefits, and safety**

Because this component of the study only involved finding out what participants thought and felt, there was minimal risk. If the participants felt uncomfortable answering any of the questions, they were able to stop at any time with no penalty for withdrawing prematurely. This study did not directly benefit its participants. However, this study could benefit hospital administrators who are interested in introducing VRI services in the future. To protect the participants' privacy, the audio-recordings, the video-recordings, transcripts, the field notes, and informed consents were saved on the PI's Box account with password-protection.

e.   **Quality control and quality assurance**

The PI was responsible for evaluating data quality. For data analysis, the PI shared the de-identified transcripts with a peer reviewer through a Dedoose account with password protection. Dedoose (Version 8.1) is web-based software and provides access to projects from any Internet connected computer via a browser or desktop app. Dedoose (Version 8.1) software incorporates qualitative and mixed methods and principal researchers can invite other researchers via email to access their projects online.

The peer reviewer was a Ph.D. student in Learning Sciences Research Institute. She was identified as a hearing person and used basic ASL. She was proficient in qualitative research methods and experienced in grounded theory research. The peer reviewer helped to enhance the rigor of data analysis, by reviewing all transcripts, codes, and codebook definitions, and applying the techniques of grounded theory. The PI and the peer reviewer reviewed transcripts and discussed the data analysis through Google Docs and Dedoose accounts, and discussions notes in Google Docs were saved with password protection.

6.   **Data analysis**

A qualitative content analysis approach was used and applied with the help of Dedoose (Version 8.1) software. Content analysis refers to identifying, organizing, and categorizing the content of texts, which differs from grounded theory. Although both content analysis and grounded theory have open coding in the beginning of data analysis, the goal of content analysis is to develop specific categories or themes in order to define the corpus of text. The goal of grounded theory is to generate a theory (Cho & Lee, 2014). The PI used a few techniques of grounded theory for the coding process, such as axial coding and in vivo coding which is a word or short phrase taken from the data (Charmaz, 2014), and then, the PI used content analysis to analyze the data. Additionally, content analysis analyzes texts rather than observation-based field notes (Patton, 2014). Content analysis has three approaches: conventional; directed; and summative (Hsieh & Shannon, 2005). The PI used the directed approach, which is guided by a more structured process than the conventional approach, where codes are derived from the text (Hsieh & Shannon, 2005).

In the directed approach, the researcher draws upon an existing theory or previous research findings to identify key concepts as initial coding categories, and then uses specific codes to identify and categorize all instances of the phenomenon of interest. Findings from the directed approach can offer supporting or non-supporting evidences for a theoretical framework (Hsieh & Shannon, 2005). That existing theory can be supported and extended is a strength of the directed approach, but at the same time, this approach has limitations, such as the researcher's bias, an overemphasis on existing theory, and participants' expectation bias (i.e., participants sharing ideas they believe the researcher expects of them). Therefore, having a peer reviewer can enhance the accuracy of data analysis (Hsieh & Shannon, 2005).

First, the PI reviewed all 16 transcripts and developed a codebook with definitions based on the five interview questions (*Experience, Preference, Suggestion,* and *Reason*).

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Weekly meetings were scheduled with the peer reviewer. Second, the PI and the peer reviewer independently coded all 16 transcripts and compared applications of codes to ensure inter-rater agreement. The peer reviewer helped to refine the codes and code definitions.

Third, the PI and the peer reviewer agreed to remove the original code, *Reason* and added a new code, *Opinion,* because participants often explained their opinions about VRI or in-person interpreting, which sometimes included their reasons for why they preferred VRI or in-person interpreting. The PI and the peer reviewer agreed upon the five main codes to be included in the codebook: *Experience*; *Preference*; *Opinion*; *Suggestion;* and *Other Issues and Concerns*.

TABLE III

CODEBOOK AND DEFINITION

Main Code	Definition
EXPERIENCE	Specific healthcare providers' and deaf/hard of hearing patients' positive or negative experiences including opinions on those experiences video remote interpreting, in-person interpreting, direct communication, family interpreting, writing, requesting an interpreter; Healthcare providers' experiences working with limited English proficiency patients and their families.
PREFERENCE	Hypothetically if both video remote interpreting and in-person interpreting were available, which do healthcare providers and deaf/hard of hearing patients choose based on critical and non-critical care, including reasons why.
OPINION	General attitudes about or reactions to video remote interpreting, in-person interpreting, or family interpreting, but not about any one specific event or experience; Someone relaying rumors that they've heard; Describing general situations that have happened in the past; Pros and cons about video remote interpreting and in-person interpreting uses; Comparison between limited English proficiency patients and deaf/hard of hearing patients.
SUGGESTION	Concrete ways to improve video remote interpreting equipments; Education to improve the interaction with healthcare providers and deaf/hard of hearing patients; Hiring; Meeting legal oblication.
OTHER ISSUES AND CONCERNS	Opinions for video remote services and 911, clinic systems, hospital administrators, and budgets; Opinions or experiences that are not related to video remote interpreting or in-person interpreting, but might be interesting information as supplemental findings.

Fourth, the PI and the peer reviewer agreed to add subcodes on each of five main codes in the codebook, which was called axial coding (Charmaz, 2014). As for *Experience*, two subcodes were created: *Positive;* and *Negative*, and then divided into two further subcodes: *VRI;* and *In-Person* to specify whether the participants were describing positive or

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negative experiences with VRI or in-person interpreting. As for *Preference*, two subcodes were created: *Critical Care;* and *Non-Critical Care*, and then divided into two further subcodes: *VRI;* and *In-Person* to specify whether the participants were discussing preferences for VRI or in-person interpreting for critical care or non-critical care. As for *Opinion*, two subcodes were created: *Positive;* and *Negative*, and then divided into two more subcodes: *VRI;* and *In-Person* to specify whether the participants were expressing opinions toward VRI or in-person interpreting based on their experiences, preferences, or suggestions. As for *Suggestion*, four subcodes were created: *Equipment; Education; Hiring;* and *Meeting Legal Obligation*.

TABLE IV
CODE DEVELOPMENT PROCESS

Research Questions	Groups	Theme	Subcode 1	Subcode 2
1. What are the perspectives of healthcare providers regarding use of video remote interpreting and in-person interpreting?	Healthcare providers	Experience Opinion	Positive	Video remote interpreting
				In-person interpreting
			Negative	Video remote interpreting
				In-person interpreting
2. What are the perspectives of deaf/hard of hearing patients regarding use of video remote interpreting and in-person interpreting?	Deaf/hard of hearing patients	Experience Opinion	Positive	Video remote interpreting
				In-person interpreting
			Negative	Video remote interpreting
				In-person interpreting
3. Are there differences in healthcare provider preferences for video remote interpreting versus in-person interpreting based on critical care and non-critical care?	Healthcare providers	Preference Opinion	Critical care	Video remote interpreting
				In-person interpreting
			Non-critical care	Video remote interpreting
				In-person interpreting
4. Are there differences in deaf/hard of hearing patient preferences for video remote interpreting versus in-person interpreting based on critical care and non-critical care?	Deaf/hard of hearing patients	Preference Opinion	Critical care	Video remote interpreting
				In-person interpreting
			Non-critical care	Video remote interpreting
				In-person interpreting
5. Are there differences in perspectives related to video remote interpreting use between healthcare providers who have primarily worked with patients with limited English proficiency and those who have worked primarily with deaf/hard of hearing patients?	Healthcare providers	Experience Pereference Opinion	Comparison with limited English proficiency patients	Video remote interpreting
				In-person interpreting
6. What are your suggestions or ideas for improving video remote interpreting?	Healthcare providers Deaf/hard of hearing patients	Suggestion	Equipment Education Hiring Meeting Legal Obligation	

Fifth, the PI and the peer reviewer independently reviewed the excerpts from transcripts to which codes were applied, developed their themes, and summarized the results from each main code and subcode, and compared application of subcodes to ensure inter-rater agreement. The PI also wrote summaries to answer the five research questions, and describe participants' opinions, and their suggestions. The PI also wrote memos after every meeting, because memo-writing is a critical method in grounded theory and helps to analyze the data and codes early in the research process (Charmaz, 2014). Lastly, the PI and the peer reviewer discussed how themes varied between healthcare providers and DHH patients, shared their disagreements, and summarized the qualitative finding in tables. These findings are discussed in Chapters VI and V.

7. **Positionality**

As Bourke (2014) discussed, the act of examining the research process with respect to the researcher's positionality can be described as reflexivity, which involves a self-conscious awareness of the relationship between the researcher and the participants. The topic of this study focused on healthcare providers' and DHH patients' perspectives on VRI and in-person interpreting. Personally, the PI experienced using VRI and in-person interpreting during critical care and non-critical care, which triggered the idea of her dissertation research to propose that hospital administrators balance the use of VRI services. Throughout the preparations to conduct this study from developing a protocol, research questions, online surveys and interview guides, the PI was aware of her positionality and tried to maintain a distinction between her own experience and that of her healthcare providers and DHH patients.

First, the PI was aware of the importance of establishing a trusting relationship between researchers and deaf participants (Meador & Zazove, 2005). The PI clarified with potential participants that the purpose of this study was to propose that hospital

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administrations should balance the use of VRI services, but not to support the popularity of VRI services. Since the PI had heard negative stories about VRI from the Deaf community, she had to be careful when explaining the purpose of the study to avoid any mistrust with the Deaf community (Young & Hunt, 2011). Additionally, the questionnaire and informed consent form needed to be culturally accessible (Young & Hunt, 2011). Due to funding and time constraints, the survey could not be made available in ASL format. Therefore, the PI explained her situation and offered an alternative approach to discuss the survey and the consent form face-to-face in person or via videophone.

Second, the PI was aware of her own positionality as an international deaf woman who uses spoken Japanese and uses English and ASL as non-native languages. The PI grew up in the midst of the hearing community and the Deaf community. Because of her unique background, the PI was often called as a hard of hearing person rather than a culturally deaf person, even though she was born deaf. Sometimes, the PI felt as an outsider within not only the hearing community, but also the Deaf community. Yet, the PI experienced working with the Deaf grassroots community and asked her colleagues who were the gatekeepers to the Deaf community for helping with recruitment.

Third, the PI maintained her professional relationship with her healthcare providers and her former DHH colleagues from the Deaf grassroots community. These contacts had also experienced use of VRI services and were willing to participate in the Part I study. However, the PI had to decline their interests in participating in the Part II study due to a possibility of bias and a conflict of interests.

Fourth, the PI asked a hearing peer reviewer for qualitative content analysis. Having a hearing peer reviewer helped balance her perspectives between hearing culture and Deaf culture, in addition to between healthcare providers and DHH patients.

Lastly, the PI drew upon the emotion work theory. The emotion work theory provides a framework for understanding researchers' experiences throughout the research process, such as individual interviews or fieldwork (Dickson-Swift, James, Kippen, & Liamputtong, 2009). Furthermore, when qualitative researchers conduct research on a sensitive topic, it is important to establish rapport with the participants. This helps to make participants feel relaxed and comfortable to share their experiences (Dickson-Swift, James, Kippen, & Liamputtong, 2009).

The PI worked with four DHH patient interviewees who emotionally shared their negative experiences with VRI. She remained calm and generated rapport. Yet, unexpectedly, the PI faced her own emotions when she interviewed one healthcare provider. The healthcare provider took her to a clinic room for the interview – it was the exact same room, where the PI received her first-time physical therapy after her car accident, and the place that would mark the beginning of her dissertation journey. And two years later, as a researcher, the PI came back to this same clinic again.

At this point, the PI's eyes were full of tears, and she had to control her emotions. She explained to the healthcare provider and the ASL interpreter that she visited this room as a patient before. Then, she continued the interview. After the interview, the PI felt that something was wrong, and she asked for feedback from the ASL interpreter who had translated her interviews with DHH patients and healthcare providers. Surprisingly, the ASL interpreter told her that the interview went well. After that incident, the PI gained more self-awareness of accepting and releasing her emotions to reduce emotional exhaustion (Dickson-Swift, James, Kippen, & Liamputtong, 2009).

G.   **Exploratory Findings from Merging Part I and II Results**

1.   **Summary**

To highlight convergent and divergent findings in Part I and II, the PI analyzed both the quantitative and qualitative data separately, compared the results, and shared congruent or incongruent findings (Creswell & Clark, 2011). For instance, if this study demonstrated that Part I's hypotheses were accepted or rejected, the PI reviewed the results with Part II's interview answers and explained the reasons why these hypotheses were accepted or rejected. This data analysis procedure involved exploring combined insights from quantitative findings and qualitative findings.

Part I Data Analysis Procedure	General Procedures in Data Analysis	Part II Data Analysis Procedure
*Established codebook. *Coded data by assigning numeric values. *Cleaned database.	**Preparing the data for analysis**	*Organized transcripts and field notes.
*Inspected data. *Conducted descriptive analysis.	**Exploring the data**	*Read through the data. *Developed qualitative codebook.
*Conducted Inferential statistics. *Analyzed the data for hypotheses testing. *Used SPSS software.	**Analyzing the data**	*Coded the data and assign labels to codes. *Group coded into themes and subthemes. *Used Dedoose software.
*Represented results in statements. *Present results in tables and figures.	**Representing the data analysis**	*Represented findings in discussions of themes. *Presented results in diagrams, tables, and figures.
*Explained how the results address hypotheses.	**Comparing data results** *Specified the dimension/information by which to compare the results from the two databases. *Represented the comparisons. *Interpreted how the combined results answer the mixed methods questions. *Validated the data and results.	*Explained how research questions were answered.

Figure 2. Data analysis procedure for Part I and II

2. **Potential validity threats**

This study had potential validity threats which typically arise when merging the quantitative and qualitative data. Threats related to data collection include: (a) selecting inappropriate individuals for quantitative and qualitative data collection; (b) obtaining unequal sample sizes for quantitative and qualitative data collection; and (c) collecting two types of data that do not address the same topics (Creswell & Clark, 2011).

To minimize these threats, this study recruited quantitative and qualitative samples from the same population so that the data gathered was comparable. Although it was ideal to sample both healthcare providers and DHH patients from the same location, the PI was unable to sample DHH patients directly due to the HIPAA policy. In addition, the small sample size limited generalizability, but the results may be beneficial for hospital administrators who are interested in introducing VRI under budget constraints.

In addition to the above threats, limitations in data analysis also need to be considered such as: (a) using inadequate approaches to converge the data; and (b) making illogical comparisons between quantitative and qualitative results (Creswell & Clark, 2011). To avoid these limitations, this study developed the sequential exploratory design to organize the data analysis.

Lastly, interpretation issues also need to be addressed such as: (a) not resolving data divergent findings; (b) not discussing the mixed methods research questions; and (c) giving more weight to one form of data than the other form of data (Creswell & Clark, 2011). This study developed a detailed framework for data collection and analysis by listing the study hypotheses and themes, participant selection, and analytic strategies for quantitative and qualitative data. Other limitations are discussed in Chapter V.

IV.   RESULTS

A.   Part I Quantitative Results

1.   Demographic characteristics of respondents

a.   Healthcare providers

The study collected a total of 62 completed surveys for healthcare providers. Incomplete surveys ($n = 2$) were excluded from analysis. Surveys were considered complete only if all questions were answered. The surveys included both healthcare providers who primarily worked with LEP patients ($n = 36$) and healthcare providers who primarily worked with DHH patients or both LEP patients and DHH patients ($n = 26$). The demographic characteristics of healthcare providers ($n = 62$) are presented in Tables V.

TABLE V
DEMOGRAPHIC CHARACTERISTICS OF
HEALTHCARE PROVIDERS

Variables	*n*	%
Gender		
Male	16	25.8
Female	45	72.6
Not Answered	1	1.6
Age		
20-29	25	40.3
30-39	15	24.2
40-49	8	12.9
50-59	6	9.7
Over 60	1	1.6
Not Answered	7	11.3
Race		
White	41	66.1
Black	2	3.2
Hispanic	4	6.5
Asian	11	17.7
Other	3	4.8
Not Answered	1	1.6
Language		
English only	35	56.5
English and Spanish	17	27.4
English and Other	10	16.1
Work Experience with Limited English Proficiency		
Limited English Proficiency Patients only	36	58.1
Deaf/Hard of Hearing Patients only	8	12.9
Both Patients	18	29.0
Work Experience as Self-Interpreter		
Experienced	22	35.5
Never Experienced	40	64.5
Practice Setting		
Outpatient	40	64.5
Inpatient	8	12.9
Both Outpatient and Inpatient	14	22.6

TABLE V (CONTINUED)
DEMOGRAPHIC CHARACTERISTICS OF
HEALTHCARE PROVIDERS

Variables	*n*	%
Profession		
Assistant Practitioner	1	1.6
Dentist, Dental Hygienist	13	21.0
Nurse, Registered Nurse, Nurse Practitioner	16	25.8
Occupational Therapist	2	3.2
Physican	5	8.1
Physical Therapist	3	4.8
Pharmacist	3	4.8
Speech-Language Pathologist	6	9.7
Student	12	19.4
Other	1	1.6
Specialization		
Dentistry, Oral Surgery	22	35.5
Dermatology	1	1.6
Emergency Medicine, Critical Care	4	6.5
Family Medicine	2	3.2
Obstetrics, Gynecology	1	1.6
Orthopedics, Neurology, Urology	4	6.5
Otolaryngology	3	4.8
Pharmacy	4	6.5
Physical Medicine, Rehabilitation	4	6.5
Surgery	4	6.5
Orthodontics	7	11.3
Pediatrics	4	6.5
Other	2	3.2
Years of Work*		
Less than 1 year	9	14.5
1 year	11	17.7
2 years	6	9.7
3 years	8	12.9
4 years	4	6.5
5 years	6	9.7
6-9 years	1	1.6
10-19 years	8	12.9
20-29 years	5	8.1
Over 30 years	4	6.5
State		
Illinois	52	83.9
Florida	2	3.2
Iowa	2	3.2
Kentucky	1	1.6
Louisiana	1	1.6
Massachusetts	1	1.6
Wisconsin	2	3.2
Not Answered	1	1.6

*Years of Work's response categories are not exhaustive as these
were created based on respondents' write-in responses.

b. **Deaf/hard of hearing patients**

The study collected a total of 41 completed surveys for DHH patients. Surveys were considered complete only if all questions were answered. Duplicate surveys ($n = 3$) were excluded from analysis. The demographic characteristics of DHH patients ($n = 41$) are presented in Tables VI.

TABLE VI

DEMOGRAPHIC CHARACTERISTICS OF
DEAF/HARD OF HEARING PATIENTS

Variables	*n*	%
Gender	17	41.5
Male	22	53.7
Female	2	4.9
Other		
Age		
20-29	5	12.2
30-39	6	14.6
40-49	9	22.0
50-59	8	19.5
Over 60	9	22
Not Answered	4	9.8
Race		
White	28	68.3
Black	5	12.2
Hispanic	4	9.8
Asian	3	7.3
Other	1	2.4
Communication		
American Sign Language	31	75.6
Oral English	5	12.2
Pidgin Signed English	3	7.3
Other	2	4.9

TABLE VI (CONTINUED)

DEMOGRAPHIC CHARACTERISTICS OF
DEAF/HARD OF HEARING PATIENTS

Variables	*n*	%
Education		
Less than High School	1	2.4
High School Graduate	6	14.6
Some College, No Degree	4	9.8
Associate Degree	9	22.0
Bachelor's Degree	8	19.5
Graduate or Professional Degree	13	31.7
Health Literacy (Difficulty with reading printed materials in English)		
Very Difficult	1	2.4
Difficult	4	9.8
Moderate	12	29.3
Easy	13	31.7
Very Easy	11	26.8
Hearing Loss		
Moderate Hearing Loss (41-60dB)	2	4.9
Severe Hearing Loss (61-90dB)	10	24.4
Profound Hearing Loss (90-120dB)	27	65.9
Not Answered	2	4.8
State		
Illinois	30	73.2
Florida	1	2.4
Indiana	1	2.4
Maryland	2	4.9
Massachusetts	1	2.4
Minnesota	1	2.4
Pennsylvania	1	2.4
Texas	2	4.9
Wisconsin	1	2.4
Not Answered	1	2.4
Completed Survey		
Independently	39	95.1
With help from someone	2	4.9

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2.   **Statistical analysis**

a.   **Hypothesis 1 and hypothesis 2**

This study tested *Hypothesis 1* and *Hypothesis 2* through a chi-square test to examine differences in interpreting preferences between healthcare providers who primarily worked with DHH patients ($n = 26$) and DHH patients themselves ($n = 41$) based on critical care and non-critical care. Statistical differences were double-checked by using a fisher's exact test for accuracy. Fisher's exact test is a test of significance that is used in place of a chi-square test in two by two tables, especially in cases of small samples (Lane, 2018). Healthcare providers who preferred phone translation or had no preferences and DHH patients who had no preferences were omitted for data analysis, because DHH patients did not have a category for phone translation, as well as the research questions focused on the two groups' interpreting preferences for VRI and in-person interpreting to compare equal categories between the two groups.

Hypothesis 1: This study examined whether there were differences in interpreting preferences for critical care encounters between healthcare providers who primarily worked with DHH patients and DHH patients themselves. A chi-square test found no difference in preferences, $\chi^2 (1, N = 58) = .011$, $p > .05$. The fisher's exact test showed similar results ($p = 1.000$). Both healthcare providers and DHH patients preferred in-person interpreting for critical care settings.

TABLE VII

HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING PATIENTS' PERFERENCES

FOR CRITICAL CARE

	In Person Interpreting	Video Remote Interpreting	Total
Healthcare Providers	20	1	21[a]
Deaf/Hard of Hearing Patients	35	2	37[b]
Total	55	3	58

[a] Five healthcare providers who had no preference were omitted from data analysis.

[b] Four deaf/hard of hearing patients who had no preference were omitted from data analysis.

