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Analyzing Perceptions of University of Mississippi Pre-Health Students Regarding the Effectiveness of Medical Interpretation Options

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ANALYZING PERCEPTIONS OF UNIVERSITY OF MISSISSIPPI PRE-HEALTH STUDENTS REGARDING THE EFFECTIVENESS OF MEDICAL INTERPRETATION OPTIONS

by
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ABSTRACT

This study investigates the perceptions of pre-health students regarding which clinical interpretation options are most effective, while also assessing their personal proficiencies of the Spanish language. Information obtained from the research survey provides a basis of research that may aid in assessing trends of interpretation services, allowing for improvements to be made to these services prior to the influx of Hispanic/Latino residents into Mississippi. This investigation is entirely conducted at the University of Mississippi and includes the ideas of undergraduate pre-medical students, pre-pharmacy students, pre-PA (physician's assistant) students, pre-PT (physical therapy) students, pre-speech therapy students, and pre-nursing students. After 61 undergraduate students provided responses to the survey via SurveyMonkey, health professionals at the University of Mississippi were asked to provide commentary on the results, indicating preferences for bilingual doctors serving interpreting functions. The most significant results of this study support previous research on Spanish interpreters in the health care professions. Pre-med students at the University of Mississippi are indeed following the norms for the rest of the nation in recognizing a need for Spanish bilingual doctors and professionally trained in-person interpreters in the clinical setting. The surprising results, however, indicate that pre-med students at the University of Mississippi believe that Spanish bilingual doctors and professionally trained in-person interpreters offer more accessible and affordable services than previous research signifies.

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ABBREVIATIONS

LEP	Limited English Proficiency
PA	Physician's Assistant
PT	Physical Therapy
MD	Doctor of Medicine
DO	Doctor of Osteopathic Medicine
PHSA	Public Health Service Act
AAMC	Association of American Medical Colleges
IMG	International Medical Graduate
USMLE	United States Medical Licensing Exam
HCOE	Hispanic Center of Excellence
IEN	Internationally Educated Nurse
AHA	American Hospital Association
ARF	Area Resource File
NSSRN	National Sample Survey of Registered Nurses
OB/GYN	Obstetrician and Gynecologist

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INTRODUCTION

This study investigates the perceptions of pre-health students regarding which clinical interpretation options are most effective, while also assessing their personal proficiencies of the Spanish language. This investigation is entirely conducted at the University of Mississippi and includes the ideas of undergraduate pre-medical students, pre-pharmacy students, pre-PA (physician's assistant) students, pre-PT (physical therapy) students, pre-speech therapy students, and pre-nursing students.

Research Questions:

The objective of this investigation is to answer several research questions, compiled below:

1. Which interpretation option(s) do pre-health students perceive to be most effective in general, as well as in regards to accessibility and affordability? Does this finding align with previous research?
2. What are the opinions of students about studying Spanish to enhance their communication abilities for their healthcare profession?
3. Do healthcare educators, including professors and advisors, find it necessary for pre-health students to learn Spanish?

Hypothesis:

Prior to conducting this survey, I intended to discover that pre-health students found in-person interpretation services, in particular in-person professionally trained interpreters and bilingual doctors, to be most effective. In conclusion, my hypothesis did align with the results obtained from my survey, with in-person professionally trained interpreters being marked as the most effective option, followed by bilingual doctors serving interpreting functions. Furthermore, I expected to find a low number of students who believed that they could communicate effectively in Spanish with patients, given their current Spanish proficiencies. This hypothesis was also supported by the results obtained through the survey, with only 10% of participants indicating their perceived ability.

Outline of Chapters:

After defining useful key terms that will recur throughout this investigation in the following section of the introduction, the literature review chapter will follow. This chapter outlines previous research that will contextualize this study. Next, the methodology chapter will provide a detailed explanation of how this study was conducted from start to finish. The methodology touches on how participants were recruited, what instruments were utilized to conduct the study, and which key themes recurred throughout the survey and the professor and advisor interviews. Following the methodology chapter is the results section, which provides an in-depth description of the results obtained from the survey. After this, the discussion chapter highlights key information from the results and incorporates commentary from healthcare experts on the obtained research. Finally, the conclusion reminds readers of this study's

relevance, as well as providing information about the investigation's limitations and suggestions for future research.

Key Terms:

Before continuing to the following chapters, it is important for readers to understand several recurring key words, which will be defined below and may be useful to refer to while reading this report.

This study asks students studying to be healthcare providers about their *perceptions*, or "physical sensation[s] interpreted in the light of experience," about the differing medical interpretation options (*Merriam-Webster.com*). Before proceeding, it is important for readers to understand the difference between interpretation and translation. According to *Languagescientific.com,* interpreters "translate[] orally" and need to be able to react quickly to paraphrase the content of what is being said and "translate in both directions on the spot," without using extraneous materials. On the other hand, translators "interpret[] written text" and need to be able to "write well in the target language" but are able to use extraneous materials such as dictionaries to help. Nonetheless, both of these practices require high proficiencies of two or more languages.

In addition, when referring to Spanish-speaking patients, many specifically identify as "Hispanic" or "Latino." According to *Merriam-Webster.com,* "Hispanic" is defined as "of, relating to, or being a person of Latin American descent and especially of Cuban, Mexican, or

Puerto Rican origin living in the U.S.," and "Latino" is defined as "a person of Latino American origin living in the U.S.". Many of these individuals are denoted as LEP patients, signifying that they have low proficiencies in Standard English and likely are candidates for interpretation services (Vela et. al). The term *proficient* refers to "well advanced in an art, occupation or branch of knowledge," with the subject matter at hand being the Spanish language (*Merriam-Webster.com).*

In order to obtain a participant demographic, the survey for this study asks participants to identify which future health-related professions they are pursuing (question 3). Therefore, it is important to understand the different roles of each of the professions. The majority of respondents indicated that they were aspiring physicians, either a doctor of medicine (MD) or doctor of osteopathic medicine (DO). According to *Merriam-Webster.com,* a "physician" is "one educated, clinically experienced, and licensed to practice medicine as usually distinguished from surgery." Likewise, *Merriam-Webster.com* defines a "pharmacist" as "a health-care professional licensed to engage in pharmacy with duties including dispensing prescription drugs, monitoring drug interactions, administering vaccines, and counseling patients regarding the effects and proper usage of drugs and dietary supplements." Furthermore, a "physician's assistant" (PA) is "a person certified to provide basic medical services usually under the supervision of a licensed physician" (*Merriam-Webster.com).* Several participants indicated that they were aspiring physical therapists, therefore practicing physical therapy. "Physical therapy" (PT) is "therapy for the preservation, enhancement, or restoration of movement and physical function impaired or threatened by disease, injury or disability that utilizes therapeutic exercise, physical modalities (such as massage and electrotherapy), assistive devices, and patient education and training"

(*Merriam-Webster.com).* Similarly, speech therapists practice "speech therapy," which is a "therapeutic treatment of impairments and disorders of speech, voice, language, communication, and swallowing" (*Merriam-Webster.com).* Finally, some participants marked that they were aspiring nurses, or "licensed health-care professional[s] who practice[] independently or [are] supervised by . . . physician[s], surgeon[s], or dentist[s] and who [are] skilled in promoting and maintaining health" (*Merriam-Webster.com).*

This report also analyzes the degree of comfort that future health students would feel if asked to "effectively communicate with Spanish-speaking patients with [their] current Spanish proficienc[ies]" (question 5). According to *Merriam-Webster.com*, the definition of "comfortable" is "free from stress or tension." If future healthcare providers theoretically were to perform a medical interpretation with Spanish-speaking patients prior to receiving formal training to be an interpreter, they would be considered *ad hoc* interpreters. According to "Language Barriers to Health Care in the United States," *ad hoc* interpreters may include "family members, friends, untrained members of the support staff, [or] strangers found in waiting rooms or on the street" who have been asked to interpret in clinical encounters. These individuals are "unlikely to have had training in medical terminology and confidentiality . . . and unlikely to have a full command of two languages or of medical terminology" (Flores).