TABLE VIII

RESULT OF CHI-SQUARE TEST: HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING PATIENTS' PERFERENCES FOR CRITICAL CARE

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	0.011[a]	1	0.915	1.0000	0.705	
Continuity Correction [b]	0.000	1	1.000			
Likelihood Ratio	0.011	1	0.915	1.0000	0.705	
Fisher's Exact Test				1.0000	0.705	
Linear-by-Linear Association	0.011[c]	1	0.916	1.0000	0.705	0.453
N of Valid Cases	58					

[a] 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.09.

[b] Computed only for a 2 x 2 table.

[c] The standardized statistic is -0.105.

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Hypothesis 2: This study examined whether there were differences in interpreting preferences for non-critical care encounters between healthcare providers who primarily worked with DHH patients and DHH patients themselves. Statistical testing found a significant difference. Healthcare providers and DHH patients had different preferences for non-critical care, χ^2 (1, N = 53) = 5.014, p < .05 (Fisher's exact test, p = .035). In other words, it appeared that healthcare providers had no preferences between VRI or in-person interpreting for non-critical care, while DHH patients tended to prefer in-person interpreting for non-critical care.

TABLE IX

HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING PATIENTS' PREFERENCES FOR NON-CRITICAL CARE

	In Person Interpreting	Video Remote Interpreting	Total
Healthcare Providers	11	10	21[a]
Deaf/Hard of Hearing Patients	26	6	32[b]
Total	37	16	53

[a] Five healthcare providers who preferred telephone interpreting or had no preference were omitted from data analysis.

[b] Nine deaf/hard of hearing patients who had no preference were omitted for data analysis.

TABLE X

RESULT OF CHI-SQUARE TEST: HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING PATIENTS' PREFERENCES FOR NON-CRITICAL CARE

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.014[a]	1	0.025	0.035	0.027	
Continuity Correction [b]	3.738	1	0.053			
Likelihood Ratio	4.971	1	0.026	0.035	0.027	
Fisher's Exact Test				0.035	0.027	
Linear-by-Linear Association	4.919[c]	1	0.027	0.035	0.027	0.022
N of Valid Cases	53					

a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.34.

b Computed only for a 2 x 2 table.

c The standardized statistic is 2.218.

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b. **<u>Hypothesis 3 and hypothesis 4</u>**

This study tested *Hypothesis 3* and *Hypothesis 4* through chi-square

tests to examine differences in interpreting preferences between healthcare providers who

primarily worked with LEP patients ($n = 36$) and healthcare providers who primarily worked

with DHH patients ($n = 26$) for critical care and non-critical care encounters. Statistical

differences were verified through a fisher's exact test for accuracy.

Hypothesis 3: This study examined differences between interpreting preferences of

healthcare providers who primarily worked with LEP patients and healthcare providers who

primarily worked with DHH patients for critical care encounters and found no significant

difference, χ^2 (1, N = 54) = .351, $p > .05$ (Fisher's exact test, $p = 1.000$). Both groups

preferred in-person interpreting for critical care encounters.

TABLE XI

HEALTHCARE PROVIDERS' PREFERENCES FOR CRITICAL CARE

	In Person Interpreting	Video Remote Interpreting	Total
Healthcare Providers who worked with Limited English Proficiency Patients	30	3	33[a]
Healthcare Providers who worked with Deaf/Hard of Hearing Patients	20	1	21[b]
Total	50	4	54

[a] Three healthcare providers who preferred telephone interpreting or had no preference were omitted from data analysis.

[b] Five healthcare providers who preferred telephone interpreting or had no preference was omitted for data analysis.

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TABLE XII

RESULT OF CHI-SQUARE TEST:

HEALTHCARE PROVIDERS' PREFERENCES FOR CRITICAL CARE

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	0.351[a]	1	0.554	0.649	0.492	
Continuity Correction[b]	0.004	1	0.953			
Likelihood Ratio	0.371	1	0.542	0.649	0.492	
Fisher's Exact Test				1.000	0.492	
Linear-by-Linear Association	0.344[c]	1	0.557	0.649	0.492	0.362
N of Valid Cases	54					

[a] 2 cells (50.0%) have expected count less than 5. The minimum expected count is 1.56.

[b] Computed only for a 2 x 2 table.

[c] The standardized statistic is 0.587.

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Hypothesis 4: This study examined differences between interpreting preferences of healthcare providers who primarily worked with LEP patients and healthcare providers who primarily worked with DHH patients for non-critical care encounters and found no significant difference, χ^2 (1, N = 49) = .007, p >.05 (Fisher's exact test, p = 1.000). In other words, both groups did not have a strong preference for either VRI or in-person interpreting for non-critical care encounters.

TABLE XIII

HEALTHCARE PROVIDERS' PREFERENCES FOR NON-CRITICAL CARE

	In Person Interpreting	Video Remote Interpreting	Total
Healthcare Providers who worked with Limited English Proficiency Patients	15	13	28[a]
Healthcare Providers who worked with Deaf/Hard of Hearing Patients	11	10	21[b]
Total	26	23	49

[a] Eight healthcare providers who preferred telephone interpreting or had no preference were omitted from data analysis.

[b] Five healthcare providers who preferred telephone interpreting or had no preference was omitted for data analysis.

TABLE XIV

RESULT OF CHI-SQUARE TEST:

HEALTHCARE PROVIDERS' PREFERENCES FOR NON-CRITICAL CARE

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	0.007[a]	1	0.934	1.0000	0.581	
Continuity Correction [b]	0.000	1	1.000			
Likelihood Ratio	0.007	1	0.934	1.0000	0.581	
Fisher's Exact Test				1.0000	0.581	
Linear-by-Linear Association	0.007[c]	1	0.935	1.0000	0.581	0.226
N of Valid Cases	49					

a 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.86.

b Computed only for a 2 x 2 table.

c The standardized statistic is -0.082.

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3.   **Recommendations**

   a.   **Recommendations for improving video remote interpreting**

The study examined healthcare providers' and DHH patients' opinions on how to improve VRI services. Each respondent had different recommendations. The most common recommendation among healthcare providers who primarily worked with LEP patients was improving connectivity. Specifically, 27.8% of respondents recommended this, so that healthcare providers and LEP patients would not have to worry about disconnecting with VRI interpreters during the treatment sessions. For healthcare providers who primarily worked with DHH patients, 26.9% of respondents recommended enlarging the screen size to 16-inch. The reason given was that with an enlarged screen, patients and VRI interpreters would be able to see each other better. For DHH patients, 19.5% of respondents recommended adding a 360-degree camera as it would be useful when patients had limited mobility or were laying down on a bed. Additionally, 14.6% of respondents recommended not using VRI at all in clinical settings. The PI attempted to test whether there was statistically significant difference among the three groups regarding their suggestions through a chi-square test, but the small sample size prevented this analysis.

TABLE XV

HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING PATIENTS' RECOMMENDATIONS FOR IMPROVING VIDEO REMOTE INTERPRETING SERVICES

Variables	Healthcare Providers who worked with Limited English Proficiency Patients		Healthcare Providers who worked with Deaf/Hard of Hearing Patients		Deaf/Hard of Hearing Patients	
	n	%	n	%	n	%
360 Degree Camera	4	11.1	5	19.2	8	19.5
Battery Free Cable Plug	8	22.2	2	7.7	2	4.9
Adjustable Height	2	5.6	2	7.7	3	7.3
16-inch Screen Size	2	5.6	7	26.9	6	14.6
Calling a Specific Interpreter	7	19.4	3	11.5	3	7.3
Higher Wireless Speed	10	27.8	4	15.4	6	14.6
Adjustable Lighting	0	0.0	1	3.8	2	4.9
Other	3	8.3	2	7.7	5	12.2
None	0	0.0	0	0.0	6	14.6
Total	36	100.0	26	100.0	41	100.0

b.   **<u>Recommendations for video remote interpreting training</u>**

The study examined whether healthcare providers had training experiences for using VRI or for treating DHH patients. More than 50% of both healthcare providers who primarily worked with LEP patients and healthcare providers who primarily worked with DHH patients had no training for using VRI. Similarly, more than 40% of both healthcare providers who primarily worked with LEP patients and healthcare providers who primarily worked with DHH patients had no training for treating DHH patients.

The PI tested whether there was a statistically significant difference between the two groups related to their training experiences using chi-square tests. The test revealed no difference for VRI training, χ^2 (3, N = 62) = 2.726, p > .05 (Fisher's exact test, p = .441), and for treating DHH patients, χ^2 (3, N = 62) = .569, p > .05 (Fisher's exact test, p = .857).

TABLE XVI

HEALTHCARE PROVIDERS' TRAINING EXPERIENCES FOR USING VIDEO REMOTE INTERPRETING AND TREATING DEAF/HARD OF HEARING PATIENTS

| | Healthcare Providers who worked with Limited English Proficiency Patients | | | | Healthcare Providers who worked with Deaf/Hard of Hearing Patients | | | |
| | Using Video Remote Interpreting | | Treating Deaf/Hard of Hearing Patients | | Using Video Remote Interpreting | | Treating Deaf/Hard of Hearing Patients | |
Variables	n	%	n	%	n	%	n	%
A Significant Amount	1	2.8	1	2.8	0	0.0	1	3.8
A Moderate Amount	3	8.3	2	5.6	4	15.4	2	7.7
A Little Amount	11	30.6	13	36.1	11	42.3	11	42.3
None at All	21	58.3	20	55.6	11	42.3	12	46.2
Total	36	100.0	36	100.0	26	100.0	26	100.0

TABLE XVII

RESULT OF CHI-SQUARE TEST: TRAINING EXPERIENCES
FOR USING VIDEO REMOTE INTERPRETING

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.726[a]	3	0.436	0.457		
Likelihood Ratio	3.088	3	0.378	0.457		
Fisher's Exact Test	2.723			0.441		
Linear-by-Linear Association	0.82[b]	1	0.365	0.397	0.232	0.09
N of Valid Cases	62					

[a] 4 cells (50.0%) have expected count less than 5. The minimum expected count is 0.42.

[b] The standardized statistic is 0.906.

TABLE XVIII
RESULT OF CHI-SQUARE TEST: TRAINING EXPERIENCES
FOR TREATING DEAF/HARD OF HEARING PATIENTS

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	0.569a	3	0.904	0.926		
Likelihood Ratio	0.568	3	0.904	0.926		
Fisher's Exact Test	0.997			0.857		
Linear-by-Linear Association	0.496b	1	0.481	0.503	0.297	0.104
N of Valid Cases	62					

a 4 cells (50.0%) have expected count less than 5. The minimum expected count is 0.84.

b The standardized statistic is 0.704.

Moreover, 88.9 % of healthcare providers who primarily worked with LEP patients and 73.1% of healthcare providers who primarily worked with DHH patients agreed that they needed to be trained. In addition, 87.8% of DHH patients agreed that healthcare providers needed to be trained.

TABLE XIX

HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING PATIENTS' RECOMMENDATIONS FOR

VIDEO REMOTE INTERPRETING TRAINING

Variables	Healthcare Providers who worked with Limited English Proficiency Patients		Healthcare Providers who worked with Deaf/Hard of Hearing Patients		Deaf/Hard of Hearing Patients	
	n	%	*n*	%	*n*	%
Need to be trained	32	88.9	19	73.1	36	87.8
Not to be trained	4	11.1	7	26.9	5	12.2
Total	36	100.0	26	100.0	41	100.0

Notably, the percent of healthcare providers who primarily worked with DHH patients who said that training was not necessary (26.9%) was more than double the percent of respondents in the other two groups who also said no training was necessary (11.1% and 12.2%). A chi-square test was used to assess whether there was a statistically significant difference related to recommendations for VRI training among the three groups. The test revealed that there were no statistically significant differences among the three groups, $\chi^2 (2, N = 103) = 3.455, p > .05$ (Fisher's exact test, $p = .221$).

TABLE XX

RESULT OF CHI-SQUARE TEST: HEALTHCARE PROVIDERS' AND DEAF/HARD OF HEARING
PATIENTS' RECOMMENDATIONS FOR VIDEO REMOTE INTERPRETING TRAINING

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.455[a]	2	0.178	0.221		
Likelihood Ratio	3.153	2	0.207	0.221		
Fisher's Exact Test	3.162			0.221		
Linear-by-Linear Association	0.005[b]	1	0.944	1	0.536	0.124
N of Valid Cases	103					

a 1 cells (16.7%) have expected count less than 5. The minimum expected count is 4.04.

b The standardized statistic is -0.070.

c.   **Suggestions**

The study also asked open-ended questions regarding healthcare providers and DHH patients' suggestions for improving VRI services. Their responses were anonymous. The PI coded themes on their suggestions in each of three groups.

Healthcare providers who worked with limited English proficiency patients. The study collected 11 open-ended answers, which were summarized as three themes: *Consistent Translation; Better Connectivity;* and *Equipment Access.*

Regarding *Consistent Translation,* three healthcare providers (A, B, and C) expressed that hospitals should provide the same VRI interpreter for patients and full translation access for all treatments.

Healthcare provider (A) said, "Would like to be able to request or make appointment for specific interpreters for physical therapy as patients can develop a relationship and trust with that particular individual." Healthcare provider (B) said, "When an interpreter is needed in a clinical situation, it is a start of the whole treatment not a one-time service. Both patients and doctors might need the very interpreter again." Finally, healthcare provider (C) argued, "many different services are available but never consistent. I don't think there is a perfect system but there should be a standard level of vocabulary."

Regarding *Better Connectivity*, three healthcare providers (D, E, and F) experienced poor connectivity several times, which ended up recalling new interpreters again during treatments. Healthcare provider (D) expressed frustration, "Improve connection-very frustrating when attempting to use video interpreter and the session cuts out and I have to keep calling new interpreters." Healthcare provider (E) also noted, "Making sure you have a good connection and the ability to reconnect with the same interpreter if for some reason the call gets disconnected."

Regarding *Equipment Access*, two healthcare providers (G and H) expressed this concern. Healthcare provider (G) shared, "The biggest problem I have with them is they are usually always plugged in or bulky. It would be nice if they were light, mobile, and easy to use with a charged battery." Healthcare provider (H) suggested to provide VRI instruction in case of emergencies, such as "User-friendly with attached simple instruction on device" or "Web-link with instructions."

Healthcare providers who worked with deaf/hard of hearing patients. The study collected 16 open-ended answers that included both their experiences and suggestions. Their answers were summarized as five themes: *Video Privacy; Specific Patient Populations; Education; Equipment;* and *Other Concerns*. Regarding *Video Privacy*, two healthcare providers (I and J) expressed that VRI had no option for video privacy with different reasons. Healthcare provider (I) pointed out,

> Video remote interpreting proves difficult when deaf or hard of hearing patients are having a gynecologic exam. There is difficulty with privacy. I have experienced this first hand. Typically, there is a "privacy shield" where patients won't be seen but then there is no way to ask patients questions while doing an exam.

Healthcare provider (J) explained,

> If a patient asks for an in-person interpreter, hospitals should respect that preference. VRIs can also be improved by being set up prior to the arrival of the patient, and the option for a "video privacy" when the patient is waiting for a nurse/doctor. It would also help if doctors/nurses are already trained so it will not make the appointment longer or awkward if the VRI has problems.

Regarding *Specific Patient Populations*, two healthcare providers (K and L) suggested not to use VRI for specific patient populations, such as limited literacy, lower mental status, or non-signers. Healthcare provider (K) noted,

> In a large patient room, the audio capabilities of the iPad are not adequate, particularly for patients with poor comprehension or lower mental status. Varying dialects can prove challenging when there is minimal interaction between the interpreter and the patient.

Healthcare provider (L) also shared her elderly patient's frustration in a detailed note,

> My experience caring for those with hearing challenges is extensive – mostly older adults who also have decreased vision. They do not sign. Currently, I care for an older gentleman with extreme hearing loss and decreased vision in his home. I have a solid rapport with him and can communicate with him with a combination of speaking in a certain tone in his better ear, and touch (to get his attention and provide reassurance) ….
>
> I accompany him to his medical appointments. He told me early on how frustrated he is when attempting to hear/understand what the doctor is saying. I have acted as a liaison during these visits. This works well because I see him several days a week and can continue to remind/clarify him of the doctor's recommendations, etc. I also accompanied him and his spouse recently to a place where they demonstrate and offer adaptive equipment for hard of hearing….
>
> In conclusion, I can speak to the need for any devices such as VRI to be presented in a simple, personable way. I'm big on education and could see a need for perhaps a short video introduction to VRIs could be helpful. (For instance, my gentleman sees well enough to watch a video if it had large print captions...)

As for *Education*, three healthcare providers (M, N, and O) suggested training for not

only healthcare providers, but also patients and their families. Healthcare provider (M) said,

> Not only medical staff training but some tangible resource for patients & families, so they understand the benefits & use of video-remote interpreting. I had one patient that was hesitant to utilize the services because the patient thought the video would be stored & accessed by others.

Healthcare provider (N) mentioned,

> I, myself, have never learned to dial in for the VRI. I have relied on my resident MD or medical student helpers. If I need to use VRI by myself with a patient, I would need to be taught how to best use the VRI for optimal communication with my patient.

As regard with *Equipment*, four healthcare providers (P, Q, R, and S) suggested

improving VRI equipment and technology, such as better connectivity, better flexibility, ease

of use and access, and "a headset for the patient and a Siri type of typed information as the

interpreter translates." Healthcare provider (P) explained, "If a call is dropped or ends but

needs to be restarted again then it would be helpful to have the same interpreter because they

already know the background of the appt."

Regarding *Other Concerns*, one healthcare provider (T) was concerned, "It's effective but the translations can be confusing and it's less personal of an experience with the patient." Healthcare provider (U) sharply noted, "Get rid of it. For deaf/hard of hearing, video interpreter services are a failure in this population." Healthcare provider (V) noted,

> Improving the equipment per the previous recommendations would go a long way toward making it easier to use with patients, particularly making it easier to move up/down and around so that the patient can easily be seen. Some aspects cannot easily be remedied such as the high ambient noise level in some areas making it difficult to hear. Overall, I've found video remote interpreting easy to use. It has been a boon for our clinic which is low on the list of priorities for in-person interpreters at our hospital. Prior to remote video interpreting being available, patients frequently attended appointments without any interpreter being available, resulting in a less than optimal experience for patient and therapist alike.

Deaf/hard of hearing patients. The study collected 25 open-ended answers including their experiences, opinions, and suggestions. Their answers were summarized into seven themes: *Patient-Provider Communication; Patient Preference; Education; Equipment; Appropriate Use; Costs;* and *"VRI forbidden period!"* Regarding *Patient-Provider Communication*, three DHH patients (A, B, and C) expressed their concerns that VRI negatively affected patient-provider communication. DHH patient (A) said, "From my past experience, VRI often make it feel unnatural since providers were more focus on VRI than me." DHH patient (B) noted, "VRI should be used as a last resort. Live interpreter should always be used." Finally, DHH patient (C) noted,

> Costly once patient is admitted to hospital then they must keep VRI on hold whether Dr. or nurses speaking to deaf patient. It is not fair we have to wait to get it connected and then communicate. Often Dr. has a little time and we will not get good care of. If Dr. comes then we must receive message from Dr. directly not thru [sic] nurse.

Regarding *Patient Preference*, two DHH patients (D and E) argued that healthcare providers should promote the option of flexibility for their patients, by giving a choice whether they would be okay with VRI or they would prefer an in-person interpreter.

Regarding *Education*, 11 DHH patients (F, G, H, I, J, K, L, M, N, O, and P) suggested training for healthcare providers and staff on how to use VRI and treat DHH patients, training

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hospital administrators for meeting legal obligations and providing VRI certified interpreters,

and training DHH patients how to use VRI beforehand.

For instance, DHH patient (F) expressed,

> I strongly believe that a deaf patient should be trained how to use VRI beforehand. I was awkward and stunned to see VRI screen appeared on without being told about (assumed an in-person interpreter would come). No notification was made.

Also, DHH patient (G) noted,

> Also, make sure that hospitals know their laws regarding use of VRIs even after a Deaf person requested for a live in-person interpreter. Way too often, I've experienced and seen hospitals put a requested method off and intentionally use VRI so they can keep money in their pocket.

Finally, DHH patients (H) pointed out,

> Training is essential. For example, I've had doctors talk to the interpreter (not looking at me) both live and VRI interpreters. While I know every doctor/nurse may not encounter a deaf person in their career-the training can be included in the brochure/how-to-do instructions when they use an interpreter.

> Regarding *Equipment*, four DHH patients (Q, R, S, and T) suggested maintaining VRI

equipment on a regular basis. DHH patient (Q) said, "Person must check it every day the first

thing to make sure they are working, VRI equipment must be tuned up or calibrated weekly."

Additionally, DHH patient (R) suggested an alternative communication option,

> If doctors just learned to type, they would not need a video interpreting. Every doctor's office has a computer today. All they need to do is turn on MS Word or anything that displays what they type what they are saying. Telecoil loops in doctors' offices and waiting rooms would be a great improvement. Almost all CI [Cochlear Implant]'s and hearing aids have built in telecoils. I am only 100% deaf when my CI is off, and I do know sign. Having doctors use remote live captioning might be nice, but getting them to do it, even with ADA requirements, is not easy. Asking for can ruin doctor/patient relationships. Educating doctors and their office staff is needed!!!!

> As for *Appropriate Use*, DHH patient (U) noted, "Honestly, I have used VRI – for a

simple doctor visit – it was fine but when it is for something more serious – emergency VRI

shouldn't be used at all." Regarding *Costs*, DHH patient (V) pointed out that in-person

interpreting services were cheaper than VRI services.

In this case to keep active VRI is going to be costly for hospitals such as VRI rate I believe $3 per minute and keep this VRI Active for 1 hour it would cost hospital $180. In person interpreter can cost much cheaper than $180 for two hours. Within person interpreting we get quality of interpreting medical.

Finally, as for *"VRI forbidden period!"* four DHH patients (V, W, X, and Y) argued

that VRI should be forbidden in clinical settings. One DHH patient (V) sharply questioned,

No flexibility such as patient is laying down then how this would be convenient to patient? Connection time is delayed by five or six minutes due to network. Connection time is more delayed if VRI interpreter is not available. During the connection time who is responsible to relay Drs or nurses' message?

TABLE XXI

THEME COMPARISON: PART I'S SUGGESTIONS

Healthcare Providers who worked with Limited English Proficiency Patients	Healthcare Providers who worked with Deaf/Hard of Hearing Patients	Deaf/Hard of Hearing Patients
Concisitent Translation	Video Privacy	Patient-Provider Communication
Better Connectivity	Specific Patient Populations	Patient Preference
Equipment Access	Education	Education
	Equipment	Equipment
	Other Concerns	Appropriate Use
		Costs
		"VRI forbidden period!"

4.   **Summary**

Part I of the study helped reveal an overall picture of healthcare providers' and DHH patients' preferences for using VRI and in-person interpreting for critical care and non-critical care encounters. This part of the larger study also helped to identify the importance of training healthcare providers in using VRI and treating DHH patients. Both providers and DHH patients preferred in-person interpreting for critical care, but DHH patients, unlike healthcare providers, tended to prefer in-person interpreting for non-critical care as well. However, the quantitative results were unable to explain why this difference existed. Additionally, Part I of the study shared a piece of open-ended answers regarding healthcare providers' and DHH patients' suggestions for improving VRI services. Following this, Part II of the study further explored some of these issues through in-depth interviews.

B.   **Part II Qualitative Results**

1.   **Screening questionnaire**

a.   **Healthcare providers**

Twenty-one of 26 respondents were interested in participating in Part II of the study. As described in Chapter III, the PI contacted 12 healthcare providers with a screening questionnaire and received interview confirmations from eight healthcare providers who included two males, six females, and all of whom were Illinois residents. All providers identified as being white.

b.   **Deaf/hard of hearing patients**

Thirty-one of 41 respondents who completed Part I of the study were interested in participating in Part II of the study. As described in Chapter III, the PI contacted 12 DHH patients with a screening questionnaire and received interview confirmation from eight DHH patients who included four males and four females. Seven were Illinois residents and one was a Wisconsin resident. All providers identified as white. Due to the small-scale of

this study, participants were selected to best match characteristics of providers. A lack of

diverse interviewees is one limitation of this study, which is discussed later in Chapter V.

 2. **Demographic characteristics of interviewees**

  a. **Healthcare providers**

   Table XXII presents the demographic characteristics of the eight

healthcare providers.

TABLE XXII

DEMOGRAPHIC CHARACTERISTICS OF INTERVIEWEES: HEALTHCARE PROVIDERS

ID*	Gender	Age	Profession	Specialization	Primary Workplace	Years of Work
BE	Female	58	Physical Therapist	Physical Medicine and Rehabilitation	Outpatient	32
EP	Female	31	Speech-Language Pathologist	Otolaryngology	Outpatient/Inpatient	8
GJ	Female	31	Dentist	Dentistry	Outpatient	3
GO	Female	32	Physical Therapist	Physical Medicine and Rehabilitation	Outpatient	1
MN	Female	38	Nurse Practitioner	Emergency Medicine	Outpatient/Inpatient	15
KS	Male	26	Oral Surgeon	Dentistry	Outpatient	4
TY	Female	27	Nurse Practitioner	Obstetrics and Gynecology	Outpatient/Inpatient	1
WD	Male	50	Physician	Orthopedic Surgery	Outpatient/Inpatient	19

*ID is coded as a fictitious intitial name.

Outpatient = Outpatient Services. Outpatient/Inpatient = Outpatient and Inpatient Services.

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b.   **<u>Deaf/hard of hearing patients</u>**

Table XXIII also presents the demographic characteristics of the eight DHH patients.

TABLE XXIII

DEMOGRAPHIC CHARACTERISTICS OF INTERVIEWEES: DEAF/HARD OF HEARING PATIENTS

ID*	Gender	Age	Education	Primary Communication	Understanding Written Information (instruction, pamphlets from doctors)	Hearing Loss
BU	Male	70	Graduate Degree	ASL	Easy	Profound
DE	Female	54	Bachelor's Degree	ASL/PSE	Easy	Severe
ED	Female	50	Associate Degree	ASL	Moderate	Profound
IK	Female	53	Graduate Degree	ASL	Easy	Profound
JA	Male	45	Some College, No Degree	ASL	Moderate	Profound
ML	Female	48	Bachelor's Degree	ASL	Easy	Profound
RM	Male	61	Associate Degree	ASL	Moderate	Severe
RP	Male	30	Graduate Degree	ASL	Easy	Severe

*ID is coded as a fictitious intitial name.

ASL = American Sign Language. PSE = Pidgin Signed English.

Severe = Severe Hearing Loss (61-90dB). Profound = Profound Hearing loss (90-120dB).

3.   **<u>Qualitative content analysis</u>**

a.   **<u>Research question 1 and 2</u>**

1)   **<u>Healthcare providers</u>**

Research Question 1 asked healthcare providers' perceptions, particularly, their positive or negative experiences related to use of VRI and in-person interpreting.

Positive experiences with using video remote interpreting. Six healthcare providers (EP, EK, GO, MN, TY, and WD) expressed their positive experiences with use of VRI. Their experiences were divided into four main themes: *Convenience of using VRI; Comfortable for Patients; "As long as it works;"* and *Patient-Provider Communication.*

Regarding *Convenience of using VRI*, four healthcare providers (EP, WD, GO, and GJ) found VRI as convenient, useful, and helpful. Specifically, EP, a speech-language pathologist, thought that it was convenient and useful when she saw VRI for the first time, even with no training offered. WD, a physician, had used VRI, and he thought that it was beneficial. GO, a physical therapist, said that it was easy to log-in and pick up a language, and it worked well. GJ, a dentist, mentioned that VRI helped improve patient-provider communication, even though VRI had limited flexibility of orienting the camera of the tablet to allow face-to-face interaction between the patient and the VRI interpreter.

GJ explained,

> I worked at, one of the other dentists was fluent in sign language. So, there is deaf patients that would come and see him there. Mostly him, but because I knew a little bit of sign language, I would sometimes help, and then when I worked at the community health center, I had a deaf patient who used a video translation system, since I couldn't communicate enough about the dentistry things to talk to her, and I also treated her son. It was a mom and a son.

Healthcare providers also believed that VRI was *Comfortable for Patients*. Two healthcare providers (MN and GO) observed that their patients looked comfortable using VRI. The other two healthcare providers (EP and GO) felt that VRI was okay to use *"as long*

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as it works." However, EP and GO explained this differently. EP, a speech-language

pathologist, said,

> I think it was interesting. When I worked at the hospital with VRI, I didn't even know
> we had access to this. I just saw it in the [hospital] floor and I just asked what it was,
> and I remember, oh, okay. I kind of looked into it myself. We had no training, no in-
> service, no, even how to use it and that I actually kind of just asked to utilize it to a
> patient and I liked it. I thought it was convenient. It was helpful.

On the other hand, GO, a physical therapist, said,

> I mean I think that's improved over the time that I've been here, and I think most of
> the time patients feel comfortable using that. So, I think that it works pretty well. As
> long as the connection is not poor it works pretty well.

MN, a nurse practitioner in Emergency Medicine, also mentioned that VRI helped to

improve *Patient-Provider Communication*, and she explained that the VRI interpreter

provided a trilingual translation in ASL-English-Spanish among the child, the mother, and

MN. She said, "The video interpreter was extremely useful because then we could assure him

[the patient] as opposed to me talking to a translator who translated to mom, who then

translated to child."

Negative experiences with using video remote interpreting. Six healthcare providers

(BE, EP, GJ, GO, KS, and TY) expressed their negative experiences with use of VRI. Their

negative experiences were divided into four themes: *Technology Issues; Non-Logistics; Lack*

of Training; Detrimental Impact on Patient-Provider Relationship; and *Unprofessionalism.*

As for *Technology Issues* and *Non-Logistics*, GJ, BE, and KS used a VRI-tablet which

was not mounted and moveable. GJ, a dentist, had to ask her patients to hold the tablet as she

could not hold it with her gloves during dental care. The tablet was difficult to hear due to

weak volume of the microphone and background noise. She could not stay on the line with

the same VRI interpreter, which resulted in five-minutes of silence. KS, an oral surgeon, was

not comfortable using VRI during oral surgery. It was hard to talk to his patients directly

because he worried whether the interpreter captured what he said.

GO and BE, physical therapists, experienced poor connectivity during the treatments, and BE felt awkward when VRI was cut off in the middle of sessions. BE also said that VRI was also not feasible for children or patients with cognitive disabilities. On the other hand, TY, a nurse practitioner, used a VRI-computer which was mounted in a doctor's office. However, it had a weak microphone, and there was no privacy space for patients during gynecological exams. Her patients had declined to use VRI because they were not comfortable due to lack of privacy, and they communicated this to TY by writing during treatments.

As for *Lack of Training*, GJ, a physical therapist, mentioned that she received no training, she simply learned how to log in, pick up, and select a language. EP, a speech-language pathologist, received no training when she used VRI for the first time.

As for *Detrimental Impact on Patient-Provider Relationship*, two healthcare providers mentioned the negative effect VRI had on their relationships with patients. GJ explained, "I think you just lose something when you can't see in person. There's some kind of like emotional disconnection, so that makes it a little bit harder."

As for *Unprofessionalism*, KS, an oral surgeon, explained,

I have also had experiences on the VRI where the interpreter gives a bias to their own opinion. Now I am sure this could happen with in-person as well. However, I remember one case in particular where the man needed his tooth extracted- no other option. The interpreter gave a bias that more treatment options should be necessary. I think this may have just been an isolated experience. However, it has kind of turned me off of it.

Positive experiences with in-person interpreting. Two healthcare providers (GO and KS) shared their positive experiences with use of in-person interpreting service. Their experiences were divided into two themes: *Patient-Provider Communication*; and *Better Treatments*. KS, an oral surgeon, explained that in-person interpreting was beneficial for the *Patient-Provider Communication*, such as having an interaction in the sitting room and talking to a patient directly.

Both GO and KS also expressed that in-person interpreting allowed them to provide *Better Treatments.* GO, a physical therapist, often put her patients in many different positions, like face down, and had them move around during physical therapy. In-person interpreters were able to accommodate this, compared to VRI which was limited. KS said, "I will say that in person, in my experience, allows for a much more person-to-person interaction between my patients and myself. And to me that leads to more treatment acceptance and better treatment outcome."

Negative experiences related to in-person interpreting. One healthcare provider (MN) shared her negative experience with use of in-person interpreting service in Emergency Medicine. Her experience was primarily related to *Limited Availability.* As a nurse practitioner in Emergency Medicine, it was often impossible to get an in-person interpreter when a patient came at unexpected times. Additionally, it was hard to get an in-person interpreter at odd hours, as the hospital did not have a contract to provide in-person interpreters overnight. MN said,

> A lot of my experiences have been especially in the triage role when patients who are deaf come into triage. So, their time is unexpected and at times not having an interpreter available to help communicate with them and for them.

2)   <u>Deaf/hard of hearing patients</u>

Research Question 2 asked DHH patients' perceptions, particularly, their positive or negative experiences with VRI and in-person interpreting.

Positive experiences related to video remote interpreting. Three DHH patients (BU, ED, and ML) had positive experiences with VRI. Their experiences were categorized into two themes: *Equipment;* and *Providers' Comfort with using VRI.* As for *Equipment*, two DHH patients (ED and ML) were lucky. Connectivity was good, the screen was clear to see, and the VRI interpreter was good. BU was also lucky because his provider who knew how to use

VRI. BU said, "I have seen my specialists who are comfortable to use VRI. They use VRI smoothly because they have experienced and learned how to use VRI."

Negative experiences related to video remote interpreting. Seven DHH patients shared their negative experiences with use of VRI (BU, DE, ED, IK, JA, RM, and RP). Their experiences were divided into four themes: *Poor Connectivity; Limited Placement and Positioning; Detrimental Impact on Patient-Provider Relationship;* and *"Without informing me."*

As for *Poor Connectivity*, five DHH patients (BU, DE, ED, RP, and RM) experienced poor connectivity, which caused lag-delay for translation during treatments. For *Limited Placement and Positioning*, two DHH patients (BU and RM) had difficulty seeing VRI interpreters as the screen was too small. RM and DE were unable to see the VRI interpreter because it was impossible to lift or lower the screen to a right position when they laid down on the bed. Three DHH patients (BU, DE, and RM) also felt awkward with placement, as they had to look back and forth to the VRI interpreter and then the doctor who stood behind them. JA had his deaf children with him when they went to the hospital, and he had to move the VRI for his deaf children and JA. He said,

> It's when I feel like I sign to them and it's my kids who are basically forcing me to have to change the screen too so they can speak, you know, to reply, and you have to constantly maneuver the screen. It's a lot of physical activity that I feel shouldn't have to happen.

With regard to *Detrimental Impact on Patient-Provider Relationship,* three DHH patients (DE, ED, and IK) expressed there was no emotional connection between the patient and provider when using VRI. DE explained,

> For example, well, my parents are deaf, and my mother she had to go to a cardiologist, and then for several years they provided an interpreter, and everything was seamless, and then all of the sudden, one day they used a VRI, and my mother was in shock. You know, she had never used this before. She had to have a relationship with the doctor previously in her relationship completely changed, you know, before where she used to be able to kind of communicate and kind of joke with the doctor in that way.

That relationship was almost gone because they wheeled in the VRI, you know, interpreter, and then she was gone.

ED also explained,

And I've also noticed sometimes when using VRI it seems to be, there is just a disconnect between the doctor and myself as a patient. When I have the interpreter in the room when I feel like you can really communicate more effectively. But there's kind of just a disconnect with the VRI because I have to look at the screen and look at the doctor and it's awkward. I don't know how to explain that. Sort of personal connection, you know what I mean.

As for the theme titled *"Without informing me,"* BU, DE, and JA were provided VRI without notifications, although they originally preferred in-person interpreters. BU said,

I went to see a surgeon in his office, and there was an in-person interpreter. That was done swiftly and easily. And then we waited for next interpreter. I didn't realize we were waiting for VRI. VRI was one of the, I guess, one of the things that they were using. They were utilizing it for vital signs and everything, like a blood-pressure machine. I just was waiting, but I did not realize that there was VRI machine, and I felt like there was no way of informing me as a patient, of letting me know that this was going to be utilized, as opposed to an in-person interpreter. I assumed that in-person interpreter was coming, but it was VRI.

Positive experiences related to in-person interpreting. Seven DHH patients (DE, ED, IK, JA, ML, RM, and RP) expressed their positive experiences with use of in-person interpreting. Their experiences were categorized as three themes: *Patient-Provider Communication; Promptness;* and *Professionalism.* For *Patient-Provider Communication*, it was seamless (DE and RM), it worked well (ED and RP), and it could build upon and retain communication more effectively than VRI (IK). Also, it was helpful for RP's parents who did not know sign language, when RP had a pre-surgery meeting with his doctor and his parents. RP said,

And the most recent time, I had surgery on my shoulder in 2016, and the hospital had contracted with an interpreter. There were two. They were there and ready. Before the procedure, I was able to communicate very well with the interpreters. The communication went smoothly. I much preferred that interaction. Because my parents don't know sign language, so they prefer to use an interpreter as well, and so I used the interpreter in recovery after the surgery. They were able to be there on the spot, and then interpreted for me, until it was time to go home.

With regard to *Promptness*, JA got an in-person interpreter promptly during emergency care. With regard to *Professionalism*, ML had an in-person interpreter who was professional and stayed with her the whole time during her child's birth.

   Negative experiences related to in-person interpreting. One DHH patient (BU) had negative experience with in-person interpreting primarily related to *Limited Availability*. BU shared, "I remember I was there after surgery once, and several doctors came to check up on me. But sometimes I'm just waiting all day for an interpreter to come. I couldn't write [to communicate with my doctors] because of my body's condition."

TABLE XXIV

THEME COMPARISON: EXPERIENCES

Code	Subcode	Healthcare Providers	Deaf/Hard of Hearing Patients
Positive	Video Remote Interpreting	Convenience of using VRI Comfortable for Patients "As long as it works" Patient-Provider Communication	Equipment Providers' Comfort with using VRI
	In-Person Interpreting	Patient-Provider Communication Better Treatments	Patient-Provider Communication Promptness Professionalism
Negative	Video Remote Interpreting	Technology Issues Non-Logistics Lack of Training Detrimental Impact on Patient-Provider Relationship Unprofessionalism	Poor Connectivity Limited Placement and Positioning Detrimental Impact on Patient-Provider Relationship "Without informing me"
	In-Person Interpreting	Limited Availability	Limited Availability

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b.   **Research question 3 and 4**

1)   **Healthcare providers**

Research Question 3 asked about healthcare providers'
preferences for VRI and in-person interpreting based on critical care and non-critical care
appointments.

Video remote interpreting preference for critical care. Two healthcare providers (EP
and TY) preferred using VRI for critical care. Their preferences were related to *Promptness*.
EP, a speech-language pathologist, pointed out that it was unrealistic to get an in-person
interpreter for emergency care because of time sensitivity. TY, a nurse practitioner, also
mentioned that VRI was quick to grab, and it was more effective to communicate, since her
clinic often did not have in-person interpreters and depended on using VRI or family
interpreters.

In-person interpreting preference for critical care. Three healthcare providers (GJ,
KS, and WD) preferred using in-person interpreters for critical care. Their preferences were
related to *Demands of Surgical Care* that preclude use of VRI. GJ, KS, and WD were
concerned about communication access during the surgery. WD, a physician from Orthopedic
Surgery explained, "If I had to do so I would prefer the live interpreter simply because it is a
little bit easier to have the patient's questions answered in a clear and precise manner." In
addition, GJ, a dentist, would not have to worry about turning on and off VRI during the oral
surgery, as VRI cannot be placed on hold for more than five minutes. GJ said,

> That's what one of the translators said to me the other day. I was translating for a
> woman who spoke Mandarin, and I was doing a consultation, and I had to leave to
> get one of the anesthesiologists to come over, and I guess it was taking him a long
> time to come over and the translator said oh, I might have to sign off. It's getting to
> be more than five minutes. I can't stay on the line without translating. I was like oh, I
> didn't know that. Okay. I guess I'll have to call back or something.
>
> …And sometimes, yeah, for just cleanings, you know, if it's a pretty standard
> procedure, it's easy to say everything you need to say up front and then you can turn
> the iPad off and do whatever you need to do and then maybe come back to the end.

> Because I know a lot of times with the iPad, unless you're constantly translating, they can't stay on the line for more than five minutes with silence, so that just makes it hard, you know.

KS, an oral surgeon, also explained,

> For something more serious like Oral surgery or a root canal, I would prefer using an in-person translator because the VRI is awkward. This is because I am working on my patient's mouth/face. Most of the time there's me and an assistant and our hands/arms are completely obstructing our field of vision. So, having someone in person, to tag in, when communication is necessary, is good. I have also found it very beneficial in these circumstances to have an in-person translator because he/she can help me before the appointment in providing the patient with non-verbal modes of communication. For example, the translator can inform the patient to raise his/her hand with pain to notify me. The translator can also notify the patient to clap if they need a break, etc.

Video remote interpreting preference for non-critical care. Two healthcare providers (GO and TY) preferred VRI for non-critical care. Their preferences related to the theme of *Patient-Provider Communication,* but they had different reasons for using VRI. GO, a physical therapist, said that it was easy to get VRI because VRI was already set up in hospital. TY, a nurse practitioner, preferred VRI to family interpreters, as in-person interpreters were not often available in her clinic. TY explained,

> I would prefer the VRI, just because I feel like the family member, they don't have that, they don't always have that medical background. So you know, it would be difficult to explain, you have to explain to them what is going on and then hope that they translate correctly, you know, to the patient and sometimes stuff gets lost in translation and then you are kind of stuck you know, with a patient who doesn't know what's going on, or they think they know what is going on and they don't. So, it can be difficult.

In-person interpreting preference for non-critical care. Four healthcare providers (EP, KS, TY, and WD) preferred in-person interpreters for non-critical care. Their preferences were divided into: *Detrimental Impact on Patient-Provider Relationship; Logistics;* and *Patient-Provider Communication*. For *Detrimental Impact on Patient-Provider Relationship*, KS, an oral surgeon, emphasized that the in-person interpreting increased the trust between the patient and the provider, which led to better chances of successful and compliant

treatments. With regard to *Logistics*, WD had 30 patients every day, so it was easier to grab an on-site interpreter, rather than chasing to pick up VRI.

With regard to *Patient-Provider Communication*, EP, a speech-language pathologist, dealt with patients who had cognitive impairment after a stroke or brain surgery or other language barriers in addition to the need for ASL-English translation. In-person interpreting was able to better provide effective communication for cognitive and speech therapy treatments. MN, a nurse practitioner, mentioned that having an in-person interpreter was ideal for Emergency Medicine. She explained,

> I would definitely prefer an in-person professional interpreter and then if that was not available, I would do the VRI and last case scenario would obviously be a family member. But yeah, I would prefer an in-person, and I would do that for any, we see a lot of Spanish population. So, I would prefer that, you know, for any population. It's a lot easier and to read like you know, body language and stuff like that.

2) **Deaf/hard of hearing patients**

Research Question 4 asked about DHH patients' preferences for VRI and in-person interpreting based on critical care and non-critical care.