Furthermore, in question 6 of the survey, participants were asked about whether they would be "willing to learn how" to speak Spanish if they did not know how "in order to communicate with Spanish-speaking patients." *Merriam-Webster.com* defines "willing" as "inclined or favorably disposed in mind."

Questions 8, 9, 10 of the survey aim to identify perceptions of how effective interpretation options are in general, as well as in terms of accessibility and affordability. According to *Merriam-Webster.com,* "effective" is defined as "producing a decided, decisive, or desired effect" Additionally, "accessible" is defined as "capable of being reached" (*Merriam-Webster.com*). On the other hand, "affordable" means "able to be afforded: having a cost that is not too high" (*Merriam-Webster.com*).

Also, it is important to understand that the "telephonic medical interpreting services," or "electronic programs serving as interpreters" mentioned in question 8 of the survey, refer to mobile applications that aid in clinical interpretation settings ("5 New Medical Interpreting Apps). "Telephonic" refers to devices or applications "of, relating to, or conveyed by a telephone (*Merriam-Webster.com*). "Electronic" refers to devices or applications "of, relating to, or utilizing devices constructed or working by the methods or the principles of electronics" (*Merriam-Webster.com*).

The following chapter, "Literature Review," will provide an overview of current research in order to help contextualize my study.

LITERATURE REVIEW

I. Background Studies: Interpretation (Establishing the Need, Different Forms, Advantages/Disadvantages)

Many studies have noted language barriers causing complications in the clinical environment for limited English proficiency (LEP) Spanish-speaking patients and the need for effective interpretation systems to equalize these healthcare disparities. In this chapter, I will analyze past investigations that aid in contextualizing this field of interest and setting the scene for my research that will be outlined in the chapters to come.

Current literature provides evidence of limitations in healthcare for LEP Spanish-speaking patients. These inherent limitations in the existing healthcare system establish a need to determine the most effective interpretation option for patients experiencing a reduced level of healthcare due to language barriers. A study comparing health care quality between LEP and non-LEP individuals in the United States reveals this need, finding that, "[w]ithin a national sample of insured Latinos seeking primary care services, LEP individuals were significantly more likely to struggle with appointment scheduling, waiting for care, and obtaining information over the phone. Similarly, a comparison of LEP and non-LEP adults with poor health found that LEP individuals were more likely to report difficulty understanding their doctor" (Vela et al.).

As the LEP Spanish-speaking people continue to stray from traditional enclaves concentrated with this population to "emerging destinations" (chiefly in the Southeast and Midwest) lacking this traditional demographic, their access to primary care and language services is shown to

decline, exacerbating the need to determine effective interpretation options for these patients (Nathenson et al.). Because over 60% of the general LEP population in the United States is Spanish-speaking, 80% is foreign-born, and 40% is uninsured, the need for affordable, accessible Spanish translation services is evident (Nathenson et al.). Nathenson et al., comparing health care quality between LEP and non-LEP individuals in the United States, further revealed that, "[w]ithin a national sample of insured Latinos seeking primary care services, LEP individuals were significantly more likely to struggle with appointment scheduling, waiting for care, and obtaining information over the phone. Similarly, a comparison of LEP and non-LEP adults with poor health found that LEP individuals were more likely to report difficulty understanding their doctor" (Nathenson et al.). While the Public Health Service Act (PHSA) attempts to address these disparities by requiring high-LEP areas to provide interpreter services, inherent ambiguities in the act, such as the lacking numerical quantification of what is to be considered a high-LEP area and a failure to address the lack of available language resources, have led health providers to practice noncompliance (Nathenson et al.).

Flores' longitudinal study further established the growing need for effective interpretation services. With the number of Spanish-speaking residents sky-rocketing in America, the quantity of available medical interpreters is failing to meet growing demands. From 1990 to 2000, there was a 47% increase in the number of American citizens utilizing a language other than English to communicate within the domestic environment (Flores). During these same years, the number of Americans with limited English proficiencies experienced a similar 53% upsurge (Flores). Certain areas in the United States were faced with especially high numbers of citizens who were unable to speak English or who had limited English proficiencies (Flores). For instance, in 2000,

40% of California occupants spoke a language other than English in the home, while another 20% had LEP's (Flores). Similarly, in Miami, Florida, 75% of inhabitants didn't use English in the home, with 47% of residents having LEP's (Flores).

However, the United States has legislation that mandates that LEP patients receive an equivalent level of healthcare, despite the existence of language barriers. In 1998, the Office for Civil Rights of the Department for Health and Human Services outlawed discrimination on the basis of national origin under a memorandum included in Title VI of the Civil Rights Act of 1964 (Flores). This legislation holds that language barriers do not constitute an excuse for someone to be denied for health care or to receive delayed health care. In fact, if inadequate health care is provided due to such complications, it is considered blatant discrimination (Flores). Therefore, beneficiaries of Medicaid and Medicare must finance suitable translation services for United States citizens with LEP's. This memorandum was later followed by an executive order mandated by the president in attempt to enhance the access of language services (Flores). This effort made some necessary improvements, stimulating thirteen states to offer reimbursements for language services through third parties such as Medicaid and the State Children's Health Insurance Program (Flores). During 2006, however, a large quantity of states facing larger numbers of residents with LEP's did not similarly comply due to elevated costs of interpreter services (Flores). In addition, in 2003, the Office for Civil Rights passed loopholes for medical providers to decline to offer language services in cases of high costs, although Title VI doesn't contain this provision (Flores). Furthermore, the Public Health Service Act attempts to address disparities in healthcare by requiring high-LEP areas to provide interpreter services, but inherent ambiguities in the act such as failing to numerically quantify what is to be considered a high-LEP

area and a failure to address the lack of available language resources, have led health providers to practice noncompliance (Nathenson et al.)

In summary, although legislation declares the universal right to adequate language services, LEP patients are being deprived thereof due to the excessive cost of interpreter services, the consequent scarcity in availability of these services ("Chronic Shortage"), the perception that physicians lack sufficient time to enforce these services (Davidson), and the absence of standardization when considering a medical professional's proficiency in a specific language (Vela et al.).

Due to failures of legislation to create equitable healthcare for LEP Spanish-speaking patients, it is necessary to determine which available interpretation option is most effective in mitigating these disparities. In order to determine the effectiveness of the differing interpretation services, it is important to analyze the pros and cons of each option. Specifically, this section of the literature review will review previous studies assessing the effectiveness of in-person professionally-trained interpreters, electronic programs serving interpreting functions, Google translate serving interpreting functions, family members (*ad hoc* interpreters) serving interpreting functions, and bilingual doctors serving interpreting functions.

According to the Instituto Cervantes, a nonprofit organization based in Spain, a major deficiency in the health care field in the U.S. implicates physicians treating Hispanics. Acknowledging significant statistics, Insituto Cervantes reveals that "the U.S. now has the world's second-largest population of Spanish speakers behind only Mexico" ("Chronic

Shortage"). As these Spanish-speaking patients visit doctors in the United States, the problem of communication in the doctor-patient relationship arises. While it is imperative that patients are able to both receive accurate information and comprehend this information in the correct manner, communication has become increasingly difficult due to "an immediate and chronic shortage of bilingual doctors" ("Chronic Shortage"). One may believe the solution is simple—why not hire an interpreter? However, the choice to bring an interpreter into the clinical setting has its disadvantages. Dr. Victor Dominguez, a physician working at the Centers for Family Health located in Santa Paula, California, explains the complications that surface from using interpreters to address the shortage of bilingual doctors in the United States: "I find that a lot of patients don't feel comfortable communicating with a provider that doesn't speak Spanish because they don't like to bring an interpreter into the room. . . . There are privacy issues associated with that" ("Chronic Shortage"). Therefore, many Spanish-speaking are forced to choose between running the risk of not fully comprehending instruction provided by doctors or experiencing privacy violations to receive information from an interpreter proficient in their language. As a result, LEP patients are deemed vulnerable to receiving inadequate health care including a lack of accessible preventive care options and an increased quantity of medical errors due to language barriers in the clinical setting (Vela et al.).