Video remote interpreting preference for critical care. Four DHH patients (BU, DE, ED, and RP) did not prefer VRI in general, but they would accept using VRI for a specific reason. Their preferences pertained to the theme of *Promptness*. For instance, BU had a surgery and waited for in-person interpreters all day, so in this case, he would prefer to get VRI when several doctors come to check-in. RP preferred in-person interpreters, but he would use VRI in case there was no in-person interpreter available or no time to wait for getting an in-person interpreter for emergency care.

On the other hand, DE and ED would not mind using VRI for emergency care until an in-person interpreter came two hours later. DE said,

> Well, if it's an emergency, If I have to wait for two hours for the interpreter to show up, then I would not mind using VRI, until an in-person interpreter comes. VRI would be okay. But if it was something, I would be able to schedule ahead of time, then I

can't use VRI. If there was already an interpreter in the hallway or in the hospital and they could schedule them and call them, then I cannot use VRI.

Also, ED said,

If they say we can't have an interpreter here until they cannot come for another two hours, then maybe using that VRI in that time until the interpreter arrives, that I would accept. But I would not accept VRI for negotiating, discussing a diagnosis for treatment options.

In-person interpreting preference for critical care. Six DHH patients (BU, DE, IK, RM, and RP) preferred in-person interpreting for critical care. Their preferences were divided into two themes: *Clarity of Information;* and *Perception of In-Person Interpreting Process.* With regard to *Clarity of Information*, four DHH patients (DE, IK, RM, and RP) chose in-person interpreting for clarifying information such as discussing diagnosis (ED, IK, and RM), cancer treatment (IK), surgery or hospitalization (RP), or treatment opinions (ED).

With regard to *Perception of In-Person Interpreting Process*, three DHH patients (ED, RM, RP) agreed that: in-person interpreting was able to relay what happened exactly (RM); it worked smoothly to ask questions or clarifications (RP); and it was allowed access to complete full information in an emergency room (ED). RM concluded, "If it were a serious case and – well, even if – I feel like if it were a serious case, something more critical, then an in-person interpreter would be better. I don't think VRI would be acceptable in that situation."

Video remote interpreting preference for non-critical care. Two DHH patients (ED and IK) would accept VRI for non-critical care with a specific reason. Their preference was labelled with the following theme: *"I would not prefer, but…"* ED and IK considered that VRI would be appropriate for follow ups. ED explained,

If it's just a follow-up from a test or maybe taking a blood pressure check, or maybe going in for a refill, something routine, something that is done pretty often and everyone kind of knows what's going to happen then I think that is fine and I would accept the use of VRI. Because I do understand it's not easy to get interpreters last minute.

IK also explained,

> Well, you know maybe if you went to a family doctor, family practice for maybe a cold or a sore throat, bronchitis, something not as complex, I probably would not mind it so much. But for the type of situation [cancer treatment] I was experiencing, that was not acceptable.

In-person interpreting preference for non-critical care. Two DHH patients (BU and DE) preferred in-person interpreting for non-critical care. Their preferences were summarized using the theme: *"If it was a pre-arranged appointment…"* If the appointments were pre-arranged, BU and DE would choose in-person interpreting over VRI. BU and DE described their reasons differently. BU said,

> I think it's appropriate for the emergency room, when you need an interpreter right away. You know, it's the priority. Again, rather than putting everything on hold, trying to call and wait for an interpreter to travel there, I think it can be advantageous. But there are other situations – if it's something pre-arranged, I think an in-person interpreter would be more beneficial.

On the other hand, DE said,

> You know, I'm going to say period I want a live interpreter. I want an in-person interpreter. If a hospital uses VRI, I mean, I will make an exception for an emergency situation, but if it's a planned ahead of time appointment, there's no reason why VRI should be used, and I would prefer a live, in-person interpreter.

TABLE XXV

THEME COMPARISON: PREFERENCES

Code	Subcode	Healthcare Providers	Deaf/Hard of Hearing Patients
Critical Care	*Video Remote Interpreting*	Promptness	Promptness
	In-Person Interpreting	Demands of Surgical Care	Clarity of Information
			Perception of In-Person Interpreting Process
Non-Critical Care	*Video Remote Interpreting*	Patient-Provider Communication	"I would not prefer, but..."
	In-Person Interpreting	Detrimental Impact on Patient-Provider Relationship	"If it was a pre-arranged appointment..."
		Logistics	
		Patient-Provider Communication	

c. **Research question 5**

1) **Comparison with limited English proficiency patients and deaf/hard of hearing patients**

Research Question 5 was added after data collection in Part I. This research question was not a primary research question, but a secondary question that was added when interviewing healthcare providers. This research question asked about healthcare providers' different experiences for treating LEP patients versus treating DHH patients through VRI or in-person interpreting. The PI did not include this specific question in the semi-structured interview question list. However, the PI asked a follow-up question when healthcare providers shared their experiences with LEP patients, since all of eight providers experienced treating LEP patients through VRI or in-person interpreting.

Working with limited English proficiency patients versus working with deaf/hard of hearing patients. Six healthcare providers (BE, EP, GJ, KS, MN, and WD) shared their comparisons between LEP patients and DHH patients. Their comparisons were divided into two themes: *Similarities;* and *Differences.*

Similarities included two subthemes: *Patient-Provider Communication;* and *Budget Concern*. As for *Patient-Provider Communication*, MN, a nurse practitioner, found that VRI was beneficial for trilingual interpreting involving a Hispanic mother, her deaf son, and MN. This situation called for ASL-English-Spanish translation. GJ, a dentist, found that in-person interpreting was helpful for LEP patients and DHH patients. BE, a physical therapist, also needed an interpreter for communication with LEP patients and DHH patients. WD, a physician, pointed out that there was no difference between LEP and DHH patients because both groups had language challenges and required some time for communication access.

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As for *Budget Concern*, WD practiced and managed the budget in his private clinic, so he described a negative impact of paying in-person interpreting services for both populations. He explained,

> Well what I am saying is there is a cost to providing a third-party interpreter. And often that cost may outweigh the cost of the reimbursement of the doctor's office visit. If I am seeing a patient and spending a half hour with them and you paid $70 but the interpreter is charging me $150, that is going to make me inclined not to want to see those folks.

BE was also in charge of managing the hospital's physical therapy budget. She explained that VRI helped to eliminate the economic loss of interpreting services when patients did not show up for appointments. She said, "We are still stewarding of resources and we shouldn't waste them. Because our budget comes from the hospital. So, if I waste the hospital's resources potentially there's fewer resources for our department and therefore for our patients anyway."

GJ also mentioned something related to her dental clinic,

> And sometimes I have in person interpreters and sometimes I've had like iPad video/audio interpreters for the English as second language patients. And I would definitely say that in person is much better, but it's much rarer because it's, I think, more expensive for the institutions.

In terms of *Differences,* two subthemes merged: *Patient-Provider Communication;* and *Interpreting Modalities.* For *Patient-Provider Communication,* GJ and BE explained that there were different challenges for working with LEP patients and DHH patients. For example, for LEP patients, it was less challenging to use VRI because they could hear when they laid down or moved around. But for DHH patients, it was more challenging to use VRI because they were unable to see the VRI interpreter when they laid down or moved around. GJ, a dentist, explained,

> So with spoken language, you're right, it's easier for the patient when they're laying down to just hear things, but I haven't had a lot of experience, but at least with the one patient I was working with who was deaf, she seemed very in tune with what my face was doing and that helped, I think, a lot to make her feel comfortable and not something that doesn't work with people who are hearing just a different language. I

feel like they don't pay as much attention to expressions and things whereas my deaf patient was really in tune with what my face was doing and at least that could be a little more comforting. Since I think, I don't know maybe it's because that's more part of the language.

For *Interpreting Modalities,* the decision to use different interpreting modalities was driven by logistics, and that the providers did not elaborate on the clinical implications of these different interpreting modalities for LEP and DHH patients' populations. KS, an oral surgeon, used Google voice translation for LEP patients for getting appointments, but it was not possible for DHH patients. EP, a speech-language pathologist, worked in one large hospital, which provided different interpreting modalities for the two groups: Telephone translation services for LEP patients; and in-person interpreting services for DHH patients.

TABLE XXVI

THEME COMPARISON:

LIMITED ENGLISH PROFICIENCY PATIENTS AND DEAF/HARD OF HEARING PATIENTS

Code	Subcode	Limited English Proficiency Patients	Deaf/Hard of Hearing Patients
Similarities	Patient-Provider Communication	Cutting off in the middle of session	
		Bringing family interpreters	
		Taking some time for communication	
		Benefit of interpreting services	
	Budget Concern	Paying for interpreter services	
		Economic loss	
Differences	Patient-Provider Communication	Spoken Language	Sign Language
		Google Translation	-
		Less face expression	More face expression
		Fewer challenges for VRI use	More challenges for VRI use
	Interpreting Modalities	Phone translation	VRI translation

d.　　**<u>Opinions</u>**

As discussed in Chapter III, the interview questions originally focused on eliciting four themes: *Experience; Preference; Suggestion;* and *Reason.* But through the course of the analytic process, the PI found that many interview participants responded with their opinions, which had to be parsed from their actual experiences. Thus, the PI renamed the theme entitled *Reason* to *Opinion* and added a fifth thematic category, *Other Issues and Concerns*, which encompassed information shared by participants that did not fit any of the other four themes. The PI found that the *Opinion* theme provided great insights into the research questions and acknowledged that *Opinion* is thematically different from *Experience*.

According to Chapter III, *Opinion* is defined as: General attitudes about or reactions to VRI, in-person, or family interpreting, but not about any one specific event or experience; Someone relaying rumors that they have heard; Describing general situations that have happened in the past; Pros and cons about VRI and in-person interpreting uses; and Comparison between LEP patients and DHH patients. In other words, opinions are defined as not having specific experiences or referring to specific experiences. Opinions are more generalized and may include instances where some participants talked about experiences of other patients or colleagues.

1)　　**<u>Healthcare providers</u>**

Healthcare providers' positive opinions about video remote interpreting. Five healthcare providers (BE, GO, MN, TY, and WD) shared positive opinions about VRI. Their opinions were categorized into five themes: *"Better tablet than mounted;" Helpful; "Already available;" "Better than nothing;"* and *Economically Viable.* With regard to *"Better tablet than mounted,"* TY, a nurse practitioner, had a fixed mounted computer in her clinic, and there was no privacy space for patients. She said,

It would be a lot better so the patient could hold it while I'm doing the exam you know, and that is something that is really unique to like gynecology is that we are dealing with a very sensitive, or some very sensitive subjects and sometimes you know if the patient doesn't feel comfortable, which is totally understandable like I said, but having the iPad and kind of being able to hold it or even having it on wheels so you could, so the interpreter couldn't see anything, that would be huge and then you can move it from room to room. You wouldn't have to worry about having that one room open.

With regard to *Helpful*, two healthcare providers (GO and MN) expressed different reasons. MN said that VRI accessed via a tablet would be helpful as it is moveable, compared to a fixed computer mounted in room. GO, a physical therapist, said that VRI would be helpful for healthcare providers who were not bilingual, or when healthcare providers did not know that LEP patients or DHH patients needed an interpreter at the first appointment without any notification. GO also said that VRI was *"Already available"* in her clinic, so it was easy to get VRI.

With regard to *"Better than nothing,"* three healthcare providers (BE, EP, and MN) expressed this concern with different reasons. MN, a nurse practitioner, said "I think the video interpreter is slightly helpful in at least you [have something], like a safety net, it is better than nothing," although she preferred to get an in-person interpreting, which was not always feasible.

EP, a speech-language pathologist, explained,

I think VRI is such a great modality and it is so easy to use, and I think you can only benefit patient care. I mean, I find that, I think, I don't think we are providing the best interpretive services to our patients. And too often I see another nurse interpreting for another nurse for another language even though they are probably not proficient enough to be providing medical education or instructions to a patient. And I think by having VRI it takes away that burden, or even just kind of that suboptimal interpretive services utilizing staff that may not be interpreters and it gives us a platform where we really have no excuse to utilize anything but adequate interpretive services for our patients.

BE, a physical therapist, said,

Even with the VRI there is sometimes, because of connectivity, there may be a delay in question or, it's just so much more rapid. It would be like this conversation. I feel like this is seamless and through an automated, or through a video link there's always

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a little delay where I'm waiting to see if they understood what I meant and you know, it's slower but it's way better than having nobody.

With regard to *Economically Viable*, two healthcare providers (BE and WD) who managed their clinic budgets, expressed that VRI helped reducing financial burdens. BE, a physical therapist, explained that VRI was helpful to avoid a situation when patients missed their appointments, which their offices still would have to pay for. She said,

> Let's say for a pediatric patient, [insurance] reimburses $40 an hour. If I have an interpretive system that costs $60 per hour on top of all of that overhead and salaries, we are losing buckets of money…. So, it's, you know, I think it is probably economically not feasible to have a live interpreter particularly with the issue of patients not showing up. You know you pay for them to come and then the patient is not here. So, from an economic point of view it's much better to have a VRI, so wait till the patient gets here and then get on to the system.

WD, a physician, explained,

> Because physicians have to pay for the service, but they do not get reimbursed for the service. And if the service costs more than what I get for taking care of a patient and then I'm essentially running a business at a loss.

Healthcare providers' negative opinions about video remote interpreting. Three healthcare providers (BE, EP, and GJ) shared negative opinions about VRI. Their opinions were categorized into two themes: *Detrimental Impact on Patient-Provider Relationship;* and *Limited Access*. With regard to *Detrimental Impact on Patient-Provider Relationship*, two healthcare providers (EP and GJ) expressed this concern.

EP, a speech-language pathologist, felt that the screen and the little bit of delay diminished the interpersonal relationship between healthcare providers and DHH patients. She explained,

> I think there are some subtle dynamics with language that are just more, I think they are easier to utilize that an interpreter, I think it's a little bit more personal if you have to have some sensitive conversations versus having a screen and sometimes even having a little bit of delay, latency in the interpretive services. It's very subtle but if you're having a quick conversation sometimes that little bit of lag can kind of change the flow of the conversation. It's very subtle.

GJ, a dentist, also explained,

A lot of people have bad dental experiences or dental anxiety or don't like to be at the dentist. So, I think you need to make sure as a dentist that you compensate for that, and it's kind of – it's harder to do with a screen and someone in the screen, you know?

With regard to *Limited Access*, BE, a physical therapist, said

Sometimes using the VRI is hard in a noisy area like the gym. It's difficult for interpreter and therapist (and patient if it's a language issue) to hear each other. It's much better in a private room but those aren't always available.

Healthcare providers' positive opinions about in-person interpreting. Four healthcare providers (GJ, EP, MN, and WD) shared their positive opinions about in-person interpreting. Their opinions were summarized into one theme: *Patient-Provider Communication.* GJ, a dentist, mentioned that in-person interpreter would be much better for both LEP patients and DHH patients, even if it was expensive for the hospital.

EP, a speech-language pathologist, explained that in-person interpreting would be helpful for a sensitive conversation with patients and their families. She said,

So, I would prefer to have an in-person interpreter and in general I feel that family, so I guess you know, we have the patient or the family member that needs the interpretive services. I just feel like having the dynamic of all being able to have the interpreter on site is helpful. I think it has the interpersonal connection that is helpful especially in very kind of sensitive conversations.

WD, a physician, explained that "I would prefer the live interpreter simply because it is a little bit easier to have the patient's questions answered in a clear and precise manner," even though he expressed budget-related concerns about in-person interpreting services.

MN, a nurse practitioner, said,

Even if you asked 100 people, they would always say they want somebody, they would always want a person. Just because it is easy. I can go and grab, let's go grab and talk to somebody. I don't know that's feasible. I cannot speak to what numbers of people that we see, if that would be feasible.

Healthcare providers' negative opinions about in-person interpreting. Three

healthcare providers (BE, GJ, and WD) shared their negative opinions about in-person

interpreting. Their opinions were categorized two themes: *Limited Availability;* and *Economic*

Loss.

As for *Limited Availability,* BE, a physical therapist, explained that her clinic would

choose an in-person interpreter for a specific treatment, but not at all treatments. She

explained,

> So, in terms of which I would choose, we actually don't really have a choice because
> there are not enough live interpreters. But the hospital has allowed us to have live
> interpreters for young pediatric patients and for some of the pelvic health issues
> which are very, very sensitive. But we have found for young children that they really
> are unable to communicate via VRI. It was probably like watching TV. It just was
> like watching TV and they can't really understand that the person they are talking to,
> so we do have live interpreters for young pediatric patients.

As for *Economic Loss*, three healthcare providers (BE, GJ, and WD) previously

mentioned in the *Comparison with LEP patients and DHH patients'* section, recognized the

benefits of in-person interpreters, yet, they believed that associated expenses outweighed

clinic benefits.

2) <u>Deaf/hard of hearing patients</u>

Deaf/hard of hearing patients' positive opinions about video

remote interpreting. Two DHH patients (BU and RM) shared positive opinions about VRI

with specific reasons. Their opinions were categorized as one theme: *"Good for a specific*

case." BU mentioned,

> I think it makes sense if you have to go for a follow-up or just a quick appointment, I
> think VRI would be an acceptable use, other than waiting several hours, or maybe
> waiting for a last-minute interpreter to become available.

RM also mentioned,

> In theory, it's a good technology…VRI is good for most. I'm not against it. VRI is a
> good thing to have in case of some situations. But I just think that there needs to be
> improvements. The speed needs to be faster. There just seems to be a lot of technical
> glitches and issues going on.

Deaf/hard of hearing patients' negative opinions about video remote interpreting.

Seven DHH patients (BU, DE, ED, JA, ML, RM, and RP) shared negative opinions about

VRI. Their opinions were categorized into ten themes: *Limited Placement and Positioning;*

Poor Connectivity; Limited Visual Access; Inappropriate Use; Limited Language Assessment;

Detrimental impact on Patient-Provider Relationship; Time Consuming; Economic Loss;

Lack of Medically Trained Interpreters; and *Lack of Understanding.*

      With regard to *Limited Placement and Positioning,* four DHH patients (DE, JA, ML,

and RM) mentioned that VRI was limited in flexibility to move and see the healthcare

provider and the VRI interpreter on the screen. ML said that DHH patients had to move the

screen, so that they can see both the healthcare provider and the VRI interpreter. Also, ML

mentioned that according to the interpreters' liability and the code of ethics[3], an in-person

interpreter must leave as a healthcare provider leaves the room. However, a VRI interpreters

cannot follow this directive. ML and RM had heard a lot of complaints from other DHH

patients regarding limited placement and positioning. DE said, "I kind of had to turn around

to communicate with them, and it was difficult for the placing. It was just very awkward."

      DE continued,

> If, I am making up, for example, a deaf patient is trying to navigate between an
> interpreter on a screen in front of them and then a provider behind them. The
> interpreter should say, "Excuse me," and ask the doctor to move so the visual sight
> lines are for both the interpreter and the doctor because it's unfair and inaccessible to
> ask the patient to move all around to try and see both the interpreter and the doctor. I
> know that, I can advocate myself, and ask my doctor to move and stand next to the
> screen. But some deaf patients cannot advocate for themselves.

      With regard to *Poor Connectivity*, two DHH patients (BU and ML) had heard

complaints from other DHH patients regarding poor connectivity. BU said,

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[3] Malcolm, K. (2014). *Towards reflective practice: Case studies for interpreting in healthcare setting*. Retrieved from https://healthcareinterpreting.org/wp-content/uploads/2015/10/Reflective_Practice_Case_Studies.pdf

I've heard some rumors about VRI not working at all. I've heard some – They had to bring in the equipment into the surgical room, but then there's no good connections. They have to move all around to get the information communicated.

With regard to *Limited Visual Access*, four DHH patients (DE, JA, ML, and RM) pointed out that VRI provided limited visual access for interpreters and patients. ML said, "There are those two situations that are the most common complaints that I've heard from other members of the community are those two primary things, signal strength and accessibility to the screen."

RM also said,

The VRI interpreter may not know me very well. And they may be very limited to what they can see. So, they may not even know like what body party is being talked about. And it's – so – but it's also not the policy that I can control the VRI – I can adjust the interpreting for the VRI. They are in control of the equipment. And how the interpreter interprets.

ED gave an example why VRI was not accessible,

You know, if I passed out, or I had a head injury, or I think it just depends also on what needs to happen and then trying to add the added stress of trying to indicate with an interpreter on the screen and not in person, there are those visual access issues as well.

With regard to *Inappropriate Use*, ED pointed out that the hospital or the providers do not know how to use VRI appropriately. She sadly expressed,

But unfortunately, hospitals in the area you know, any doctors or nurses and things like that they are not understanding that there are two options. One, they don't understand how to use the VRI. I have seen this happen so many times. They struggle with the equipment. Or they put it in the wrong place. Or they try to give me, they give it to me to hold and I cannot sign and hold the iPad at the same time. And then also, there are some situations where VRI is just not appropriate. If it is a mental health situation. If it is a really traumatic, someone, you know there is news of a death or news of a serious diagnosis. It is not appropriate. Or if there are various tests or procedures in a room where the patient cannot sit and sign as they would have to maneuver around. I think there are lots of people who do not understand the law and really what it means.

With regard to *Limited Language Assessment*, three DHH patients (BU, DE, and RP) previously mentioned that in-person interpreters were able to accommodate patients' language levels, and DE emphasized that VRI was unable to accommodate this. DE argued,

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But the VRI interpreter cannot do that [assess a patient's language level]. You know what I mean? I am educated, so I can get along with in-person interpreter or VRI interpreter. But for other deaf people. It is not accessible. They may not understand the VRI interpreter because of their communication and language levels.

With regard to *Detrimental Impact on Patient-Provider Relationship*, DE expressed how VRI was awkward to use, "With VRI, I mean, because it's almost too neutral that I don't really get a chance to really form a connection with them [healthcare providers]."

With regard to *Time Consuming,* two DHH patients (BU and ED) said that VRI was time consuming to set up. ED shared her experience,

I went in to see my doctor and I was at the front desk and the receptionist and then one of the nursing staff, they were really struggling with getting VRI to work and I was really tired of waiting and I just said, you know what, forget it, and we will just write back and forth.

With regard to *Economic Loss*, two DHH patients (JA and RP) pointed out that VRI was a waste of money. RP shared his mother's work experience in hospitals, "The hospitals have used too much money for equipment, but they rarely used it. They spent two million dollars for this equipment, but the equipment still left over in doctor's office."

JA had learned from his friend who studied the costs of VRI and in-person interpreting and found that overall expenses of in-person interpreters were cheaper than overall expenses of VRI. JA shared the fact that in-person interpreting services were much cheaper than VRI services. He said,

I wanted to really explain one more situation that I feel was shocking and worth mentioning. So, we had an interpreter with me and the medical staff, the VRI charged $150 to $125,000 a year and there's unlimited use of 24/7 to whenever they needed, for whenever they needed it, which was, you know, it's kind of fit the warm bodied approach, but they would be on call. So, we'd have the VRI and the on-site interpreter kind of worked out so there was a budget set up to balance out, you know, to onset both. Then, what we found out? Warm-bodied [in-person] interpreter services were much cheaper than the VRI services. That's the evidence.

With regard to *Lack of Medically Trained Interpreters*, RP pointed out that VRI interpreters were not medically trained. He said, "Most of the VRI interpreters are not really

medically trained, or not focused on medical technology. Sometimes they don't know the

terminology. They don't know the lingo."

      JA also asked whether his VRI interpreter had a medical interpreting license.

> The medical license in each state varies, the requirements vary. In Wisconsin where I
> live, compared to Illinois requirements are different. So, I asked the video remote
> interpreter, "Can I see your medical license as a licensed interpreter?" and they said,
> "Yes, I do have a license for medical interpreting." "Can I clarify? I want to see it
> please." "There are five surrounding states including Wisconsin where I can work."
> "Okay. Can you understand what I'm asking you? No. No. No. Don't interpret what
> I'm saying. I'm asking you a question. This piece of paper, do you have one? Can I
> see your license?" and they said, "Sorry I'm not allowed, my boss forbids me from
> showing my license." And I mean it was sad.

      With regard to *Lack of Understanding*, ED was concerned that hospitals and

providers did not recognize the importance of legal obligation related to communication with

patients. She expressed,

> I think there are lots of people who do not understand the law and really what it
> means. And so, I think that, well I think they assume that if we are provided with
> VRI then that satisfies the ADA, and other Section 504 law. But that's not true. They
> must discuss with the patients the preferred communication method for effective
> communication. And if both of those are consented to, then go ahead and use the
> VRI. But it's not a successful communication experience. If they do not honor that
> person's preference and they say that it's good enough to provide VRI, they can't
> have effective communication with that. They should respect someone's wishes to
> not use VRI. And I have seen that happen a lot…

> If I've already explained to the healthcare provider and they are just stubborn, and
> they don't want to provide me with the option I choose then I would file a complaint.
> It is sad and unfortunate, but it is something that I would have to do. Because I don't
> want the next person to just have to put up with whatever accommodation they are
> given. It is a very frustrating situation sometimes. Like I said, sometimes the request
> is honored and sometimes it is ignored.

      Deaf/hard of hearing patients' positive opinions about in-person interpreting. Five

DHH patients (BU, DE, ML, RM, and RP) shared their positive opinions about in-person

interpreting. Their opinions were categorized into five themes: *Full Access; Accurate and*

Timeliness of Translation; Flexibility to move; Language Assessment; and *Detrimental*

Impact on Patient-Provider Relationship. With regard to *Full Access,* ML pointed out that the

in-person interpreter was able to understand the whole situation taking place in a provider's

office, compared to the VRI interpreter's limited access. ML explained,

> Sometimes on-site interpreters can catch things that maybe a VRI interpreter will
> miss. It is really hard to explain. So, both have interpreters that are there for the
> doctor. And for the patient. So, if I have an on-site interpreter, a live interpreter in
> place and the doctor leaves the room, the interpreter also leaves the room. They leave,
> you know, they leave in tandem. So that would facilitate communication between the
> doctor and the patient in that way.

> I don't know, with the, I don't know because for the patient in the VRI system they
> are, you know they are also seeing everything that's going on in the room because the
> interpreter is not leaving the room. You know, the interpreter may not understand
> everything because they don't have visual space to see and they might not ask what is
> going on. What is it because if you are looking one way and the interpreter can't see it
> there is information being missed. You know, that would be a negative aspect of the
> video, of remote interpreter. I think it would be more beneficial to have an on-site live
> interpreter that can be aware of the whole situation.

> With regard to *Accurate and Timeliness of Translation*, RM explained,

> I think I'm much more comfortable with someone there in the room. You know, it's –
> the communication is much more fluid and successful. They are able to communicate
> with the doctor and with myself…Because there, again, they can sort of – they can tell
> me exactly what is being done. It's done in a more real-time manner.

With regard to *Flexibility to move*, two DHH patients (ML and RM) mentioned that

the in-person interpreter was able to move around. RM explained, "They can interact with the

doctor. They can move around."

With regard to *Language Assessment*, three DHH patients (BU, DE, and RP)

mentioned that in-person interpreters were able to assess and accommodate patients' language

levels. DE explained, "I think an in-person interpreter is best because the interpreter can then,

kind of, make an assessment about the patients' sign style and skills, maybe even their

intellectual level. They can make a better match for the patients' needs."

> RP addressed,

> I still think an in-person interpreter would be more appropriate. They're able to
> expand in ways that the VRI interpreters are limited. The body language is really
> important. So, I think that the interpreters can adjust for my comprehension…I think
> that VRI depends on lot on who is speaking. If someone is speaking, or they're only
> using a spoken language, then maybe VRI is enough. They can just hear what they

need. But with ASL, the facial grammar, the body language, is so important, and VRI seems to be less preferred for that language.

As a certified deaf interpreter, BU argued that VRI was not enough to accommodate DHH patients with limited literacy skills. He was concerned, "But I have to think about other deaf patients. When I was interpreting for them, I've seen they become very frustrated when the communication is not successful. Not only patients from English spoken countries, but also patients from other countries."

With regard to *Detrimental Impact on Patient-Provider Relationship*, DE pointed out that in-person interpreters were able to provide rapport. She said, "Like if it's a real live interpreter, I can really get that rapport, and I have that connection."

Deaf/hard of hearing patients' negative opinions about in-person interpreting. One DHH patient (IK) shared her negative opinion about in-person interpreting. Her opinion was categorized into one theme: *Limited Availability*. IK complained,

> The hospital that I worked with was incredibly great. They provided interpreters but sometimes there were no interpreters available or the interpreter scheduling, they had to leave right after the job, so I ended up having to depend on VRI and no, it wasn't really good.

TABLE XXVII

THEME COMPARISON: OPINIONS

Code	Subcode	Healthcare Providers	Deaf/Hard of Hearing Patients
Positive	Video Remote Interpreting	"Better tablet than mounted" Helpful "Already available" "Better than nothing" Economically Viable	"Good for a specific case"
	In-Person Interpreting	Patient-Provider Communication Detrimental Impact on Patient-Provider Relationship Limited Access	Full Access Accurate and Timeliness of Translation Flexibility to move Language Assessment Detrimental Impact on Patient-Provider Relationship
Negative	Video Remote Interpreting		Limited Placement and Positioning Poor Connectivity Limited Visual Access Inappropriate Use Limited Language Assessment Detrimental Impact on Patient-Provider Relationship Time Consuming Economic Loss Lack of Medically Trained Interpreters Lack of Understanding
	In-Person Interpreting	Limited Availability Economic Loss	Limited Availability

e.   **Suggestions**

1)   **Healthcare providers**

Six healthcare providers (BE, DO, GJ, GO, KS, and MN) provided suggestions for improving VRI services. The main suggestions were*: Equipment; Education;* and *Hiring*. With regard to *Equipment,* four healthcare providers (GJ, GO, KS, and MN) suggested improving VRI equipment, such as better connectivity (GJ and MN), more flexibility to move around (MN), a gooseneck attachment for picking the right height position to see the screen better (BE), larger screen to see better (KS), bright lighting and mounting somewhere for dental care (GJ), and more VRI availability for clinics (MN).

With regard to *Hiring,* BE, a physical therapist, also suggested hiring more bilingual providers for better patient-provider communication, not just only depending on VRI services or using in-person interpreters. With regard to *Education,* two healthcare providers (EP and GJ) advocated for education, such as training students to interact with DHH patients. EP, a speech-language pathologist, also suggested training for providers to interact with DHH patients in using different interpreting modalities, as well as training for patients and their families to advocate for their rights. EP explained,

> And so, I think truly if we are going to be utilizing VRI and we are paying for the service in the hospital system I think there needs to be education to staff, not only nurses, post cycle therapy, or aides, lifespan integration services like speech, occupational therapy physical therapy etc. I think physicians are the ones that need probably increased education. I find that having education on hand, quick, fast education on how to utilize this would be easy and then also not only having education for staff but having some sort of advocacy or some flyer for all patients to have so that they know their rights and know what opportunities they have in that health system for interpretive services.

2)   **Deaf/hard of hearing patients**

Eight DHH patients (BU, ED, DE, IK, JA, ML, RM, and RP) provided suggestions for improving VRI services. The main suggestions were: *Equipment; Education; Hiring;* and *Meeting Legal Obligation.* For *Equipment*, four DHH patients (BU,

ML, RM, and RP) had similar suggestions for improving equipment such as improving

connectivity (BU, ML, RM, and RP), attaching a gooseneck to the rolling carts that carry the

tablet (ML and RM), larger screen size (RM), and more VRI availability (BU). ML explained,

> Now they have this, this cord or almost like a neck that you can bend and mold, so you can move the iPad around. So, if you are laying down you have the flexibility to look at the screen because you can maneuver it, so you can look at it, you know what I mean? There are other devices out there today that say suppose, if you have an appointment where the situation allows you to look at the screen face to face but if you are in an awkward situation or not able to look at the screen directly you have the ability to move the screen so you can see which way would work best for you to access the interpreter.

In terms of *Education*, four DHH patients (DE, IK, ML, and RM) also suggested more

education, such as training students and providers for interaction with DHH patients (DE, IK,

ML, and RM), training VRI interpreters to advocate for DHH patients (DE) and training them

in medical terminology (RP), and training hospital administrators (IK).

> DE explained,

> Maybe... maybe one idea to improve VRI services would be to train the interpreters to explain to the professional about how to use the VRI, and that a doctor doesn't need to stand behind the deaf person. The doctor needs to stand in front of the computer, so I can see both the doctor speaking and the interpreter. I shouldn't have to be turning my head and looking all around and looking behind me to look at both the doctor and the interpreter…

> Maybe, the VRI interpreters can break their ethics, interrupting the meeting with the doctor and the deaf patient and asking the doctor to help the deaf patient who does not know how to advocate by self. You know, in the code of ethics, interpreters must be neutral, and they cannot help the deaf patients. But because VRI is a remote interpreting, sometimes, deaf patients are helpless. So maybe, they need to train to interrupt and help the deaf patients to advocate themselves.

IK explained that hospital administrators need more training on how to figure out

whether DHH patients needed VRI or in-person interpreters. In other words, the hospital

administrators should not assume that VRI services are enough to accommodate DHH

patients, and they should be aware of DHH patients' preferences for using VRI services or in-

person interpreting based on different types of treatment sessions. IK said,

In my opinion VRI limits, I don't know how they can improve, the quality of interpreter I don't think it's that. I think it is more the system itself. Doctors, nurses, anybody, even the scheduler who coordinates appointments, I don't know, interpreter referral services, regardless, case managers, whoever is in charge of coordinating maybe they have to have some training in figuring out how to screen the needs between, is this a good employment for a VRI interpreting situation or is this appropriate to have an on-site interpreter.

Maybe they need to know the criteria and base their decisions off that first but because they have a variety of patients who come to their office whose language may be, for instance they might benefit more from an on-site interpreter or maybe they have the ability to code switch and they can figure out whatever they need to and negotiate the situation that way.

Related to *Meeting Legal Obligation*, one DHH patient, ED explained meeting legal

obligations related to two groups: VRI companies; and hospital administrators. First, ED

suggested that VRI companies should take their responsibilities seriously under law

enforcement, such as educating hospitals how to use VRI and providing resources to

hospitals. Second, ED suggested that hospitals should follow the legal obligation to provide

patients' preferred interpreting services. ED explained,

So, the VRI companies need to take more responsibility and I think at the same time they need to partner with healthcare providers as well. I think that they are both, they both share that responsibility equally. And now with the ACA,[4] still, it's alive, the law under the ACA, it very clearly states that consumers have a right to choose their preferred method of communication. And a lot of doctors and hospitals and providers, they refuse to accept that. Because they think that that law does not affect them, or that people won't know about it. So, they can get around it.

But I had to explain to many providers and deaf people as well to sort of advocate for them and teach them that this is a right and a lot of people just assume that deaf people don't know their rights and that is not true. They know their rights. That problem is, hospitals, doctors, or whoever, providers refuse to honor their request of preferred method of communication. That's a problem.

With regard to *Hiring*, one DHH patient, JA, suggested getting away from VRI. He

suggested hiring more bilingual providers, so that it could help to save money for interpreting

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[4] US Department of Health & Human Services (2016). *Section 1557: Ensuring meaningful access for individuals with limited English proficiency.* Retrieved from https://www.hhs.gov/sites/default/files/1557-fs-lep-508.pdf

services, to reduce miscommunications, and to provide more direct communication between

the healthcare providers and the DHH patients.

TABLE XXVIII

THEME COMPARISON: SUGGESTIONS

Code	Healthcare Providers	Deaf/Hard of Hearing Patients
Equipment	Better Connectivity	Better Connectivity
	Larger Screen	Larger Screen
	Gooseneck Attachment	Gooseneck Attachment
	More VRI	More VRI
	Better Flexibility (Tablet)	
	Better Lighting (Dental Care)	
	Mounting (Dental Care)	
Education	Educate Students	Educate Students
	Educate Staff	Educate Providers
	Educate Patients and Families	Educate Hospital Administrators
		Educate VRI Interpreters
Hiring	More Bilingual Providers	More Bilingual Providers
Meeting Legal Obligation	-	"Hospitals need to follow a law…"
		"VRI Companies need a law…"

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4.   **Summary**

Overall, the PI and the peer reviewer compared the themes between healthcare providers and DHH patients.

a.   **Video remote interpreting**

1)   **Healthcare providers**

Healthcare providers had experienced technology issues, such as poor connectivity, limited placement and positioning, limited visual access, and detrimental impact on patient-provider communication and relationship during treatments. Yet, VRI was useful for trilingual translation, for promptness, for saving money and minimizing providers' losses of paying in-person interpreters over healthcare providers' benefits.

Additionally, healthcare providers suggested training students and staff, and improving VRI equipment, such as better connectivity, gooseneck attachments, larger screen sizes, and more VRI. Specifically, one healthcare provider (TY) suggested using tablets in favor of mounted units for gynecological exams, while another healthcare provider (GJ) suggested mounting a tablet for dental exams. One healthcare provider (EP) suggested providing training for patients and families.

Also, healthcare providers who worked with LEP patients suggested adding microphones to minimize background noises, while other healthcare providers who worked with DHH patients suggested enlarging the screen size for better visual access. Thus, VRI equipment needs to accommodate situations based on different professional needs, types of treatments, and depending on whether use spoken languages or sign languages.

2)   **Deaf/hard of hearing patients**

Furthermore, DHH patients had experienced technology issues, such as poor connectivity, limited placement and positioning, limited visual access, and lack of patient-provider communication and relationship. Also, DHH patients mentioned specific

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issues, such as inappropriate use, lack of notification (*"Without informing me"*), lack of medically trained interpreters, lack of language assessment, and waste of money on VRI equipment.

Additionally, DHH patients suggested training students and providers, and improving VRI equipment, such as better connectivity, gooseneck attachments, larger screen sizes, and more availability of VRI equipment. Specifically, BU pointed out that healthcare providers used pagers which had good connectivity, but VRI had poor connectivity. Thus, BU suggested setting up a specific network system for VRI within hospitals. Other DHH patients also suggested training hospital administrators and VRI interpreters and VRI interpreting companies and educating them about meeting legal obligations toward patients. Although DHH patients (DE, ED, IK, and RP) would not prefer VRI, they would accept VRI under special circumstances, such as situations where in-person interpreters are unable to come within two hours, follow-up appointments, or when access to an interpreter is urgent and time-sensitive.

3) **Comparison between healthcare providers and deaf/hard of hearing patients**

There were some similarities and some differences between perspectives of healthcare providers and DHH patients. Both healthcare providers and DHH patients had similar experiences with technology issues with VRI equipment. Both groups also suggested VRI training for providers and staff as well as improving VRI equipment, such as better connectivity, gooseneck attachments, larger screen sizes, and more VRI.

However, healthcare providers also suggested training patients and their families for understanding their rights, while DHH patients suggested training hospital administrators and VRI companies to meet legal obligations. Specifically, DHH patients suggested training VRI interpreters for advocating for DHH patients, such as asking providers to place VRI

equipment correctly, as some DHH patients may not know how to advocate for themselves when healthcare providers did not use VRI appropriately.

Three DHH patients (BU, ML, and RM) experienced that VRI interpreters were who were not professionally trained, while only one healthcare provider (KS) had experienced a VRI interpreter who was not professionally trained. Two DHH patients (JA and RP) mentioned that VRI was a waste of money, in contrast healthcare providers (BE and GJ) believed that VRI saved a lot of money in avoiding a financial loss after patient no-shows. In addition, DHH patients (ED, DE, IK, RP, and RM) would accept VRI under special circumstances, while healthcare providers (GO, EP, MN, and TY) would accept VRI, as "*Already available*" or "*Better than nothing.*"

b. **In-person interpreting**

1) **Healthcare providers**

Healthcare providers identified three main reasons to explain why and how they valued in-person interpreting: better and clearer patient-provider communication; better patient-provider relationship; and full access to communication in a provider's office. The most common reason why providers valued in-person interpreting was that it was able to provide clear communication between themselves and their patients. Healthcare providers commented that there were fewer miscommunications regarding medications and treatments because of in-person interpreting. Most healthcare providers claimed that they enjoyed a better relationship with their patients when they used in-person interpreting.

Healthcare providers (BE, GJ, TY, and WD) also had a number of budget concerns, specifically losing because in-person interpreting fees often exceeded patients' visit fees, or unnecessary costs incurred when patients missed appointments. Healthcare providers who mentioned negative experiences with in-person interpreting mainly focused on budget

concerns. WD worked at a private clinic that used their private funds from patients' visits to pay for interpreters. BE and GJ worked at a state clinic that used federal funds to pay for interpreters. TY worked at a public clinic that used patients' Medicare and Medicaid insurance reimbursement to pay for interpreters. TY explained,

> It is public. So, we take patients that are on any, really, we take private insurance too. Most private insurance. But we also take a majority of patients that are Medicare, Medicaid and we also take uninsured patients or underinsured. Like it's a federally qualified health center, and it is extremely busy as you can imagine…So, if they are uninsured, we pay for it and it is covered by yeah, it is covered by whatever budget that we have. And then I think that different Medicaid payers. I know like for us, at night, they have specific codes that we punch in for those patients.

Two healthcare providers (BE and WD) explained that hiring an in-person interpreter costs more money than what the patient is required to pay for the office visit. These healthcare providers explained further that if patients needed interpreting and missed their appointments, their offices still had to compensate the interpreter for their time. Three healthcare providers (BE, MN, and TY) mentioned that they had no choice of using VRI because the clinics offered limited options to provide in-person interpreters.

Additionally, healthcare providers had also worked with LEP patients and DHH patients, and in-person interpreting was beneficial for both populations, especially during surgical care (WD), dental care (GJ and KS), emergency care (MN), physical therapy (BE and GO), cognitive speech therapy (EP), and discussions with patients' families (EP). Thus, in-person interpreting services should be offered based on the demands of critical care treatments, the levels of patients' disabilities and language needs, and dynamics of communication with patients and their families.

2) **Deaf/hard of hearing patients**

Overall, DHH patients identified three main benefits of in-person interpreting: better patient-provider communication; better patient-provider relationship; and full access to communicate in healthcare settings. Specifically, DHH patients mentioned that in-person interpreters provided language assessment and could accommodate DHH patients' languages levels. Only one negative aspect was identified, lack of in-person interpreting availability. DE expressed with confusion,

> Well, I heard – I was told that people who are on, I think, Medicaid or Medicare – I don't know which one – they have the right to request an in-person interpreter because those are paid by federal funds. So, the hospital cannot refuse to provide an in-person interpreter. But I have employee insurance, but they won't provide an in-person interpreter…

> But if it was something, I would be able to schedule ahead of time, then I can't use VRI. If there was already an interpreter in the hallway or in the hospital and they could schedule them and call them, then I cannot use VRI. Am I right?

> Five DHH patients (BU, DE, ED, IK, and RP) had mentioned that they would not need to use VRI, and could communicate via writing, typing, or speaking directly in cases where the types of treatments were not critical, such as registration appointment, refill medicines, or follow-up. But three DHH patients (BU, DE, and ED) pointed out that it depended on each individual. Some DHH patients were able to advocate for themselves and ask for different communication modes, while other DHH patients might not be able to do that.