In attempt to create more bilingual doctors to address these shortcomings in patient care due to noncompliance with United States legislation, several initiatives have been developed to allow more medical professionals the opportunity to speak Spanish. For instance a Medical Spanish program-- Ecela Spanish-- has been organized that allows pre-health participants an immersive experience including the opportunity to travel to a South American country where they will

shadow real-life physicians, involve themselves in volunteer initiatives, and receive exposure to Spanish grammar principles and vocabulary in a tight knit classroom environment ("Chronic Shortage"). Ecela Spanish has begun offering its six-week summer program in Viña del Mar, Chile, where participants have the option of residing with a Chilean host family or with fellow students ("Chronic Shortage"). Not only will this program allow participants to further their Spanish fluency, but they will also be able to experience cultural immersion. The goal of this program is to produce more bilingual doctors so that patients can feel confident in the information that they are receiving, while simultaneously comfortable that their medical information is not being revealed to an outside source ("Chronic Shortage"). Not only are there programs that help students have more opportunities to practice Spanish, but there have also been initiatives developed to aid international students (who could potentially communicate effectively with other limited English proficiency individuals) in establishing themselves successfully in United States' health professions. According to Sarah Mann, a writer reporting for Association of American Medical Colleges (AAMC), "'[a] sizable number of international medical graduates (IMGs) from Latin or South America were living in California, but were unable to practice medicine because they had not met U.S. licensing requirements . . . Instead, these doctors were working as health educators, X-ray technicians, or pharmacy staff while they settled in the United States'" ("Doctors & Diversity"). In response, the University of Southern California, Los Angeles has formed the IMG program to facilitate the process of taking the United States Medical Licensing Exam (USMLE) for international medical graduates ("Doctors & Diversity"). The objective of this program was to produce more bilingual physicians to serve the Hispanic/Latino population ("Doctors & Diversity"). Other universities such as the Albert Einstein College of Medicine at Yeshiva University (Bronx, New York) and the University of

Illinois at Chicago College of Medicine have created similar initiatives to aid the Hispanic/Latino people of the United States ("Doctors & Diversity"). For instance, the Albert Einstein College of Medicine at Yeshiva University formed the Hispanic Center of Excellence (HCOE) which is a school offering medical Spanish classes to enhance students' language proficiencies ("Doctors & Diversity"). Furthermore, the University of Illinois at Chicago College of Medicine (UIC) organized the Urban Medical program, with the aim of getting students involved in impoverished communities so that they will be able to comprehend "'personal perspective[s] on the culture and experiences of underserved populations,' including Hispanics and Latinos" (quoted in "Doctors & Diversity"). According to the program director Jorge Girotti, it is useful for medical schools to integrate language training into the clinical aspect of the curriculum so that the Hispanic/Latino population can be better accommodated to ("Doctors & Diversity"). Girotti also holds that non-minorities often enroll into medical school hoping to help those from underserved areas, and, in order to cultivate this desire, medical schools should promote opportunities for students to do so ("Doctors & Diversity").

However, a similar effort to implement language coursework into medical school for aspiring professionals has declined to exhibit progress in enhancing language services or mounting the number of bilingual doctors entering the field, potentially due to the curriculum's lack of standardization and authentication, along with its promotion of unclear, insufficient literature. (Vela et al.) A mixed-methods study was generated to evaluate the comfortability and practices of senior medical students graduating from the University of Chicago (class size ~ 88 students per year) and the University of Illinois (class size ~ 190 students per year). During the two-year period of data collection, students were encouraged to provide answers to an eight-question e-

mail survey comprised of true/false, Likert scale, and open-ended questions inquiring about their emotions regarding past experiences serving as clinical interpreters and their self-reported proficiency levels (Vela et al.). After obtaining responses and assembling demographic data of survey participants, three authors utilized inductive content analysis to assess the categorical themes of the study (Vela et al.). The results of the study revealed that, out of the 413 students contacted with the survey, 216 responded (Vela et al.). Of these 216 students, 87 reported fluencies in languages other than English (47.1% Spanish, 12.6% Chinese, 2.3% Hindi) (Vela et al.). While 84% of these 87 students recounted being asked to frequently or very frequently interpret for patients, only 2% of the students reported formal interpreter training and certification (Vela et al.). Of this 84% of students, 62% had never rejected to fulfill the request to interpret for patients, 11.5% reported feeling frequently or very frequently uncomfortable while serving as an interpreter, and another 31% recounted feeling occasionally uncomfortable during interpretations (Vela et al.). Furthermore, 53 of the 87 students communicated incidents (37% of which were deemed high stakes) that made them feel uncomfortable serving as an interpreter (Vela et al.). 39% of students who reported such an incident attributed their discomfort to insufficient vocabulary, while 30% recounted a lack of fluency, and an additional 6% relayed a lack of cultural competency (Vela et al.). This study continued to report various instances in which interpreters felt uncomfortable as well as recording some in which they did feel comfortable (Vela et al.). Although there were inherent limitations such as refining the survey to only senior students from only two universities, this study does indeed call for a need for standardization in fluency reports and formal training for students prior to interpreting for patients in a clinical setting (Vela et al.). This studies also reveals the difficulties in creating bilingual doctors who feel comfortable enough to serve interpreting functions in clinical settings

(Vela et al.). It is unclear whether the shortage in bilingual doctors can be resolved by initiatives allowing aspiring medical professionals opportunities to speak Spanish, due to insufficient research on the progress of language initiatives for pre-health students.

Nonetheless, Hardin's study emphasizes the benefits of bilingual doctors serving interpreting functions in the clinical setting during her investigation. Her study videotaped medical interviews "between ten Spanish-speaking patients and two Spanish-speaking physicians" that occurred inside of an Eastern hospital in Ecuador in order to analyze conversational discourse in the clinical environment (Hardin). The study scrutinize exactly what words were said and looked at what could have been implied in the conversation through methods such as the use of different voice inflections (Hardin). One researcher on the subject, Cordella, has developed an impression that doctors have three predominant voice inflections which, in turn, reflect their roles as doctors, educators, and fellow humans (Hardin). She has collected examples of these different voices (Hardin) and identifies the purpose of each voice in the doctor-patient relationship (Hardin). She holds that physicians' doctor voice is utilized to "seek information by asking questions, offer[ ] assessment and review, and align the patient to the doctor as an authority figure" (Hardin). Moreover, the educator voice answers to "patient discomfort" by providing "medical facts," "medical treatment and management" (Hardin). Lastly, the fellow human voice expresses empathy, friendliness, and cooperation (Hardin). This voice may also prompt patients to share more information about themselves that is not related to medicine, helping doctors to establish a bond of trust with patients and get to know them on a more personal level (Hardin). The use of the educator voice and the fellow human voice, along with the doctor voice, have been shown in a study by another researcher, Nithiananda, to be beneficial with respect to "patient adherence"

when compared to the use of the doctor voice alone (Hardin). Not only can physicians reflect these voices through words, but they can also manifest them in their choice of body language (Hardin). For instance, an example provided in this study speaks of a physician frowning, showing a doctor voice, in response to a patient's poor diet choices (Hardin). These video interviews also had the purpose of teaching pre-health students how to conduct conversations in Spanish (Hardin). This study considered speaking habits of physicians during the medical interviews and analyzed that of patients: "Perhaps the most important purpose of the video dialogue is to demonstrate how patients speak differently than doctors: they have a variety of accents, social backgrounds, and expectations" (Hardin). Due to doctors' abilities to inflect differing voices and utilize body language to effectively communicate with patients (Hardin), they are able to form more tightly-knit bonds with patients than interpreters able to better respect patients' privacy ("Chronic Shortage"), and able to avoid complicated dynamics involving interpreters (LA).