3) **Comparison between healthcare providers and deaf/hard of hearing patients**

Themes overlapped and differed between healthcare providers and DHH patients addressed only. For example, in healthcare providers' perspectives, in-person interpreting allowed them to provide better quality treatments. In DHH patients' perspectives, in-person interpreting provided better healthcare experiences. As another

example, two healthcare providers (BE and TY) mentioned that they had no choice in using VRI because the clinic had limited options in providing in-person interpreters, and DHH patients may not be aware of the reason why in-person interpreters were not available. Both groups shared positive aspects of in-person interpreting, such as better patient-provider communication, better patient-provider relationship, and full access for communication, that VRI could not accommodate. Both healthcare providers (MN and TY) and DHH patients (BU and IK) also had experience with limited availability of in-person interpreting.

However, DHH patients (BU, DE, and RP) mentioned that in-person interpreters provided language assessment and could accommodate DHH patients' languages levels, which healthcare providers did not address. There was a conflict related to budget concerns between healthcare providers (BE, GJ, and WD) and DHH patients (RP and JA). While healthcare providers (BE and WD) mentioned economic loss from providing in-person interpreting services, DHH patients (RP and JA) purported that VRI was cheaper than in-person interpreting. There was also confusion whether different types of insurance such as Medicare, Medicaid, employer-based, private funds, or state funds cover the costs of providing an in-person interpreter. The PI will discuss this concern later in Chapter V. Interestingly, DHH patients gave more detailed perspectives on the issues of in-person interpreting and VRI, compared to the general perspectives that healthcare providers shared.

V.   DISCUSSION

This study proposed five research questions related to healthcare providers' and DHH patients' perspectives and preferences on VRI and in-person interpreting for critical care and non-critical care. In this section, the PI presents the summaries of Part I and II of the study, introduces a new theoretical framework for interpretation, and discusses implications for practice and future research, limitations, and overall conclusions.

A.   **Summary of Part I**

This study found that there were no differences in interpreting preferences for critical care between healthcare providers and DHH patients, and both groups preferred in-person interpreting for critical care encounters. On the other hand, there were statistically significant differences in interpreting preferences for non-critical care between healthcare providers and DHH patients. Healthcare providers had no preferences between VRI or in-person interpreting for non-critical care, while DHH patients tended to prefer in-person interpreting for non-critical care encounters.

This study found no differences between interpreting preferences of healthcare providers who primarily worked with LEP patients and healthcare providers who primarily worked with DHH patients for critical care. Both groups preferred in-person interpreting for critical care encounters. There were also no differences between interpreting preferences of healthcare providers who primarily worked with LEP patients and healthcare providers who primarily worked with DHH patients for non-critical care. Both groups did not have a strong preference for either VRI or in-person interpreting for non-critical care encounters. Finally, no differences were found between healthcare providers who worked with LEP patients and healthcare providers who worked with DHH patients, related to their training experiences for using VRI and treating DHH patients. In addition, healthcare providers who worked with LEP

patients, healthcare providers who worked with DHH patients, and DHH patients, did not differ in terms of recommendations for VRI training.

Therefore, this study demonstrates that the three groups, healthcare providers who worked with LEP patients, healthcare providers who worked with DHH patients, and DHH patients, preferred in-person interpreting for critical care and agreed about offering training to healthcare providers on how to use VRI and treat DHH patients. The study also shared a piece of open-ended answers regarding healthcare providers' and DHH patients' suggestions for improving VRI services. Since this is the first study of its kind, it is difficult to contextualize the findings of Part I within existing literature. However, Part II findings yielded further insights.

B.   **Summary of Part II**

1.   **Comparison with video remote interpreting and in-person interpreting**

Previous literature has presented the advantages of VRI, such as 24/7 availability, cost-effectiveness, and usefulness for last-minute appointments (Marsland, Lou, & Snowden, 2010; Pagano, 2017). According to the findings of Part II of the study, healthcare providers stated that it was convenient to pick up VRI for last-minute appointments as VRI was already available in their clinics. Additionally, other healthcare providers mentioned that VRI was cost-effective for their clinic budgets.

In contrast, previous literature has also presented disadvantages of VRI, such as poor connectivity, limited visual access, and limited placement (Belz, 2014; Hedding, 2014; Kashar, 2009; Rosenblum, 2015). Healthcare providers had experience with poor connectivity, limited visual access, placement, and positioning. Not only healthcare providers, but also DHH patients had those technology issues with VRI. For instance, DHH patients were unable to see the VRI screen when they laid down on the examination tables during their treatments. Additionally, VRI was not accessible for specific DHH patient populations, such

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as those with cognitive disabilities or linguistic limitations. Two healthcare providers had DHH patients with cognitive disabilities, and VRI was not effective for their patients. One DHH patient explained that VRI was not effective for DHH patients who were from other non-spoken English countries.

Finally, both healthcare providers and DHH patients emphasized the lack of the patient-provider communication and relationship. This study's findings related to negative effects of VRI on the patient-provider relationship has not been previously discussed in the literature.

An alternative to VRI is in-person interpreting. Previous literature suggests that in-person interpreting provides accurate translation for group meetings and medical appointments, compared to VRI (Kashar, 2009; National Association of the Deaf, 2018). As healthcare providers mentioned that in-person interpreting could provide sufficient patient-provider communication, such as surgery cares, family meetings, pediatric treatments. Previous literature also supports this finding. For example, Bagchi, Dale, Verbitsky-Savitz, and Andrecheck (2010) found that in-person interpreting services increased satisfaction with patient-provider communication during emergency department visit, not only for patients, but for all healthcare providers, including triage nurses, physicians, and discharge nurses. Additionally, DHH patients mentioned that in-person interpreting provides better access to communicate in a doctor's office about such things as cancer treatment surgery treatment, childbirth, comfort, and to develop patient-provider relationship.

On the other hand, Marsland, Lou, and Snowden (2010) pointed out that VRI helped to avoid financial loss of in-person interpreting services, because in-person interpreting often charge for two hours to compensate their travel time and expenses. Travel delays for unexpected visits resulted in frustrating waits for both patients and healthcare providers. In-person interpreters needed to be paid even when patients missed their appointments,

especially, in mental health settings. Patient-interpreter-provider miscommunication for appointment times resulted in missed appointments (Marsland, Lou, & Snowden, 2010).

According to the Office of Management and Budget, the average cost of telephone interpreting was $132.00 per hour ($2.20 per minute), compared to $10.00 to $32.00 per hour for a staff interpreter, which meant staff interpreters were cheaper than telephone interpreters. In this case, staff interpreters could reduce the costs associated with telephone interpreters (Marsland, Lou, & Snowden, 2010).

Healthcare providers shared budget concerns in their clinics: hospitals were unable to get a refund when patients missed appointments; in-person interpreting costs were higher than the providers' benefits. However, healthcare providers did not discuss differences regarding the specific costs with agency interpreting versus staff interpreting, or telephone interpreting versus VRI services. In contrast, DHH patients pointed out that in-person interpreting services were cheaper than VRI services. This conflict between the two groups is discussed later in the *Implications for Future Research* section.

2.   **<u>Comparison between limited English proficiency patients and deaf/hard of hearing patients</u>**

Originally, this study did not expect to get a large number of respondents who worked with LEP patients only and interviewees who worked with both LEP patients and DHH patients, which led the PI to develop a new research question during data collection. At this time there is no existing literature comparing LEP patients and DHH patients' experiences with VRI services or comparing healthcare providers who worked with LEP patients and healthcare providers who worked with DHH patients regarding their experiences with using VRI services.

Thus, the PI reviewed additional literature regarding LEP patients, and found that both LEP and DHH patients populations have experienced communication barriers due to lack of

qualified interpreting availability, healthcare providers' little knowledge of cultural

competency and legal obligations, and limited literacy skills (Brooks et al., 2016; Chen,

Youdelman, & Brooks, 2007; Harmer, 1999; Meader & Zazove, 2005). Healthcare providers

often depend on ad hoc interpreters for LEP patients and DHH patients, such as friends or

family members, including parents or children of LEP patients and DHH patients (Harmer,

1999). Typically, LEP patients' family members are fluent in native languages. However,

90% of DHH patients' parents are hearing, and they are often not fluent in sign languages or

have limited communication access at home (Harmer, 1999).

Even when interpreters' services are available, LEP patients may turn them down due

to time constraints or mistrust. Also, LEP patients feel frustration and embarrassment at their

limited language skills and attempt to express themselves in imperfect English to avoid

depending on others' help. Sometimes, LEP patients express understanding to the providers,

even when they actually do not understand (Brooks et al., 2016). Also, DHH patients

experience a similar frustration and pretend to understand during conversations with

providers. Both LEP patients and DHH patients experience similar barriers to healthcare

access, although LEP patients have more healthcare communication access with their family

members in their native languages, compared to DHH patients with hearing family members

(Harmer, 1999). Furthermore, the previous research looked at the language skills between

LEP patients and DHH patients, and both groups had significant difficulty understanding

words commonly used by healthcare providers. However, DHH patients expressed that their

healthcare providers understood less often than LEP patients, yet, DHH patients were less

likely to try to re-explain themselves (McEwen & Anton-Culver, 1988).

Furthermore, previous research has found that healthcare providers' choice of

interpreting modality with LEP patients was influenced by four factors: time constraints;

alliances of care; therapeutic objectives; and organizational level considerations (Hsieh, 2015). In this regard, a qualitative study by Hsieh (2015) emphasized three points:

> (a) healthcare providers' calculated use of interpreters and interpreting modalities, (b) the complexity of the functions and impacts of time in healthcare providers' decision-making process, and (c) the importance of organizational structures and support for appropriate and effective interpreter utilization. (p. 75)

Yet, this study did not discuss healthcare providers' interpreting modality with DHH patients and the use of VRI services. However, concurrent with the above literature findings, one healthcare provider mentioned that there was no difference between LEP patients and DHH patients in terms of providing interpreter services.

Another healthcare provider needed interpreting services for both populations, yet, VRI would only be suitable for LEP patients who do not depend on visual access, and not DHH patients. Interestingly, one healthcare provider pointed out that DHH patients had more facial expressions, compared with LEP patients. Healthcare providers experienced using different interpreting modalities, such as phone translation and Google translation for LEP patients. Healthcare providers also experienced use of family interpreting for both populations. Finally, healthcare providers said that even with different interpreting modalities, in-person interpreting services would be beneficial for both populations, compared to VRI.

3.   **Communication strategies for limited English proficiency patients and deaf/hard of hearing patients**

To improve healthcare communication for both LEP patients and DHH patients' populations, Brooks et al. (2016), Harmer (1999), and Karliner, Jacobs, Chen, and Mutha (2007) recommend that healthcare providers must provide qualified sign language interpreters and consider the use of VRI as an alternative option, when an in-person interpreter is not available. Chen, Youdelman, and Brooks (2007), Harmer (1999), and Sears (2012) recommend that healthcare providers need to be trained to understand the benefits of interpreting services, to prepare for cultural competency education, to reduce their

cultural/racial bias toward LEP patients and DHH patients, and to be aware of their legal obligation for providing LEP patients and DHH patients' communication needs.

Meador and Zazove (2005) recommend that healthcare providers need additional considerations for communication, such as ensuring a clear visual field and avoiding sitting in front of a bright window, talking to DHH patients without over enunciating, and speaking to the patients directly, rather than directing communication at the interpreters. However, previous literature did not specifically mention training on how to use VRI, but for working with LEP patients and DHH patients through interpreting services.

In qualitative findings, both healthcare providers and DHH patients recommended training for healthcare providers for cultural interaction with DHH patients, for hospital administrators for meeting legal obligations and understanding the use of appropriate interpreting services, for VRI companies to ensure they are aware of legal obligations and employ medically trained VRI interpreters, and for patients and their families for understanding their rights. Additionally, both groups recommended to improve VRI equipment, such as better connectivity, visual access, positioning, and placement.

C.   **Theoretical Framework**

Findings from the online surveys and the qualitative interviews aligned well with the social model of difference (DeVault, Garden, & Schwartz, 2011). For instance, several qualitative themes addressed barriers such as equipment breakdown, and poor connectivity of VRI technology, which applies to environmental factors. In addition, other themes addressed clinical considerations, such as surgery demands, need for privacy, and budget concerns, which appeared to drive the choice of interpreting modality. Thus, choice of interpreter (e.g., VRI or in-person interpreting) and any related challenges arose as a result of the interaction between environmental demands and constraints and the embodied difference (e.g., hearing versus DHH) within the actors involved.

As for additional examples from thematic findings, healthcare providers and DHH patients experienced poor connectivity, limited placement, and limited positioning to move VRI around. Healthcare providers preferred VRI for time sensitiveness. Also, DHH patients would accept VRI for non-critical care, such as for a cold, follow up, refill, or if an in-person interpreter would come within two hours. Healthcare providers preferred in-person interpreters for critical treatments, specifically surgical care. Both groups experienced not getting in-person interpreters due to lack of availability or limited choice of interpreting modality offered at their clinical setting. Healthcare providers had budgetary concerns because VRI services could save a lot of money, compared to in-person interpreting services.

Therefore, both groups had logical reasons why they would prefer VRI or in-person interpreters based on what was surrounding them, and what the demands of critical care and non-critical care were. Those examples could be related to not only environmental and social factors, but also physical factors, organizational policies, and economic factors. Thus, the PI explored another theoretical framework to offer a specific theoretical application beyond the social model of difference.

1. **<u>Rhetoric of medicine and health</u>**

Findings of this study can also be interpreted in light of the theoretical framework of Rhetoric of Health and Medicine (RHM) (Meloncon & Scott, 2018). Edbauer (2005) described the concept of RHM as "rhetorical ecologies" (p. 5). Edbauer (2005) used this theory of rhetorical ecology to highlight the importance of the social field in understanding how certain utterances or ideas circulate and proliferate. Specifically, an ecology focuses on the relations between organisms and their environment, while a rhetorical ecology focuses on how words interact with their environments (Edbauer, 2005), which applies to health communication interaction within a social environment.

Furthermore, the rhetorical ecology approach has two modes of engaging: a flow of circulation model that traces the communication of ideas; and a percolation model that draws connections between health rhetoric in historical periods (Jensen, 2015). The circulation model of rhetorical ecology could be used to describe how environmental, physical, and economic factors affected healthcare providers' and DHH patients' interpreting preferences for using VRI or in-person interpreting for critical and non-critical care.

There have been rhetorical studies that have used the circulation model of rhetorical ecology in science and health communication. Opel, Abbott, and Hart-Davison (2018) used RHM to analyze clinical communication practices based on different roles in the clinic including provider, nurse, medical assistant, and front desk receptionist, beyond the patient encounter.

Lawrence, Hausman, and Dannenberg (2014) used the rhetorical ecology approach in order to identify what factors influenced flu vaccine refusal, to understand patients' perspectives on vaccination, and to examine how to improve doctor-patient communication about vaccination. Gonzales and Bloom-Pojar (2018) suggested that medical interpretation among providers, LEP patients, and interpreters could be further considered as a method and practice within RHM. The researchers pointed out that RHM research could apply to not only English-dominant communication, but also multilingual communication and translation (Gonzales & Bloom-Pojar, 2018).

However, previous RHM studies have not discussed communication practices between DHH patients and healthcare providers using the rhetorical ecology approach. Therefore, the PI proposes that the rhetorical ecology theory within RHM research could help to explain healthcare providers' and DHH patients' experiences and preferences for using VRI and in-person interpreting for critical care and non-critical care. The findings of this study were closely linked to four themes: *Experiences; Preferences; Opinions;* and

Suggestions, which could be interpreted using a rhetorical ecology approach. As an example

of a physical factor, GJ, a dentist said,

> A lot of people have bad dental experiences or dental anxiety of don't like to be at the dentist. So, I think you need to make sure as a dentist that you compensate for that, and it's kind of – it's harder to do with a screen and someone in the screen, you know?

RM, a DHH patient said,

> Until I went to another room, where I had to lay down on the table. And I was actually facedown. And there was no way that they could manipulate the VRI so that I could see the interpreter, so I didn't really actually even know what they were doing.

As an example of an environmental factor, BE, a physical therapist said,

> Sometimes using the VRI is hard in a noisy area like the gym. It's difficult for interpreter and therapist (and patient if it's a language issue) to hear each other. It's much better in a private room but those aren't always available.

DE, a DHH patient said,

> And then the second time was for a mammogram for myself, and they actually found something, so I had to have a biopsy. And that was in the basement of the institution, and there was – I mean, clearly, not very good Internet right there, and I just had to laugh because it was really up to them to figure it out.

As an example of an economic factor, WD, a physician said,

> Because physicians have to pay for the service, but they do not get reimbursed for the service. And if the service costs more than what I get for taking care of a patient and then I'm essentially running a business at a loss.

RP, a DHH patient said,

> My mom is a nurse, and she told me that they ordered equipment for two million dollars, but they used once or twice in five years.

Seen through the lens of rhetorical ecology, findings of this study highlight the social

field surrounding VRI technology, which included physical factors related to VRI equipment,

such as limited flexibility and small screen size; environmental factors related to clinical

treatments, such as background noise, poor connectivity, limited space, and time

sensitiveness; and economic factors for saving expenses due to higher costs of in-person

interpreting and lower costs of VRI. These social fields influence healthcare providers' and

DHH patients' experiences and preferences for using VRI and in-person interpreting during critical care and non-critical care.

D.   **Implications for Practices**

1.   **Hospital administration**

The study recommends that hospital administrators should not popularize VRI for 100% of their clinical treatments, but they could allocate funding for in-person interpreting for critical care encounters, such as in emergency medicine, surgery, cognitive speech therapy, and cancer treatment. This study identified the challenges that not only DHH patients' experience, but also healthcare providers' experiences with VRI. The study argues that hospital administrators and VRI companies need to follow legal obligations and provide training for not only healthcare providers, staff, and VRI interpreters, but also DHH patients and their families for advocacy.

2.   **Video remote interpreting companies**

This study also recommends that special policies be developed for VRI companies. VRI companies need to work with hospital administrators closely to improve the quality of VRI equipment as well as undertake initiatives to provide training for VRI interpreters.

E.   **Implications for Future Research**

1.   **Costs of video remote interpreting services versus in-person interpreting services**

There appeared to be disagreement between healthcare providers' and DHH patients' perceived costs related to VRI services and in-person interpreting services. Healthcare providers believed that VRI saved money and helped avoid an economic loss from paying more for in-person interpreting services. In contrast, DHH patients said that VRI was a waste of money, and in-person interpreters were cheaper. Also, there was confusion for both

providers and DHH patients whether a patient's healthcare insurance paid for in-person interpreting services.

Thus, the PI contacted a national expert on the federal Medicaid match program. The expert clarified that Illinois Medicaid does not cover interpreting services, and community health centers usually have different funding streams, which might cause confusion among patients and providers (M. Youdelman, personal communication, April 16, 2018; Youdelman, 2016; Youdelman, 2017). The PI also contacted 10 VRI companies regarding the prices of VRI services, and she got the information from three companies; the other seven companies were unable to provide information due to confidentiality reasons.

Prices varied by company. One VRI company charged per minute, $3.25 for ASL, $2.75 for foreign languages, and $2.25 for Spanish (S. Schoen, personal communication, February 1, 2017). Another VRI company charged $30.00 for 30 minutes for jobs scheduled 48 hours in advance. For jobs scheduled less than 48 hours in advance, they charged $40.00 for 30 minutes (C. Call, personal communication, February 2, 2017). The third VRI company charged $2.95 per minute for ASL, $1.85 per minute for Spanish, and $1.95 per minute for all other languages (T. Costello, personal communication, June 12, 2017).

The PI also researched estimated costs on VRI company websites. The cheapest VRI company charged $1.95 per minute for all languages (IU Group, 2017). Another VRI company charged $3.00 per minute and provided an estimate comparison between VRI services and in-person interpreting services (Alternative Communication Services, n.d.). The company gave an example of the cost for a two-hour business meeting: In-person interpreting services would include fees of hourly charges, travel time, and mileage and ranged from $216.60 to $266.60, compared to VRI services that ranged from $45.00 to $180.00 with only hourly charges, but no travel and mileage (Alternative Communication Services, n.d.).

Thus, expenses would depend on types of VRI companies and situations. However, if VRI failed due to poor connectivity, the patients would reschedule another meeting to request an in-person interpreter, which could be at a loss of patients' visits, travel time, and their healthcare insurance payment. Healthcare providers would waste their time and money paying for VRI services, and then they would pay for an additional payment of in-person interpreting for the next appointment. Future studies comparing cost-effectiveness of VRI and in-person interpreting services are needed.

2.   **<u>Healthcare providers who had treated limited English proficiency patients</u>**

Part I of this study involved 36 healthcare providers who had worked with LEP patients and 26 healthcare providers who worked with DHH patients. This study analyzed the statistical difference between these groups' preferences for using VRI and in-person interpreting for critical care and non-critical care. The study found that there was no difference between the groups. Both groups had a similar experience: poor connectivity; difficulty to hear due to background noise; no headset microphone; and switching between different interpreters during treatments.

Specifically, healthcare providers who worked with LEP patients suggested improved connectivity for better communication, while healthcare providers who worked with DHH patients suggested a large screen size for better communication. It would be interesting to conduct additional in-depth qualitative research comparing experiences of healthcare providers who worked with LEP patients and those LEP patients' experiences and preferences for using VRI versus in-person interpreting.

3.   **<u>Hard of hearing limited English proficiency patients who are non-signers</u>**

This study collected information from DHH patients who were fluent in ASL and had experience with VRI. However, during the cognitive interviewing, the PI interviewed one healthcare provider who had worked with hard of hearing patients who were non-signers

and identified themselves as LEP rather than culturally deaf. The healthcare provider mentioned that this group had difficulty with lip-reading VRI interpreters' lips in their spoken languages due to small screen sizes. They could not understand what VRI interpreters or healthcare providers were saying due to no headset microphones. And interestingly, she mentioned that VRI interpreters did not use the technology correctly. The VRI interpreter did not face the screen towards the hard of hearing patients so that patients could lip-read (K. Feggestad, personal communication, September 5, 2017). It would also be interesting to study hard of hearing LEP patient experiences and preferences related to VRI and in-person interpreting.