Not only is the United States facing shortages in bilingual physicians and medical interpreters, but it also continues to face deficiencies in available nursing staff (Cho). As a result, United States' hospitals have begun to hire internationally educated nurses (IENs) at an increased rate. Staking a claim as "the epicenter of global nurse migration," the United States' population of IENs in the workforce increased from 3.5% to 5.4% in the four years between 2004 and 2008 (Cho). Although still comprising a small percentage of the overall nursing demographic, this upward trend "suggest[s] that as the U.S. population ages and becomes increasingly diverse the demand for IENs is likely to [continue to] grow" (Cho). However, a study analyzing IEN hiring practices in 2007 and 2008 has revealed that IENs are not distributed consistently throughout healthcare organizations in the United States, with "26% [being located]

in California, 12% in New York, and 10% in Texas" in 2008 (Cho). This study used data from a voluntary survey provided to American hospitals called the AHA (American Hospital Association) Annual Survey, as well as information regarding U.S. counties from a data collection system called the Area Resource File (ARF) and results from the 2008 NSSRN County Public Use File recording U.S. nurse "supply, composition and distribution" (Cho). The results of this study reflected that "[h]ospitals in counties with older, more diverse, and more educated populations were more likely to hire IENs" (Cho), potentially due to an increased likelihood that more diverse populations would be more accepting of foreign-trained nurses than those populations lacking in diversity. This study also revealed increased IEN hiring at larger hospitals, potentially due to an availability of more connections to IEN recruiters and other ways to hire IENS (Cho). However, "[t]he study findings that more community characteristics than hospital characteristics were strongly associated with IEN hiring suggest perceived community needs [such as demographic make-ups] and receptivity to IENs could" be more useful when considering whether or not health administrators should hire IENs over nurses educated in the United States (Cho).

In addition to a lack of accessibility when it comes to appropriate hospital and clinic staffing, it is also evident that there is a lack of affordability when it comes to healthcare, especially in relation to interpretation services. With the number of uninsured patients increasing by 50% in the 25 years following 1980, the need for free clinics is unprecedented (Gertz et al.). Gertz et al., surveying 362 patients who have attended free clinics to receive medical care, found that 77% indicated a preference for the care available at these clinics as opposed to other options, and 97% reported contentment with services at free clinics. When considering types of care

sought after by patients attending these clinics, it became clear that primary care and pharmacy services were utilized the most with 86% of patients receiving primary care and 80% using pharmacy services (Gertz et al.). By offering free medical care, these clinics-- whether independent, church-run, student-run, etc.—allowed fiscally struggling populations to receive treatment. After patients were asked what they would do should their free clinic not exist, 24% responded they would not pursue care, 21% of which because of costs. Furthermore, 47% indicated they would search for another free clinic, while 23% would go to the emergency room (Gertz et al.). Of patients who responded, the majority were found to be between the ages of 18 and 64, English speakers or English speakers with the addition of another language and considered to be working poor (Gertz et al.). Out of the 1,114 clinics recognized as free clinics in the United States, 172 clinical directors provided answers to survey questions (Gertz et al.), with 44% of these 172 clinics identified as independent clinics. In addition, these clinics specified a mean annual number of 4,310 patient visits with a mean of 87.3% of patients across the clinics being uninsured (Gertz et al.). These clinics indicated 156.7 volunteers on average, 6.9–7.5 paid staff" with the majority "located in the South. Most clinics reported a target population of the uninsured, seeing a majority of female, adult, non-Hispanic, Caucasian, adult patients" (Gertz et al.). Clinic directors denoted a mean annual budget of $447,730. Of surveyed clinics, 38.4% were located in the South, 30.2% in the Midwest, 15.7% in the West, and 15.7% in the Northeast (Gertz et al.). This study, among others, highlights the need for affordable healthcare.

A similar study related to free clinics revealed that correlations exist between patients' levels of interaction with the healthcare system and their education levels, incomes, ages, and ethnicities (Kamikura et al.). According to Kamikura et al., the typical patients who attend free

clinics have low levels of income and education and are young or middle-aged adults. Furthermore, Kamikura et al. reveals that many free clinic patients are from minority groups or are immigrants from foreign countries. There are few existing studies focused on patient satisfaction in free clinics. However, the previous studies have found high levels of satisfaction among free clinic patients with insurance, but less satisfaction among those without insurance (Kamikura et al.). The authors of one study recognized that there was a need for more studies that analyze the satisfaction of uninsured or uninsured patients with the services of free clinics and decided to explore this field with their investigation (Kamikura et al.). Their particular report had a specific interest in studying the services of interpreters, language proficiency, and health status as factors that influence patient satisfaction. Kamikura et al. found that "[i]n general, interpreter services improve outcomes of healthcare services and patient satisfaction of patients with limited English proficiency." Specifically, Spanish-speaking patients reported higher levels of satisfaction if they used a professional interpreter (Kamikura et al.). When rating their satisfaction levels in regards to "provider communication and office staff helpfulness," Spanish-speaking patients with limited English proficiencies indicated lower satisfaction levels than English speakers or bilingual patients (Kamikura et al.). This study was conducted at the free Intermountain West clinic, which provides a lot of preventive care for patients living below 150 percent of the federal poverty level. Study participants were divided into three groups based on their linguistic abilities (native English, non-native English, and Spanish speakers) (Kamikura et al.). Levels of patient satisfaction were assessed by "the Patient Satisfaction Questionnaire Short Form, the Patient-Doctor Depth-of-Relationship Scale, and four original questions regarding the clinic services developed by the clinic staff" (Kamikura et al.). Each of these scales had its own group of questions that were evaluated by Likert scales, where a higher score indicated positive

results. Also, participants were asked demographic questions including their age, gender, race, ethnicity, level of education, country of origin, as well as questions regarding their self-assessed English proficiency and their experiences with the free clinic. The data analysis process involved an SPSS, a "Pearson's Chi square test," a variety analysis (ANOVA), and a "multivariate regression analysis" (Kamikura et al.). There were 351 participants in this study, including 53 native Anglo-Saxons, 128 non-native Anglo-Saxons, and 128 Spanish speakers. The free Intermountain West clinic consisted of six professional workers and 60 volunteers employed based on their language proficiencies (Kamikura et al.). The volunteer interpreters did perform training and received certification from Intermountain West's volunteer coordinator, "[b]ut volunteer interpreters [were] not always 'professional' interpreters who possess[ed] an official medical interpreter certificate" (Kamikura et al.). The results from the demographic questions of the study revealed approximately one half of the free clinic's patients were Hispanic, and more than 60% of participants were of Hispanic or Latino origin (Kamikura et al.). Also, 60.4% of the native English speakers had received education at the university level or higher, and 30.2% were employed (Kamikura et al.). Furthermore, 30% of Spanish speakers had a college-level education or higher, and 51.2% were employed (Kamikura et al.). Although the majority of the English speakers involved in this study were born in the United States, the majority of Spanish speakers who participated in the investigation were born in foreign countries (the most prevalent was Mexico followed by El Salvador) (Kamikura et al.). Moreover, 40% of participants indicated that they were fluent in the English language, but only 10% of Spanish speakers noticed this fluency. Fortunately, 85.2% of participants did not think they were mistreated due to a lack of English fluency (Kamikura et al.). When analyzing the results of this study, it is important to recognize that 23.4% of non-native English speakers and 74.7% of Spanish speakers used a

professional interpreter in the clinic, while 25.8% of non-native English speakers and 35.9% of Spanish speakers used an *ad hoc* interpreter in the clinic. Those who did use professional interpreters indicated high levels of satisfaction with their clinical experience (an average greater than 9 on a scale up to 10) (Kamikura et al.).

Before attending the free clinic, many of the participants stated that the emergency room and community clinics were their only options (Kamikura et al.). Patients' most prevalent reason for not attending the free clinic was a lack of transportation. Similarly, 31.3% of patients could not comply with the doctor's suggestions due to a lack of money (Kamikura et al.). Therefore, this study highlights the need for health services that are both accessible to patients, as well as affordable. The results also found that native English speakers reported worse levels of health and worse relationships with their doctors than the other two groups (Kamikura et al.). Spanish speakers had more positive opinions about the implementation of educational health classes than the other two groups (Kamikura et al.), indicating that educational programs may be beneficial for this demographic group. Therefore, this study found that satisfaction with the interpreters was high, but data may have been convoluted due to the use of *ad hoc* interpreters in some of the clinical encounters and difficulties in distinguishing which volunteer interpreters were actually considered professional. However, patients who did utilize professional interpreters rather than *ad hoc* interpreters indicated higher levels of satisfaction (Kamikura et al.). Furthermore, because the three different participant groups reported different needs and different levels of satisfaction, only the improvement of services or communication between patients and providers would not be effective. Therefore, according to the results of this study, different treatments for each of the language groups may be necessary in order to provide optimal patient care, patients prefer

professional interpreters as opposed to ad hoc interpreters, and healthcare services need to be accessible and affordable so that patients have the means to utilize them (Kamikura et al.). Although patient satisfaction has been shown to increase with professional interpreters, they are not always an option for patients due to shortcomings in this accessibility and affordability. Because professional interpreter services limited in cost, accessibility, and availability, health providers often utilize "*ad hoc* interpreters including "family members, friends, untrained members of the support staff, and strangers found in waiting rooms or on the street" are often the only choice for LEP patients (Flores et al.).

Similar studies also show correlations between language groups and reported satisfaction with healthcare (Morales et al.). Several researchers provided information regarding their investigation of language and ethnicity. Specifically, investigators analyzed the relationships between patient satisfaction ratings and their ethnicities (white vs. Latino) and native languages (English vs. Spanish) from 7,093 surveys returned by patients randomly selected from independent physician groups primarily located in the West Coast area of the United States (Morales et al.). Researchers indicate that "relatively few studies have examined satisfaction with care in this population once they have access to the health care system." Furthermore, they cite that previous studies within this subject area are predominantly limited to either comparisons of patient satisfaction between Latino and non-Latino individuals or comparisons of satisfaction levels between native English speakers and native Spanish speakers (Morales et al.). While the results of the studies comparing Spanish-speaking and English-speaking patients tended to show higher levels of satisfaction among English-speaking patients, the studies analyzing comparisons between Latino and non-Latino patients generated varied results. This study was able to aid in

filling existing knowledge gaps (Morales et al.). This investigation divided participants into one of three classification groups: “non-Latino whites responding in English (whites); Latinos responding in Spanish (Latino/Spanish); and Latinos responding in English (Latino/English) (Morales et al.). The average age of patients who completed the survey was 51, and 65% of the respondents were women (Morales et al.). White respondents reported that they had private health insurance (88%) more so than the Latino/English group (84%) and Latino/Spanish group (64%) (Morales et al.). There was no statically significant difference between the physical health index or the mental health index of each group (Morales et al.). The results of this study found that Latino patients indicated lower levels of satisfaction regarding communication in the clinical setting than the white patients (Morales et al.). For the survey question, “How would you rate medical staff listening to what you have to say?,” Latino/Spanish respondents indicated lower levels of satisfaction with staff willingness to listen (Morales et al.). Specifically, 28.8% of Latino/Spanish patients selected “poor,” “very poor,” or “fair” for this question, while only 17.2% of Latino/English patients and 13.4% of whites chose these options (Morales et al.). Furthermore, when asked to rate satisfaction levels with the responses of medical personnel to their questions, Latino/Spanish participants indicated the lowest levels of satisfaction, followed by Latino/white respondents and then white patients (Morales et al.). Moreover, to the question, “How would you rate [medical personnels’] explanations over prescribed medications?,” 30.5% of Latino/Spanish participants indicated low levels of satisfaction, answering “poor,” “very poor,” or “fair” (Morales et al.). On the other hand, only 18.6% of respondents from the Latino/English group and 14.0% of participants from the white group selected marked these answer options. (Morales et al.) Additionally, 36.0% of Latino/Spanish respondents indicated low levels of satisfaction (marking “poor,” “very poor,” or “fair”) when asked, “How would you

rate explanations about medical tests and procedures?" (Morales et al.). Conversely, 21.2% of Latino/English patients and 17.3% of white patients expressed dissatisfaction with these explanations (Morales et al.). The last question of the survey asked participants, "How would you rate reassurance and support from your doctor and the office staff?" (Morales et al.). Investigators found that 28.8% of patients from the Latino/Spanish group, 17.3% of patients from the Latino/English group, and 13.4% of patients from the white group experienced dissatisfaction with reassurance from medical personnel (Morales et al.). Therefore, the Latino/Spanish group experienced the lowest levels of satisfaction with patient-medical personnel clinical communication, followed by the Latino/English group and finally the white group (Morales et al.). Furthermore, Morales et al. mention a previous study conducted in an emergency department that revealed lower patient satisfactions among monolingual Spanish-speaking patients than English-speaking patients even when professional interpreters were utilized, signifying that healthcare inequalities stemming from language barriers are not fully equalized by interpreter use.

Although patient satisfaction has been shown to increase with interpreter use (Kamikura et al.), it has also been shown not to fully eliminate consequences arising from language barriers (Morales et al.). Therefore, it is important to understand the potential clinical consequences of the differing interpretation options and how these potential clinical consequences can manifest as interpretation errors. One relevant study conducted by Flores et al. in 2012 helps provide useful context by aiming to compare the number and types of mistakes made in instances where professional interpreters, *ad hoc* interpreters, and no interpreters were utilized in clinical settings. This investigation took place at two hospitals over the course of 30 months (Flores et al.). Types of errors were classified into several groups, including omission, addition, substitution,

editorialization, and false fluency (Flores et al.). The authors of this study defined "omission errors" as mistakes in which "[t]he interpreter did not interpret a word/phrase uttered by the clinician, parent, or child and "addition errors" as mistakes in which "[t]he interpreter added a word/phrase not uttered by the clinician, parent, or child" (Flores et al.). On the other hand, "substitution errors" were specified to be mistakes in which "[t]he interpreter substituted a word/phrase for a different word/phrase uttered by the clinician, parent or child" (Flores et al.). Furthermore, Flores et. al defined "editorialization errors" as mistakes in which "[t]he interpreter provided his or her own views as the interpretation of a word/phrase uttered by the clinician, parent or child, and "false fluency errors" as mistakes in which "[t]he interpreter used a word/phrase that does not exist in that particular language or as an incorrect word phrase that substantially altered the meaning." To help facilitate understanding of false fluency errors, the authors provided an example: "[A] false-fluency error in interpreting the Spanish word for "eye" (*ojo*) would be **eyo* (a nonexistent word) or *oreja* ("external ear")" (Flores et. al). During the course of this study, investigators audiotaped 57 clinical encounters in two large pediatric emergency departments located in Massachusetts (Flores et al.). In 20 of these encounters, a professional interpreter was utilized (Flores et al.). Furthermore, in 27 encounters, an *ad hoc* interpreter was used, and, in the remaining 10 encounters no interpreter was present (Flores et al.). When analyzing these encounters, the authors of this study found a total of 1,884 interpreter errors, or an average of 33 interpreter errors per clinical encounter (Flores et al.). Of these total errors, 344 were classified as errors of "potential clinical consequence" (Flores et al.). The errors that were committed most frequently were classified as omission errors (47% of the total errors), "followed by false fluency (26%), addition (10%), editorialization (9%), and substitution (9%)" (Flores et al.). Furthermore, the authors found correlations between the quantity of hours of