4.   **Video remote interpreters**

This study found that not only healthcare providers, but also VRI interpreters should be trained to use VRI, to advocate for DHH patients, and to obtain medical interpreting certificates. Future studies need to confirm how many VRI interpreters are medically trained. One research article reported burnout among VRS interpreters, risking errors of translation (Bower, 2015), but no other articles on the same topic related to VRI interpreters were retrieved. It would be interesting to study VRI interpreters' work experiences with DHH patients, VRI interpreters' work experiences with LEP patients, and VRI interpreters' preferences for translating in-person or remotely based on critical care and non-critical care needs.

5.   **Hospital administrators**

The previous section discussed costs of VRI and in-person interpreting services discussed. This study found that financial concerns played a role in choice of interpreting modality. These concerns can be closely linked with the political economy of American healthcare – the imperative for cost control, quick services, and efficiency under managed care and a for-profit health system. According to Gaffney (2014), the political

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economy of American healthcare, which was supposed to be a universal healthcare, was changed into an inequality healthcare system due to the corporate power and the economic crisis in the 1970s. As a result, the healthcare system became a medical marketplace where private care producers could engage in unrestricted commerce with patients as consumers (Gaffney, 2014). This viewpoint could help understand the attitudes of hospital administrators toward the VRI services. It is likely that administrators are motivated to save costs and avoid a loss of their benefits, rather than ensuring accessible and effective patient-provider communication, which could lead to the better treatment choices and healthcare outcomes. In future research it would be interesting to study how hospital administration systems, and changes in healthcare policies, such as the ACA, have influenced the quality of interpreting services.

F.   **Limitations**

1.   **Part I of the study**

An important limitation of Part I of the study was a small sample size of healthcare providers who worked with DHH patients. Sixty-two providers were recruited, 36 of whom worked with LEP patients only; 26 worked with both LEP and DHH patients or DHH patients only.

Another limitation of Part I of the study was a lack of availability of an ASL survey. The PI received feedback from a few members of the Deaf community, asking whether an ASL survey version was available. However, the PI explained that ASL survey was not available due to the limited timeframe of the study and funding constraints. The study collected survey responses from DHH patients who were able to understand the survey in English. The study was unable to collect other information from DHH patients who had limited literacy or who did not have computer access. Another limitation is that the survey

was specifically created for the purposes of this study and has not been tested for validity or reliability.

2.   **Part II of the study**

One limitation of Part II of the study was lack of diversity in racial/ethnic background and age of interviewees All participants in Part II of the study, including healthcare providers and DHH patients, identified as being white. While DHH patients included older individuals, healthcare providers tended to be younger. In addition, the PI personally had known four DHH patients and two healthcare providers, and she had to omit these participants from the interested participant groups to avoid research bias. This further limited the PI's ability to recruit a diverse sample.

Another limitation of the study was a small sample size of interviewees (eight healthcare providers and eight DHH patients). The PI was unable to recruit 12 healthcare providers and 12 DHH patients to satisfy data saturation criteria due to the limited timeframe of the study. Lack of tracking data saturation was also an important limitation. Finally, observations of patient-provider interactions would have yielded greater insights into communication practices and barriers. However, the limited scope of this study did not allow this.

3.   **Overall limitations**

The online survey and interview guide were designed to illuminate access barriers and communication challenges during clinical encounters between healthcare providers and DHH patients. This study was not designed to illuminate other cultural factors that might affect interactions between healthcare providers and DHH patients. Interestingly, healthcare providers who valued communication with patients included those who had worked with DHH as well as LEP patients. Those healthcare providers did not have much knowledge about Deaf culture, and they did not fully understand cultural interaction with

DHH patients. Even so, those healthcare providers were aware of the importance of communication. Understanding how cultural factors impact healthcare contexts for DHH patients can be an area for future research. For example, a future research question might consider how an understanding of Deaf culture influences healthcare providers choice of their communication and interpreting modality.

G.   **Conclusion**

The literature review provided an overview of communication barriers for DHH patients in clinical settings, the advantages and the disadvantages of VRI and in-person interpreting services, and how culture and intersectionality influence communication barriers between healthcare providers and DHH patients. Prior to conducting the study, it was assumed that healthcare providers' and DHH patients' preferences regarding VRI and in-person interpreting would be closely linked with their cultural differences.

However, after conducting a mixed methods study using a sequential exploratory design, it was found that their perspectives were strongly influenced by environmental, physical, and economical factors, which were not sufficiently explained by disability studies and deaf studies theoretical frameworks. Therefore, the rhetoric ecology framework was used to interpret study findings and share future implications and recommendations to improve the quality of VRI services.

In conclusion, this study identified healthcare providers' and DHH patients' experiences and preferences for VRI and in-person interpreting for critical care and non-critical care. Based on findings of this study, provision of appropriate interpreting services between healthcare providers and DHH patients is recommended to improve patient-provider communication, and ultimately improve healthcare experiences for patients and quality indicators for hospitals and clinics.

APPENDICES

Appendix A
Institutional Review Board Approval Letter

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice
Initial Review (Response To Modifications)

August 4, 2017

Manako Yabe, MSW
Disability and Human Development
1640 West Roosevelt Road
M/C 626
Chicago, IL 60608
Phone: (312) 675-4340

RE: **Protocol # 2017-0592**
         "Healthcare Providers' and Deaf Patients' Perspectives toward Video Remote Interpreting:
         A Mixed Methods Study"

Dear Ms. Yabe:

> **Please note that stamped .pdfs of all approved recruitment and consent documents have been uploaded to OPRSLive, and can be accessed under "Approved Documents" tab. Please also note that administrative changes have been made to Part I Consent Form, v3, 7/14/17, to ensure the document is in compliance with UIC IRB regulations. Please remember to use only those approved documents to recruit and enroll subjects into this research project. OPRS/IRB no longer issues paper letters or stamped/approved documents.**

Your Initial Review (Response To Modifications) was reviewed and approved by the Expedited review process on August 3, 2017. You may now begin your research

Please note the following information about your approved research protocol:

Protocol Approval Period: August 3, 2017 - August 3, 2018
Approved Subject Enrollment #:   224
Additional Determinations for Research Involving Minors: These determinations have not been made for this study since it has not been approved for enrollment of minors.
Performance Sites: UIC

Research Protocol(s):
   a) Video Remote Interpreting; Version 3; 07/14/2017

Recruitment Material(s):
   a) Cognitive (Pre-) Interview Consent; Version 2; 06/21/2017
   b) Cognitive Interview Recruitment Letter; Version 2; 06/21/2017
   c) Video Remote Interpreting (DHH Flyer); Version 2; 06/21/2017

d) Video Remote Interpreting (DHH1) Flyer; Version 2; 06/21/2017
e) Video Remote Interpreting (Flyer HP); Version 2; 06/21/2017
f) Video Remote Interpreting (Flyer HP1); Version 2; 06/21/2017
g) Thank You Letter; Version 2; 06/21/2017
h) Permission Letter (DHH); Version 2; 06/21/2017
i) Permission Letter (HP); Version 2; 06/21/2017
j) Recruitment Letter (DHH); Version 2; 06/21/2017
k) Recruitment Letter (HP); Version 2; 06/21/2017
l) Screening Questionnaire (DHH); Version 2; 06/21/2017
m) Screening Questionnaire (HP); Version 2; 06/21/2017
n) Video Remote Interpreting (Flyer HP2); Version 2; 06/21/2017

Informed Consent(s):
a) Part II Informed Consent Document; Version 3; 07/14/2017
b) Part I Informed Consent; Version 3; 07/14/2017
c) A waiver of documentation of informed consent (verbal consent/no written signature obtained) for pre-interview by phone, online survey, and main phone survey, has been granted under 45 CFR 46.117(c)(2) (minimal risk; subjects can decline to participate at any time, and will be provided with information sheet containing all of the elements of consent. Contact information of subjects who decline will be destroyed).
d) A waiver of documentation (verbal consent/no written signature) and an alteration of consent have been granted for eligibility screening purposes only under 45 CFR 46.117(c)(2) and 45 CFR 46.116(d) (minimal risk; verbal consent will be obtained for screening; screening data will be destroyed for subjects who are ineligible or who decline to participate).

Your research meets the criteria for expedited review as defined in 45 CFR 46.110(b)(1) under the following specific category(ies):

(6) Collection of data from voice, video, digital, or image recordings made for research purposes., (7) Research on individual or group characteristics or behavior (including but not limited to research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
05/24/2017	Initial Review	Expedited	06/16/2017	Modifications Required
06/21/2017	Response To Modifications	Expedited	07/11/2017	Modifications Required
07/13/2017	Response To Modifications	Expedited	08/03/2017	Approved

Please remember to:

→ Use your **research protocol number** (2017-0592) on any documents or correspondence with the IRB concerning your research protocol.

Appendix A (continued)

→ Review and comply with all requirements on the enclosure,
   "UIC Investigator Responsibilities, Protection of Human Research Subjects"
   (http://tigger.uic.edu/depts/ovcr/research/protocolreview/irb/policies/0924.pdf)

Please note that the UIC IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact OPRS at (312) 996-1711 or me at (312) 413-1518. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Alma Milat, BS
IRB Coordinator, IRB # 2
Office for the Protection of Research Subjects

Enclosure(s):   Following approved recruitment and consent documents have been uploaded under "approved documents" tab in OPRSLive:

1.   **Informed Consent Document(s):**
   a) Part I Informed Consent; Version 3; 07/14/2017
   b) Part II Informed Consent Document; Version 3; 07/14/2017
2.   **Recruiting Material(s):**
   a) Cognitive (Pre-) Interview Consent; Version 2; 06/21/2017
   b) Cognitive Interview Recruitment Letter; Version 2; 06/21/2017
   c) Video Remote Interpreting (DHH Flyer); Version 2; 06/21/2017
   d) Video Remote Interpreting (DHH1) Flyer; Version 2; 06/21/2017
   e) Video Remote Interpreting (Flyer HP); Version 2; 06/21/2017
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   l) Screening Questionnaire (DHH); Version 2; 06/21/2017
   m) Screening Questionnaire (HP); Version 2; 06/21/2017
   n) Video Remote Interpreting (Flyer HP2); Version 2; 06/21/2017

cc: Tamar Heller, Disability and Human Development, M/C 626
        Mansha Mirza, Faculty Sponsor, Disability and Human Development, M/C 811

Appendix A (continued)

UNIVERSITY OF ILLINOIS
AT CHICAGO

Office for the Protection of Research Subjects (OPRS)
Office of the Vice Chancellor for Research (MC 672)
203 Administrative Office Building
1737 West Polk Street
Chicago, Illinois 60612-7227

Approval Notice
Amendment to Research Protocol and/or Consent Document – Expedited Review
UIC Amendment # 1

September 20, 2017

Manako Yabe, MSW
Disability and Human Development
1640 West Roosevelt Rd., M/C 626
Chicago, IL 60608
Phone: (312) 675-4340

RE: **Protocol # 2017-0592**
**"Healthcare Providers' and Deaf Patients' Perspectives toward Video Remote Interpreting:
A Mixed Methods Study**"

Dear Manako Yabe:

> Members of Institutional Review Board (IRB) #2 have reviewed this amendment to
> your research and/or consent form under expedited procedures for minor changes to
> previously approved research allowed by Federal regulations [45 CFR 46.110(b)(2)].
> The amendment to your research was determined to be acceptable and may now be
> implemented.

Please note the following information about your approved amendment:

Amendment Approval Date: September 19, 2017
Amendment:
Summary: UIC Amendment #1 dated September 6, 2017 and received via OPRS Live September 9,
2017: An investigator-initiated amendment involving the notification of the completion of the Pre-
Interview section of the study and the submission of the study's documents, which have been revised
based upon the feedback of the Pre-Interview Participants. The following documents were revised:
informed consent documents (Parts I & II: V4; 9/6/17), online surveys (Parts I & II: V3; 9/6/17),
interview questionnaires (Parts I & II: V3; 9/6/17), research protocol (V4; 9/6/17), recruitment letters
(DHH: 3, 9/6/17 & HP: V3; 9/6/17) and the Initial Review Application form (V4; 9/6/17).

Research Protocol(s):
a) Video Remote Interpreting; Version 4; 09/06/2017
   Recruiting Material(s):

a) Recruitment Letter (HP); Version 3; 09/06/2017
b) Recruitment Letter (DHH); Version 3; 09/06/2017

Informed Consent(s):
a) Part II Informed Consent Document; Version 4; 09/06/2017

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Appendix A (continued)

b) Part I Informed Consent; Version 4; 09/06/2017

Please note the Review History of this submission:

Receipt Date	Submission Type	Review Process	Review Date	Review Action
09/08/2017	Amendment	Expedited	09/19/2017	Approved

Please be sure to:

→ **Use only the IRB-approved and stamped consent document(s) and/or HIPAA Authorization form(s) enclosed with this letter when enrolling subjects.**

→ Use your research protocol number (2017-0592) on any documents or correspondence with the IRB concerning your research protocol.

→ Review and comply with all requirements on the guidance document,
   "**UIC Investigator Responsibilities, Protection of Human Research Subjects**"
   (http://tigger.uic.edu/depts/ovcr/research/protocolreview/irb/policies/0924.pdf)

Please note that the UIC IRB #2 has the right to ask further questions, seek additional information, or monitor the conduct of your research and the consent process.

Please be aware that if the scope of work in the grant/project changes, the protocol must be amended and approved by the UIC IRB before the initiation of the change.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact the OPRS at (312) 996-1711 or me at (312) 355-2939. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Jewell Hamilton, MSW
IRB Coordinator, IRB # 2
Office for the Protection of Research Subjects

Enclosure(s):

> **Please note that stamped .pdfs of all approved recruitment and consent documents have been uploaded to OPRSLive, and you must access and use only those approved documents to recruit and enroll subjects into this research project. OPRS/IRB no longer issues paper letters or stamped/approved documents.**

cc: Mansha Mirza, Faculty Sponsor, M/C 811
       Tamar Heller, Disability and Human Development, M/C 626

Part I: Qualtrics Online Survey
(To: Healthcare Providers)

Dear Healthcare Providers,

Many hospitals have popularized the use of Video Remote Interpreting (VRI). I am asking your cooperation to share your feedback to improve VRI services.

You may participate in the study if you have experience with VRI or you have treated deaf/hard of hearing patients in clinical settings. This study includes in two parts. In Part I, you will be asked to complete this online survey. This survey takes no more than 10 minutes to complete.

At the end of the survey, you will be asked to complete a 20-minute interview (in-person, phone, Skype, or Zoom) for Part II of this study. If you agree to participate in the interview, you will be compensated for your time with a $25.00 Target gift card. (You may participate in Part I only, but you will not be given a gift card.)

Your participation in both parts is voluntary and anonymous. The risks are minimal, and there are no direct personal benefits to you for responding to this study.

If you have any questions about Part I or Part II of the study, please contact me at myabe3@uic.edu or my faculty sponsor, Dr. Mansha Mirza at mmirza2@uic.edu. For concerns about the study or questions about your rights as a research participant, please contact the UIC Office for the Protection of Research Subjects at 312-996-1711 or uicirb@uic.edu.

Click and download the informed consent.

Please indicate that you agree to participate in the survey by checking the appropriate box:
- o   Yes, I agree to participate in the survey.
- o   No, I do not agree to participate in the survey.

Part 1

Q1. When you use an interpreter, how often do you use the following services?

Video Remote Interpreting (A device with a web camera that provides sign language or spoken language interpreting services)
- o   Always
- o   Most of the time
- o   Sometimes
- o   Rarely
- o   Never

In-person Interpreting (A medical certified interpreter visits and interprets in a doctor's office)
- o   Always

- o Most of the time
- o Sometimes
- o Rarely
- o Never

Telephone Interpreting (A service that connects human interpreters via telephone to translate languages)
- o Always
- o Most of time
- o Sometimes
- o Rarely
- o Never

Q2. In critical situation (e.g., surgery, urgent care) which method would you prefer to use?
- o Video Remote Interpreting
- o In-Person Interpreting
- o Telephone Interpreting
- o No preference/Not sure

Q3. In non-critical situation (e.g., follow up, non-urgent care) which method would you prefer to use?
- o Video Remote Interpreting
- o In-Person Interpreting
- o Telephone Interpreting
- o No preference/Not sure

Q4. Overall, which method would you most prefer to use for better communication with your patients?
- o Video Remote Interpreting (Skip to Q4-1)
- o In-Person Interpreting (Skip to Q4-2)
- o Telephone Interpreting (Skip to Q4-3)
- o No preference/Not sure (Skip to Q4-4)

Q4-1. Please check all the reasons why you prefer to use video remote interpreting.
- o It is already set up in my clinical setting.
- o It is convenient to use.
- o It saves time rather than requesting an in-person interpreter.
- o It is less expensive.
- o It uses more than one language simultaneously.
- o It is useful when an in-person interpreter is not available.
- o Other (Specify: _____)

Q4-2. Please check all the reasons why you prefer to use in-person interpreting.
- o Video remote interpreting consumes more time than in-person interpreter.
- o Video remote interpreting has issues with equipment or network access.
- o An in-person interpreter can provide an accurate and efficient way to communicate.

o An in-person interpreter can adjust his/her position when a doctor's room has a limited space or when a patient has limited mobility, such as laying on a bed.
o An in-person interpreter can read and translate printed materials for a patient with limited literacy.
o It is accessible when there is limited visibility in a clinical area.
o Other (Specify: _____)

Q4-3. Please check all the reasons why you prefer to use telephone interpreting.
o It is already set up in my clinical setting.
o It is convenient to use.
o It saves time rather than requesting an in-person interpreter.
o It is less expensive.
o It is useful when an in-person interpreter is not available.
o Other (Specify: _____)

Q4-4. Please check all the reasons why you have no preference.
o In my experience, there is no difference in quality and effectiveness between video remote interpreting and in-person interpreting.
o My preference varies by the nature of the appointments.
o It depends on patients' preferences.
o I have no prior experience to use either video remote interpreting or in-person interpreting.
  I am bilingual/multilingual in the following languages:(_____)
o Other (Specify: _____)

Part 2

Q5. To improve the quality of video remote interpreting in the clinical area, which of the following equipment would you recommend? Please select all that apply.
o 360-degree camera (It is useful when a patient has limited mobility, such as laying on a bed.)
o Battery-free cable plug (It is useful when a patient exercises without connecting to a plug.)
o Adjustable height (It is useful to adjust height when a patient sits or lies down.)
o 16-inch screen size (It is larger than iPad's 12.9 size.)
o The ability to call a specific interpreter (It avoids using random interpreters at each appointment.)
o Higher wireless speed (It is useful when a doctor's office is in a basement.)
o Adjustable lighting. (It is useful when it is slightly dark in the clinical area where the patient is being seen.)
  Other (Specify: _____)

Q5-1. If you selected more than one of the following equipment, which one would you most often recommend? Please select one.
o 360-degree camera (It is useful when a patient has limited mobility, such as laying on a bed.)
o Battery-free cable plug (It is useful when a patient exercises without connecting to a plug.)

o Adjustable height (It is useful to adjust height when a patient sits or lies down.)
o 16-inch screen size (It is larger than iPad's 12.9 size.)
o The ability to call a specific interpreter (It avoids using random interpreters at each appointment.)
o Higher wireless speed (It is useful when a doctor's office is in a basement.)
o Adjustable lighting. (It is useful when it is slightly dark in the clinical area where the patient is being seen.)
o Other (Specify: _____)

Q6. **Have you used video remote interpreting to communicate with deaf/hard of hearing patients or patients with limited English proficiency?**
o Deaf/hard of hearing patients only
o Limited English proficiency patients only
o Both deaf/hard of hearing patients and limited English proficiency patients

Q6-1. Have you ever needed to be an interpreter for someone else in your workplace?
o I have experienced being an interpreter myself. I am bilingual/multilingual in the following languages:(_____)
o I have not experienced being an interpreter myself.

Q6-2. How much training have you received to work with video remote interpreters?
o A significant amount
o A moderate amount
o A little
o None at all

Q6-3. How much training have you received to work with deaf/hard of hearing patients?
o A significant amount
o A moderate amount
o A little
o None at all

Q6-4. Would you recommend that health providers need to be trained to improve the quality of video remote interpreting and interaction with deaf/hard of hearing patients?
o Need to be trained.
o Do not need to be trained.

Q7. Please share any suggestions or ideas for improvement of video remote interpreting.
(_____)

Part 3
Q8. Please indicate your gender.
o Male
o Female
o Other

Q9. Please indicate your age. (_____)

Q10. Which of the following racial group or groups best describes you?
- o   White or Caucasian
- o   Black or African American
- o   Hispanic or Latino/a American
- o   Asian or Asian American
- o   American Indian or Alaska Native
- o   Native Hawaiian or Pacific Islander
- o   Other (Specify: _____)

Q11. When communicating with your patients, do you use any other languages in addition to English?
- o   English only
- o   Spanish
- o   Other (Specify:_____)

Q12. What is your position?
- o   Assistant Practitioner (Dental Assistant, Occupational Therapy Assistant, Pharmacy Assistant, Physical Therapy Assistant, Physician Assistant, Nursing Assistant, etc.)
- o   Audiologist
- o   Clinical Psychologist
- o   Chiropractor
- o   Clinical Social Worker
- o   Dentist, Dental Hygienist
- o   Diagnostic Medical Sonographer, Cardiovascular Technologist
- o   Dietitian, Nutritionist
- o   EMT, Paramedic
- o   Nurse Practitioner
- o   Occupational Therapist
- o   Optometrist
- o   Physician, Surgeon
- o   Physical Therapist
- o   Pharmacist
- o   Podiatrist
- o   Speech-Language Pathologist
- o   Intern, Resident, Fellow, Attending
- o   Other (Specify: _____)

Q13. Which of the following specializations best describes you?
- o   Dentistry
- o   Dermatology
- o   Emergency Medicine
- o   Family Medicine
- o   Nutrition
- o   Neurology
- o   Obstetrics/Gynecology
- o   Orthopedics
- o   Otolaryngology
- o   Pharmacy

- Physical Medicine/Rehabilitation
- Psychiatry/Mental Health
- Radiology/Diagnostic
- Surgery
- Other specialty (Specify: _____)

Q14. Which is your primary workplace – outpatient services or inpatient services?
- Outpatient services
- Inpatient services
- Both outpatient and inpatient services

Q15. How many years have you worked in your current setting? (If you work less than one year, please answer 0.)