training experience that interpreters had undergone, the categories of errors they committed, and whether these errors were of potential clinical consequence (Flores et al.). Specifically, investigators revealed that omission and false-fluency errors were considerably more prevalent in instances where ad hoc interpreters or no interpreters were utilized (Flores et al.). Overall, this study found that "[t]he proportion of errors of potential clinical consequence was significantly lower for professional hospital interpreters versus ad hoc interpreters and no interpreter, at 12% versus 22% versus 20%, respectively…" (Flores et al.). These statistics may be explained by a lack of training on the part of ad hoc interpreters: whereas doctors are trained to handle sensitive topics in a professional, unbiased manner, ad hoc interpreters don't have such training (Flores). Therefore, ad hoc interpreters used in clinical settings can impose their personal opinions into medical conversations, creating hostile environments for the patients (Flores). Furthermore, their lack of confidentiality training and knowledge of how to properly navigate medical terminology can cause a patient to receive insufficient care (Flores). Misinterpretations by untrained individuals can also produce grave clinical consequences (Flores). For instance, a resident misunderstood a Spanish-speaking woman's description of a child falling off of her tricycle as an abusive situation, eventually causing the Department of Social Services, who also lacked a professional interpreter present, to have the mother "sign over the custody of her two children" (Flores).

Furthermore, due to a shortage of interpreters in the United States according to the 2000 census report (Kratochvil) and a growing number of immigrants to the United States (Reynolds et al.), there has been a growing trend for children of immigrants to interpret and translate for their parents, accompanying them wherever they may go. In fact, according to the U.S. census, Illinois, the top fifth state in terms of Hispanic/Latino population base, is "one of six gateway

states, or points of entry, for many new immigrants to the United States" (Reynolds et al.). In addition, in 2000, the city of Chicago was named the top third U.S. city to have such a large Hispanic/Latino(a) immigrant population (Reynolds et al.). To be more exact, 26% of its residents (about 752,964 people) declared themselves to be Hispanic/Latino(a) (Reynolds et al.).. This same year, the top three counties with the largest Hispanic/Latino populations in the United States were the Illinois area of Cook County, along with Dade County, Florida, and Los Angeles County, California (Reynolds et al.). With such large proportions of people of Hispanic/Latino descent in the United States, it is important to consider what resources are available in terms of language services for those who are unable to speak English or who have a low proficiency (Reynolds et al.). Research reveals that "even in medical spheres where hospitals are required by law to provide interpreter services; children are still called to interpret" (Reynolds et al.). In one case recounted in a study analyzing interpretation practices in the United States, a child named Sammy had his voice recorded as he accompanied his family to a clinical setting (Reynolds et al.). This child's history of serving as a translator was evident in that he had all of his family's proof of insurance, social security papers, and informed consent information memorized when going into the encounter (Reynolds et al.). However, when the child inquired about signing paperwork, the nurse receptionist informed him he was too young to legally sign anything: "It is ironic that the sole person capable of providing this [interpreter] service is considered legally incapable of representing himself or his family because of requirements delimiting authorized participation in this particular type of legal speech act" (Reynolds et al.). Furthermore, utilizing children as translators for other family members subjects children and parents to ethnicization and racialization by others as a result of linguistic profiling. (Reynolds et al.). For instance, when this study analyzed parent-teacher conferences with children present as interpreters for parents,

"[c]hildren were ethnicized for successfully interpreting in English just as their parents were racialized; they were presumed to 'lack' English and thus [were] considered incapable of supporting [their] children's academic achievement" (Reynolds et al.).

These untrained children qualify as ad hoc interpreters when serving interpreting functions in clinical settings. Psychologists hold that the trend to use children as *ad hoc* interpreters may have negative effects on children (Kratochvil). For instance, children may experience "short-term stress, embarrassment and psychological and practical difficulties" (Kratochvil). The use of children as translators also causes issues such as misinterpretations. For example, Brian Palmer, the associate executive director at Coney Island Hospital, recounts a situation in which a teenager was designated to provide a translation of his grandmother's diagnosis (Kratochvil). However, when this diagnosis ended up to be cancer, Palmer says that "'the child did not and could not deal emotionally with his grandmother's diagnosis'" (Kratochvil). Therefore, when relaying the information to his grandmother, the teenager was not able to fully inform his grandmother, excluding the word cancer from his speech (Kratochvil). By giving children the responsibility of delivering high-stakes information, children feel great pressure to provide interpretations outside of their emotional, mental, and physical capabilities (Kratochvil). When they feel that they are not able to provide a perfect interpretation, they feel as if they have failed and anxiety and depression may result (Kratochvil). Furthermore, children are sometimes taken out of school to provide translation services for parents and family members (Kratochvil). This hinders their ability to keep up with children who are not from immigrant families (Kratochvil). Furthermore, "[s]ocial workers say the stress of translating can make some children nervous and tired at school and neglectful of homework" with parents consequently "finding it harder to

discipline them" (Kratochvil). Therefore, immigrant children are less likely to be properly disciplined when involving themselves in negative activities such as gangs, making parents also feel guilty when their children experience failure (Kratochvil). Allowing children to serve as interpreters for adults also poses a problem in situations involving discussing adult topics such as contraception (Kratochvil). Although there are many drawbacks to using children as interpreters, Kratochvil argues that a child could also experience a sense of pride in providing language services to those older than them.

Although the disadvantages to utilizing *ad hoc* interpreters or not using interpreters at all have been articulated, it is also imperative to understand the role of professional interpreters while delivering interpretation services and the disadvantages of professional interpreter use. Davidson conducted a linguistic investigation at Riverview General Hospital's General Medicine Clinic that analyzed cross-linguistic interactions in observed and recorded medical interviews. This study aimed to answer three predominant questions: (1) "What is the role of the interpreter within the goal-oriented, learned form of interaction known as the `medical interview'?"; (2) "What is the 'interpretive habit', and how does one engage in the practice of interpreting?"; (3) "If interpreters are *not* neutral, do they challenge the authority of the 'physician-judge' (cf. Foucault 1979), and act as patient 'ambassadors' or 'advocates' (as Haffner 1992, Juhel 1982, and Kaufert and Koolage 1984 suggest); or do they reinforce the institutional authority of the physician and the health-care establishment, and should we create a model for the 'interpreter-judge'? (cf. Foucault 1979)" (Davidson). This 1996 study required the participation of patients receiving hospital care for chronic illnesses and interpreters employed by Riverview General Hospital (but who had not received official degrees in interpreting or translating) (Davidson).

The investigation involved observation of more than 100 patient visits and observation and recording of 50 visits (Davidson). Of these visits, 10 visits solely involved utilization of the English language, and 10 visits involved professional interpreters converting messages from Spanish to English (Davidson). Through analyzing these patient visits, Davidson found that visits with LEP patients took longer. Because of this, Davidson maintained that interpreters feel pressure to keep patient visits "on track." This perception arises from shortages in the health care field: "Time is scarce in hospitals today . . . and interpreters are conscious of their role as facilitator and editor; during one interaction (visit 11), after several minutes of conversation with the patient in the absence of the physician, the interpreter looked at me and said, `you chose one that's hard to keep on track'" (Davidson). This role of interpreters as facilitators and editors manifests itself in various instances in the observed and recorded medical interviews (Davidson). In many occurrences, interpreters neglected to pass patient's questions on to doctors, resulting in a potentially dangerous medical situation in that many questions go unanswered (Davidson). Furthermore, in the majority of the examples provided, questions were answered more prevalently by interpreters rather than doctors (Davidson). Moreover, Davidson mentioned various patient complaints about instances when the doctor was unable to hear due to interpreter discourse, the doctor heard but declined to respond, and the doctor heard and responded but the interpreter did not transfer the information to the patient. The fact that interpreters in these interviews answered medical questions or did not pass on valid complaints to doctors creates high risk clinical situations. In one extreme case (visit #30), the interpreter conducted the entire medical interview without intervention of the doctor (Davidson). Davidson further explained interpreters' thoughts in these instances while considering their perceived role as facilitators and editors of the medical interview: "The interpreter here evaluates the patient's response and

dismisses it as irrelevant . . . to the initial closed question, denying its entry into the discourse." The interpreter was acting as a "pre-filter for patients' utterances, screening them for relevance to the physician's questions: as noted earlier, however, converting data by passing it through a grid of medical meanings is the central component of the process of diagnosis itself" (Davidson). However, Davidson also states that the great lack of training provided to hospital interpreters potentially explains the prevalence of errors and patient complaints throughout the course of the medical interviews: "The training given to these interpreters was scant; the requirements for becoming an interpreter at Riverview were a good grasp of both English and Spanish, and the ability to translate 50 medical terms on a test with complete accuracy. There was no training in discourse processes, and the training for how medical interactions worked was on-the-job. Physicians, for their part, received absolutely no training in how to use interpreters, beyond being told how to call them to come interpret" (400). Therefore, Davidson concludes that interpreters are informational gatekeepers who deny patients proper medical interviews due to the perception that it is their role to keep the visit "on track." Hospital interpreters in the medical interviews do not act as advocates for patients and are instead more concerned about the agenda of the hospital, the institution that is paying them (Davidson). Since interpreters help keep patient visits short, the hospital is able to see more patients and make more of a profit (Davidson). This suggests that the position of interpreters fulfills more of a financial agenda than an ethical agenda in the hospital (Davidson). In one instance, Davidson mentions a doctor concerned about the low number of interpreters in the hospital and the lack of interpreter training (Davidson). However, after expressing these concerns, the doctor was advised by a hospital administrator to not pursue any studies that may suggest the hiring of further interpreters (Davidson). Davidson holds that the interpretation services offered by Riverview General Hospital were inadequate and unethical.

He states that interpreters need to fulfill more active roles in interpretation and avoid neutrality (Davidson). He also suggests the implementation of more interpreter training and supervision, so that professional interpreters can better serve the linguistic needs of patients (Davidson). Although this study does provide important data, it does have several limitations, including offering few examples, its data could be linked to a lack of interpreter training rather than the given position as employee of the hospital, and the results could not be generalized to other hospitals (Davidson).

A similar study conducted by Wu et al. addresses additional disadvantages of professional interpreter utilization in the clinical setting. In order to provide unbiased interpretations, professional interpreters are found outside of the medical team. While this is beneficial in the sense of impartiality, there are pitfalls to the lack of exposure between medical professionals and interpreters (Wu et al.). Medical personnel often lack adequate knowledge of interpreter services, which affects patient care negatively, in that interpreters may "assume that care is safer simply because an interpreter is present, rather than working to ensure that the care delivered to patients with LEP is safe" (Wu et al.). Furthermore, due to their higher status in the professional medical job hierarchy, nurses and doctors sometimes dismiss professional interpretation services as unnecessary. Because "the benefits of partnering with interpreters can only be realized when providers consistently use their services," great concerns for patient care arise when interpreters are needed but not chosen to utilize (Wu et al.). Unfortunately, this shortcoming in patient care is quite common "even in settings with robust interpretation services," with "interpreters [being] used in in less than one third of encounters with LEP patients" (Wu et al.). This lack of a standard process for determining whether interpretation

services are needed, thus, furthers the language barriers in the United States. Many medical professionals are also unaware of how to properly employ interpreter services in the clinical setting (Wu et al.). For instance, they "may compromise patient safety by asking interpreters to engage in processes outside of their scope of practice, such as providing an opinion on a diagnosis or independently obtaining informed consent from patients" (Wu et al.). Thus, a lack of standardization for generalizing interpreter services to different clinical settings creates a healthcare barrier for LEP patients.

Rigid budgets among health care providers and patients, along with the lack of accessibility and standardization of professional interpretation services, have made telephonic interpretation systems a progressively more favorable option to overcoming linguistic barriers in the clinical setting ("5 New Medical Interpreting Apps"). The demand for this technology has led to the innovation of several new apps ("5 New Medical Interpreting Apps"), one of which has been crafted by a company that originated in New York called Canopy Apps ("5 New Medical Interpreting Apps"). While the application continues to improve, it currently offers explanations for intricate medical concepts in the areas of "Internal Medicine, Emergency Medicine, OB/GYN and Surgery." Users can have these explanations translated from a list of 20 different languages ("5 New Medical Interpreting Apps"). The company eCaring® has also created an application dedicated to providing language services to those in need. This application has the goal of extending the amount of time non-English-speaking senior citizens are able to remain in their home environment ("5 New Medical Interpreting Apps"). The application currently offers services in languages including, but not limited to, Spanish, Russian, Chinese, and Filipino ("5 New Medical Interpreting Apps"). By tracking patients' daily habits such as eating, exercising,

and using the restroom, this app creates a record that allows the elderly to receive more comprehensive care from medical professionals (“5 New Medical Interpreting Apps”). The application also enables the elderly to regularly document their moods and attitudes, allowing medical personnel to monitor patients’ mental health (“5 New Medical Interpreting Apps”). Moreover, the application Starling Health® has been developed to address the communication gap between medical personnel and patients (“5 New Medical Interpreting Apps”). By forming a record of patients’ typical requests, it allows medical professionals to better understand their habits and needs and prevent shortcomings that may lead to patient readmission (“5 New Medical Interpreting Apps”). This innovative application has also recognized the need for tools to facilitate communication among patients with poor verbal abilities due to strokes, physical/neurological disorders, or past surgeries (“5 New Medical Interpreting Apps”). Similarly, VerbalCare® was originally crafted to cater to the needs of stroke patients with aphasia, or the struggle to comprehend or articulate speech due to neurological damage (“5 New Medical Interpreting Apps”). This application links bedridden hospital patients to nurses via mobile devices (“5 New Medical Interpreting Apps”). This app’s functions have proven beneficial to a wide variety of patients, not just limited to those suffering from strokes (“5 New Medical Interpreting Apps”). Patients are able to indicate pain or emergent situations to their nurses using the app, allowing them to receive care in a timely manner (“5 New Medical Interpreting Apps”). While these telephonic applications have their benefits, they are not devoid of disadvantages. It is often difficult to fully understand the context of a conversation without having the ability to evaluate the body language and gestures of the other party involved (“5 New Medical Interpreting Apps”). Mobile Video Remote Interpretation® allows patients and interpreters to see one another while speaking, enabling both parties to be less likely to

misunderstand the conversation (“5 New Medical Interpreting Apps”). Provided that a mobile device is available, Mobile Video Remote Interpretation’s benefit of visual image is of no extra cost to that of the aforementioned telephonic apps (“5 New Medical Interpreting Apps”). While this innovation allows an additional conversational dimension, it is still not equivalent in effectiveness to professional in-person interpreters (“5 New Medical Interpreting Apps”). However, these newfound applications enable patients to receive available, accessible, and low-cost services (“5 New Medical Interpreting Apps”).