(_____)

Q16. Which state do you currently practice in?

(_____)

Thank you for your participation! If you would also like to participate in a 20-minute interview in Part II, please enter your email address or phone number. You will be contacted via email or phone to schedule an interview appointment, once data collection for Part I is complete. The contact information that you provide will be kept confidential. You will be given a $25 Target Gift Card for completing both Part I and Part II.

(_____)

Part I: Qualtrics Online Survey
(To: Deaf/Hard of Hearing Patients)

Dear Deaf/Hard of Hearing Patients,

Many hospitals have popularized the use of Video Remote Interpreting (VRI). I am asking your cooperation to share your feedback to improve VRI services.

You may participate in the study if you have experience with VRI in clinical settings and you are 18 years or older. This study takes place in two parts. In Part I, you will be asked to complete this online survey. This survey takes no more than 10 minutes to complete.

At the end of the survey, you will be asked to complete a 20-minute interview (in-person, videophone, Skype, or Zoom) for Part II of this study. If you agree to participate in the interview, you will be compensated for your time with a $25.00 Target gift card. (You may participate in Part I only, but you will not be given a gift card.)

Your participation in both parts is voluntary and confidential. The risks are minimal, and there are no direct personal benefits to you for responding to this study.

If you have any questions about Part I or Part II of the study, please contact me at myabe3@uic.edu or my faculty sponsor, Dr. Mansha Mirza at mmirza2@uic.edu. For concerns about the study or questions about your rights as a research participant, please contact the UIC office for the Protection of Research Subjects at 312-996-1711 or uicirb@uic.edu.

Click and download the informed consent.

Please indicate that you agree to participate in the survey by checking the appropriate box:
- o   Yes, I agree to participate in the survey.
- o   No, I do not agree to participate in the survey.

Part 1

Q1. When you see a healthcare provider, how often do you use the following services?

Video Remote Interpreting (A device with a web camera that provides sign language or spoken language interpreting services)
- o   Always
- o   Most of the time
- o   Sometimes
- o   Rarely
- o   Never

In-person Interpreting (A medical certified interpreter visits and interprets in a doctor's office)
- o   Always
- o   Most of the time
- o   Sometimes

- o Rarely
- o Never

Q2. In critical situation (e.g., surgery, urgent care) which method would you prefer to use?
- o Video Remote Interpreting
- o In-Person Interpreting
- o No preference/Not sure

Q3. In non-critical situation (e.g., follow up, non-urgent care) which method would you prefer to use?
- o Video Remote Interpreting
- o In-Person Interpreting
- o No preference/Not sure

Q4. Overall, which method would you most prefer to use for better communication with your healthcare provider?
- o Video Remote Interpreting (Skip to Q4-1)
- o In-Person Interpreting (Skip to Q4-2)
- o No preference/Not sure (Skip to Q4-3)

Q4-1. Please check all the reasons why you prefer to use video remote interpreting.
- o It is already set up in my clinical setting.
- o It is convenient to use.
- o It saves time rather than requesting an in-person interpreter.
- o It is less expensive.
- o It uses more than one language simultaneously.
- o It is useful when an in-person interpreter is not available.
- o Other (Specify: _____)

Q4-2. Please check all the reasons why you prefer to use in-person interpreting.
- o Video remote interpreting consumes more time than in-person interpreter.
- o Video remote interpreting has issues with equipment or network access.
- o An in-person interpreter can provide an accurate and efficient way to communicate.
- o An in-person interpreter can adjust his/her position when a doctor's room has a limited space or when a patient has limited mobility, such as laying on a bed.
- o An in-person interpreter can read and translate printed materials for a patient with limited literacy.
- o It is accessible when there is limited visibility in a clinical area.
- o Other (Specify: _____)

Part 2

Q5. To improve the quality of video remote interpreting in the clinical area, which of the following equipment would you recommend?
- o 360-degree camera (It is useful when a patient has limited mobility, such as laying on a bed.)

- o Battery-free cable plug (It is useful when a patient exercises without connecting to a plug.)
- o Adjustable height (It is useful to adjust height when a patient sits or lies down.)
- o 16-inch screen size (It is larger than iPad's 12.9 size.)
- o The ability to call a specific interpreter (It avoids using random interpreters at each appointment.)
- o Higher wireless speed (It is useful when a doctor's office is in a basement.)
- o Adjustable lighting. (It is useful when it is slightly dark in the clinical area where the patient is being seen.)
- o Other (Specify: _____)

Q5-1. If you selected more than one of these following equipment, which one would you most often recommend? Please select one.
- o 360-degree camera (It is useful when a patient has limited mobility, such as laying on a bed.)
- o Battery-free cable plug (It is useful when a patient exercises without connecting to a plug.)
- o Adjustable height (It is useful to adjust height when a patient sits or lies down.)
- o 16-inch screen size (It is larger than iPad's 12.9 size.)
- o The ability to call a specific interpreter (It avoids using random interpreters at each appointment.)
- o Higher wireless speed (It is useful when a doctor's office is in a basement.)
- o Adjustable lighting. (It is useful when it is slightly dark in the clinical area where the patient is being seen.)
- o Other (Specify: _____)

Q6. Would you recommend that health providers need to be trained to improve the quality of video remote interpreting and interaction with deaf/hard of hearing patients?
- o Need to be trained.
- o Do not need to be trained.

Q7. Please share any suggestions or ideas for improvement of video remote interpreting.
(_____)

Part 3

Q8. Please indicate your gender.
- o Male
- o Female
- o Other

Q9. Please indicate your age. (_____ **)**

Q10. Which of the following racial group or groups best describes you?
- o White or Caucasian
- o Black or African American

- o Hispanic or Latino/a American
- o Asian or Asian American
- o American Indian or Alaska Native
- o Native Hawaiian or Pacific Islander
- o Other (Specify: _____)

Q11. What is the highest degree or level of education you have completed?
- o Less than high school
- o High school graduate (includes GED)
- o Some college, no degree
- o Associate degree
- o Bachelor's degree
- o Graduate or professional degree
- o Ph.D. degree

Q12. What is your primary communication method?
- o American Sign Language
- o English/Oral Communication
- o Pidgin Signed English
- o Signed Exact English
- o Cued Speech
- o Other (Specify: _____)

Q12-1. How easy or difficult it is for you understand written information, such as instructions, pamphlets, or other materials from your doctor or pharmacy?

- o Very Difficult
- o Difficult
- o Moderate
- o Easy
- o Very Easy

Q13. Which of the following best describes your estimated or approximate hearing level?
- o Normal hearing (0-20dB)
- o Mild hearing loss (21-40dB)
- o Moderate hearing loss (41-60dB)
- o Severe hearing loss (61-90dB)
- o Profound hearing loss (90-120dB)

Q14. Which state do you currently live in?
   (_____)

Q15. Did you complete the survey by yourself or did someone help you?
- o Completed by myself.
- o I asked someone to help me.

Thank you for your participation! If you would also like to participate in a 20-minute interview in Part II, please enter your email address or phone number. You will be contacted via email or phone to schedule an interview appointment, once data collection for Part I is complete. The contact information that you provide will be kept confidential. You will be given a $25 Target Gift Card for completing both Part I and Part II.

(_____)

Appendix C
Interview Questionnaire

Part II: Interview Questionnaire
To: Healthcare Providers

Thank you for joining me today. My name is Manako Yabe. I've invited you to this interview because I am interested in your opinions about video remote interpreting.

With your permission, our conversation will be audio-recorded or video-recorded, and then will be transcribed after the interview ends. In my research, I will not be using your name and our conversation will be confidential.

Please read the consent form. Your participation in the research project is voluntary and you may withdraw from the study at any point. Withdrawing from the study will not affect your grades or your employment. If you agree to participate, please the consent form.

Before we begin, do you have any questions about the consent form? Let's begin!

Questions:
Q1. Think of all the times you have worked with deaf/hard of hearing patient. During those appointments, tell me about your experiences.

Follow up question:
In which clinical situations, would you prefer to use video remote interpreting?
In which clinical situations, would you prefer to use in-person interpreting?
In which clinical situations, would you prefer to use telephone interpreting?

Q2. During critical encounters (e.g., surgery, urgent care), what interpreting mode you prefer, and why?

Q3. During non-critical treatments (e.g., follow up, non-urgent care), which method would you prefer to use and why?

Q4. How do you decide what interpreting method is appropriate for different appointments with your patient?

Follow up question:
How frequently are you able to use your preferred communication method?
What prevents you from your preferred method?

Q5. What are your suggestions or ideas for improvement of video remote interpreting?

Follow up question (if healthcare providers are signers):
How frequently do you interact with deaf/hard of hearing patients?
Do you identify as being deaf/hard of hearing?

Part II: Interview Questionnaire
To: Deaf/Hard of Hearing Patients

Thank you for joining me today. My name is Manako Yabe. I've invited you to this interview because I am interested in your opinions about video remote interpreting.

With your permission, our conversation will be audio-recorded or video-recorded, and then will be transcribed after the interview ends. In my research, I will not be using your name and our conversation will be confidential.

Please read the consent form. Your participation in the research project is voluntary and you may withdraw from the study at any point. Withdrawing from the study will not affect your grades or your employment. If you agree to participate, please sign the consent form.

Before we begin, do you have any questions about the consent form? Let's begin!

Questions:
Q1. Please describe your experience with video remote interpreting and in-person interpreting during healthcare appointments?

Follow up question:
In which clinical situations, would you prefer to use video remote interpreting?
In which clinical situations, would you prefer to use in-person interpreting?

Q2. If you see a doctor (or other healthcare provider) for critical treatments (e.g., surgery, urgent care), which interpreting method would you prefer to use?

Q3. If you see a doctor (or other healthcare provider) for non-critical treatments (e.g., follow up, non-urgent care, refill), which interpreting method would you prefer to use?

Q4. How do you decide what interpreting method is appropriate for different appointments with your healthcare provider?

Follow up question:
If you are concerned about your privacy, which method would you prefer to use?
If you have difficulty understanding English, which method would you prefer to use?

Q5. What are your suggestions or ideas for improvement of video remote interpreting?

Appendix D
Recruitment List

Healthcare Providers	DHH Patients
University of Illinois at Chicago	**University of Illinois at Chicago**
University of Illinois Hospital Health Sciences System	University of Illinois Hospital Health Sciences System
College of Applied Health Sciences	College of Applied Health Sciences
College of Dentistry	College of Dentistry
College of Medicine	College of Medicine
College of Nursing	College of Nursing
College of Pharmacy	College of Pharmacy
Community Engagement Advisory Board	Community Engagement Advisory Board
Illinois	**Illinois**
American Nurse Association Illinois	Access Living
Illinois Academy of Family Physicians	Chicago Hearing Society
Illinois Academy of Nutrition and Dietetics	Chicagoland Black Deaf Advocates
Illinois Association of Orthopedic Surgeons	Choices for Parents
Illinois College of Emergency Physicians	Deaf Adult Education Access Program
Illinois Dermatological Society	Deaf Coffee Chat Group
Illinois Emergency Nurses Association	Deaf Illinois News Group
Illinois Occupational Therapy Association	Equip for Equality
Illinois Osteopathic Medical Society	Great Lake ADA Center
Illinois Speech-Language-Hearing Association	Illinois Association of the Deaf
Illinois Psychiatric Society	Illinois Deaf/Hard of Hearing Commission
Illinois Pharmacists Association	Jewish Vocational Services Chicago
Illinois Physical Therapy Association	Mayor's Office for People with Disabilities
Illinois State Dental Society	Mount Sinai Hospital
Illinois State Medical Society	Progress Center for Independent Living
Illinois Society of Eye Physicians & Surgeons	St Francis Borgia Deaf Center
Illinois Surgical Society	Swoboda Deaf Center
Mental Health America of Illinois	Thresholds
National	**National**
American Association Public Health Deaf/Hard of Hearing-Hearing Loss/Deaf-Blind Group	Alexander Graham Bell Association for the Deaf and Hard of Hearing

Association of Medical Professionals with Hearing Losses	Association of Late-Deafened Adults
Hearing Loss Association of America	Deaf Academic Facebook Group
National Association of Social Workers	National Association of the Deaf
National Organization of Nurses with Disabilities	Registry of Interpreters for the Deaf
Speech Pathology National Organization	Wisconsin Association of the Deaf
Note. The PI contacted all the list, but she got permission from parts of them. The PI also contacted the national level organizations to increase data collection rate.	

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Ph.D., Disability Studies, University of Illinois at Chicago, Chicago, Illinois, Expected 2019 |
| PROFESSIONAL EXPERIENCE | Disability Resource Center, University of Illinois at Chicago, Communication Access Consultant, 2014-2017

Writing Center, University of Illinois at Chicago, Writing Consultant, 2016

Illinois Leadership and Education in Neurodevelopmental and Related Disabilities, University of Illinois at Chicago, Self-Advocate, 2015-2016

Department of Disability and Human Development, University of Illinois at Chicago, Postgraduate Intern, 2014

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Deaf and Hard of Hearing/Low Incidence Programs, Los Angeles Unified School District, Social Work Intern, 2012-2013

Deaf, Disabled, and Elder Services, Peace Over Violence, Los Angeles, Social Work Intern, 2011-2012 |
| RESEARCH EXPERIENCE | Department of Disability and Human Development, University of Illinois at Chicago, "Healthcare Providers' and Deaf Patients' Perspectives on Video Remote Interpreting: A Mixed Methods Study," 2016-2019

Disability Resource Center, University of Illinois at Chicago, "Students, Faculty, and Staff's Willingness to Pay for Emergency Texting," 2014-2017

School of Social Work, University of Southern California, "American, International, and Deaf Students' Willingness to Pay for Captioned Online Courses," 2011-2013 |

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TEACHING EXPERIENCE	<u>Teaching Certificate</u> Certificate in the Foundations of College Instruction, 2018 <u>Teaching Assistant</u> Department of Disability and Human Development, University of Illinois at Chicago, DHD440: Introduction to Assistive Technology, 2017-2018 School of Social Work, University of Southern California, SOWK545: Social Work Practice with Families, 2012-2013 National Center on Deafness, California State University, Northridge, ENG255: English Literature, ENG155: Freshman English, COM151/L: Public Speaking, and UNIV100: Freshman Seminar, 2007-2010 <u>Guest Lecturer</u> Department of Disability and Human Development, University of Illinois at Chicago, DHD506: Illinois Leadership and Education in Neurodevelopmental and related Disabilities, 2014-2018 Department of Disability and Human Development, University of Illinois at Chicago, DHD494: Special Topic in Disability and Human Development, 2017 College of Medicine, University of Illinois at Chicago, ECPP1: Essentials of Clinical Practice and Professionalism, 2016-2018 Honors College, University of Illinois at Chicago, HON123: Mental Health, Stigma, and Justice in Asian American Communities, 2016 Rossier School of Education, University of Southern California, EDU531: Student Disability Issues in Higher Education, 2012
AWARDS AND SCHOLARSHIPS	1. 2018 American Public American Association Scholarship 2. 2018 Canadian Writing Center Association Scholarship 3. 2018 Chancellor's Graduate Research Award 4. 2017-2019 Disability and Human Development Travel Awards 5. 2017-2018 Health Professional Student Council Travel Awards 6. 2017 Chancellor's Student Service and Leadership Award 7. 2017 UIC Impact Day Outstanding Oral Presentation 8. 2016 Association of Medical Professionals with Hearing Loss Scholarship

	9. 2015 Applied Health Sciences Fund Scholarship 10. 2015 Chancellor's Committee on Status of Person's Disabilities Grant 11. 2015 Carlos Drazen Memorial Research Award 12. 2014 Annie Hopkins Scholarship • Received 29 scholarships and awards from 2006 to 2019.
PRESENTATIONS	1. Accardi, S., Higgins, J., Iverson, C., & **Yabe, M.** (2019). *Alliance, authority, and the power of partnerships*. Conference on College Composition and Communication, Pittsburgh, Pennsylvania. 2. Womack, A., Walter, M., O'Leary, M., & **Yabe, M.** (2019). *Performing disability in classroom and writing centers*. Conference on College Composition and Communication, Pittsburgh, Pennsylvania. 3. Grayson, M., Migliaccio, C., Particelli, B., & **Yabe, M.** (2019). *Interdisciplinarity and its implications for equitable education in composition studies: (Dis)ability, equity, interdisciplinary, translingualism, writing about writing*. Modern Language Association Convention, Chicago, Illinois. 4. **Yabe, M.** (2018). *Healthcare providers' and deaf patients' perspectives toward video remote interpreting: A mixed method study*. American Association Public Health Conference, San Diego, California. 5. **Yabe, M.** (2018). *Translingualism and deaf writers*. Canadian Writing Center Association Conference, Saskatoon, Saskatchewan. 6. Xu, Y., Gordon, T., Koneczy, N., Abdelrahim, R., & **Yabe, M.** (2018). *How to Approach Disability Rights Under Troubled Times: A Multicultural Perspective*. International Congress of Qualitative Conference, Urbana, Illinois. 7. **Yabe, M.** (2018). *Healthcare providers' and deaf patients' perspectives toward video remote interpreting: A mixed method study*. Michigan Medicine Interpreter Conference, Michigan, Michigan. 8. **Yabe, M.** (2018). *Healthcare providers' and deaf patients' perspectives toward video remote interpreting: A mixed method study*. Chicago Disability Studies Conference, Chicago, Illinois. 9. **Yabe, M.**, & Holtz, R. (2017). *Translingualism in tutoring*. International Writing Center Association Conference, Chicago, Illinois.

	10. **Yabe, M.** (2017). *Campus safety app.* UIC Impact Day, Chicago, Illinois.
	11. **Yabe, M.** (2017). *Domestic violence in the Deaf community.* Chicago Disability Studies Conference, Chicago, Illinois.
	12. **Yabe, M.** (2016). *Hidden intersectionality: Silent storytelling from Deaf Asian Americans.* Chicago Disability Studies Conference, Chicago, Illinois.
	13. **Yabe, M.,** & Price, K. (2015). *Strategies in universal design for online course content.* TechTeach Conference, Chicago, Illinois.
	14. **Yabe, M.** (2015). *Benefit comparison of captioned online courses for American, international, and deaf/hard of hearing students.* Chicago Disability Studies Conference, Chicago, Illinois.
	15. Hasnain, R., Pak, J., Alfarado, F., Taradash, J., Mirza, M., & **Yabe, M.** (2014). *It makes cents: Connecting non-profits and minority-owned business to a talented untapped disabled workforce.* National Refugee and Immigrant Conference, Chicago, Illinois.
	16. **Yabe, M.** (2011). *The importance of sign language and deaf cultural understanding on international social work to the deaf community: A case study for the support system of Jamaican deaf private schools.* 4th Annual International Social Work Conference, Los Angeles, California.
	17. **Yabe, M.** (2010). *Historical comparative research among the Japanese, American, and Jamaica Deaf primary and secondary educational systems.* Presidential Scholars Day, Northridge, California.
	18. **Yabe, M.** (2009). *A change of dandelion seeds: The Lives of Tetsuji Tomikawa and Mariko Takamura*, Presidential Scholars Day, Northridge, California.
PUBLICATIONS	1. **Yabe, M.** (2019). Book review: Academic ableism. *Kairos: A Journal of Rhetoric, Technology, and Pedagogy, 23*(2). Retrieved from http://kairos.technorhetoric.net/23.2/reviews/yabe/index.html
	2. **Yabe, M**. (2018, July 30). Placing a piece of the puzzle: Translingualism and international deaf writers. *Connecting Writing Centers Across Borders.* Retrieved from https://www.wlnjournal.org/blog/2018/07/placing-a-piece-of-the-puzzle-translingualism-and-international-deaf-writers/

	3. **Yabe, M.** (2018). The journey of a deaf translingual tutor. *Writing on the Edge, 28* (2), 73-85.
	4. **Yabe, M.** (2017). Cost-Benefit evaluation: Students, faculty, and staff's willingness to pay for a campus safety app. *Journal of Criminal Justice Education, 28* (2), 207-221.
	5. **Yabe, M.** (2016). The journey of a real social worker. *Reflections: Narratives of Professional Helping, 21*(3), 2-11.
	6. **Yabe, M.** (2016). Benefit evaluation: Students, faculty, and staff's willingness to pay for emergency texting. *Journal of Applied Security Research, 4*(11), 1-13.
	7. **Yabe, M.** (2016). Benefit factors: American students, international students, and deaf/hard of hearing students' willingness to pay for captioned online courses. *Universal Access in the Information Society Journal*, *15*(4), 773-780.
	8. **Yabe, M.** (2015). Benefit comparison of captioned online courses for American, international, and deaf/hard of hearing students: From the viewpoint of individual value and total value. *Journal of Accessibility and Design for All, 5*(1), 27-46.
	9. **Yabe, M.** (2009). A change of dandelion seeds: The lives of Tetsuji Tomikawa and Mariko Takamura. *Journal of the Association on National Disability.* (Japanese).
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UNIVERSITY SERVICES	Chancellor's Committee on Status with Disabilities, University of Illinois at Chicago, 2015-2016
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