Similarly, after recognizing limitations in the time-consuming and inaccessible clinical interpretation services on their rounds at the San Francisco General Hospital, two senior medical students at the University of California San Francisco (Brad Cohn and Alex Blau) met to discuss ways to address long wait times for language services when little staffing is available and to “reduce disparities in health care delivery to racial and ethnic minorities” (“UCSF Medical Students”). In this discussion, Blau noted, “Ninety percent of diagnoses come from the patient’s self-reported medical history, so the ability to communicate is critical . . . Time is not an asset doctors or patients have. You need that information when you need it” (“UCSF Medical Students”). In order to address these communication deficiencies in the medical field, Blau and Cohn worked to develop MediBabble®, an app offering translations of medical history background questions instructions in Spanish, Russian, Creole, Cantonese, Mandarin, and Haitian (“UCSF Medical Students”). The touch-screen application proceeds to read close-ended questions out-loud to patients, evoking responses that are yes/no or gesture-related (“UCSF Medical Students”). These questions follow a customary symptom-based approach, primarily inquiring about current symptoms and then delving into medical history concerns such as allergies (“UCSF Medical Students”). Although the app has inherent limitations, the creators,

along with help from Google, Apple, Twitter, and a growing team of faculty members, professors, medical translators, software programmers, and interface designers, work to continually make improvements ("UCSF Medical Students"). This team has not only established goals of installing additional languages onto the app, having the app log obtained information onto patients' medical records, and creating an online system connecting patients are providers, but they have also provided funding so that the app could be available at no charge for users ("UCSF Medical Students"). Because the app runs on donations and grants, medical institutions with little monetary resources are able to have access to language services that were previously unaffordable ("UCSF Medical Students"). Not only is the application free, but it is also accessible without internet connection, making it a plausible option "anywhere – from commonly shielded hospital settings to resource-strapped urban clinics and danger zones" ("UCSF Medical Students"). In fact, by 2011, when the article was published, the application had received 8,000 downloads from areas all over the world ("UCSF Medical Students").

Google Translate® is also a useful service that has been utilized to facilitate communication barriers in clinical settings. In response to a report issued by the British Broadcasting Corporation (BBC) regarding high costs of translation services near the end of 2006, David Jones decided to investigate whether the National Health Service (NHS) should halt spending on translation services (Wade). However, in 2011, Google Translate entered the public eye as "an effective alternative way of communicating with non-English speakers" (Wade). This ground-breaking translation service allows users to either speak or type their desired messaged into the application in their native language (Wade). Google Translate has a capability for auto-recognition of spoken or written language, allowing for users with unknown nationalities to still

have the ability to utilize the application (Wade). After the spoken or typed message is completed, Google Translate then efficiently converts the message into the language that the user selects (Wade). The user is then able to either read the translated message on the screen or have the message read out loud to them (Wade). Google Translate is an accessible electronic device that can be utilized for free (Wade). According to Ryckie G. Wade, a foundation year 1 doctor at James Paget University Hospital, "doctors should try [Google Translate] when other methods of translation are unavailable or inadequate" (Wade). To back up this claim, he cites that unofficial testing utilizing Google Translate to overcome language barriers between multilingual staff and LEP patients in the James Paget University Hospital "has yielded satisfying results, with a high degree of accuracy" (Wade). However, it is difficult to know whether patients show the same inclination to use apps (mentioned above) or Google Translate to serve interpreting functions in clinical settings.

II. Demographics of Mississippi:

Because my investigation takes place exclusively in the state of Mississippi, an "upcoming emerging" area that is projected to receive an influx of Hispanic and Latino residents in the coming years (Nathenson et al.), it is important to find the most effective interpretation option prior to this potential increase in limited English proficiency Spanish-speaking patients. Thus, it is imperative to analyze the demographics of Mississippi to fully contextualize my study before progressing to the subsequent chapters.

The demographic of Mississippi in the years 2018-2019 shows that 2% of the total population of Mississippi is Hispanic/Latino, and in the Census 2000, 1.4% of the population of Mississippi was reported to be Hispanic/Latino (Logue), indicating a 0.6% increase in this population since 2000 (Logue). In a parallel study in Alabama, although the data on Hispanic/Latino demographics is self-reported and anonymous, many of the Hispanic/Latino residents in Alabama are illegal immigrants who do not respond to these surveys (Logue), which may account for seemingly low percentage of Hispanic/Latino residents reported in Mississippi (Logue). Furthermore, demographics on Hispanic/Latino populations may be complicated in that those of Hispanic origin may identify as any race, although they most frequently identify as white (Logue). According to Census 2000, there were Hispanic/Latino residents located in every county of Mississippi. However, only 11 counties showed a percentage of Hispanic/Latino residents that was higher than or equal to 2% (Logue), including Calhoun County, Chickasaw County, DeSoto County, Harrison County, Jackson County, Jones County, Leake County, Scott County (which was the only one with higher than 5% Hispanic/Latino population), Tippah County, Tunica County, and Yazoo County (Logue).

The total number of residents in Mississippi, according to the 2000 Census, was 2,967,297, with 81,481 of these residents identifying as Hispanic or Latino. Out of these 81,481 Hispanic or Latino residents, 47,683 identified as male and the other 33,798 identified as female (“Current Hispanic or Latino Population”). Out of the Hispanic/Latino households in Mississippi, 3,070 homes contained one or more Hispanic/Latino resident(s) over the age of 60 years old. 1,172 of the Hispanic/Latino households were composed of three or more familial generations. 21,587 residents out of the total Hispanic/Latino population in Mississippi are ages 18 or under

("Current Hispanic or Latino Population"). In order to determine the length of time Hispanic/Latino people tended to reside in Mississippi, statistics on whether homes were occupied by owners or not were gathered ("Current Hispanic or Latino Population"). As a result of this study, it was determined that only 8,311 of the Hispanic/Latino households in Mississippi were occupied by owners ("Current Hispanic or Latino Population").

According to Logue, because "of Hispanics aged 5 and over, one in five speak English poorly or not at all," social factors such as language barriers affect the Hispanic/Latino population in Mississippi in areas such as educational achievement. Therefore, it is also important to analyze Mississippi schools' policies regarding languages. The "Mississippi World Languages Teaching Guide," organized by the Mississippi Department of Education, holds that students in Mississippi generally do not have to take a world language course to graduate from high school. Nonetheless, the majority of universities require a world language credit for college entry ("Mississippi World Languages Teaching Guide"). Therefore, not only are lacking world language requirements in Mississippi causing students to miss learning about different languages and cultures, but they also neglect to recognize the intense time requirements for learning languages. The Foreign Service Institute (FSI), states that Spanish is a category one language. The qualifications for learning a category one language are approximately 575 to 600 instructional hours (Minardi).

With this background in mind, my study takes place at the University of Mississippi: all respondents to my survey were pre-health students attending the university. Therefore, it is also important to know background information regarding this specific institution in order to

contextualize my study. The University of Mississippi, a public coeducational university founded in 1848, has an approximate undergraduate population of 18,007 students ("University of Mississippi"). Also known as Ole Miss, the university is located in the rural town of Oxford, Mississippi ("University of Mississippi").

Now that the appropriate context for this study has been articulated in the literature review above, the following chapter—the methodology—will address the methods of the investigation.

METHODOLOGY

The research of this study aims to collect perceptions of medical translation options by analyzing the survey responses of future medical personnel (undergraduate pre-medical students, pharmacy students, physician assistant students, physical therapy students, speech therapy students, and nursing students). As Mississippi is an emerging area for Hispanic/Latino residents (Nathenson et. al), it is important to determine the varied perceptions of language services during the increase of limited English proficiency residents. Effective language services can prevent major complications resulting from linguistic barriers. Currently, many *ad hoc* interpreters, including family members (Kratochvil) or other underqualified individuals, are utilized to fulfill language requirements in the clinical setting (Vela et. al). However, the use of untrained individuals presents a risk to patient care (Vela et.al). Furthermore, professional interpreters are costly (Vela et. al) and not very accessible (Nathenson et. al) and there is a shortage of bilingual doctors ("Chronic Shortage").

To mitigate shortages, electronic interpreting devices are available. Each available electronic language service also has its advantages and disadvantages. For instance, electronic language services such as Mobile Video Remote Interpretation® reduce the costs and increase the accessibility of clinical interpretation, but sacrificing the higher levels of effectiveness that arise from in-person interpretation services ("5 New Medical Interpreting Apps"). The lack of standardization when determining which interpretation service is necessary for patients further complicates the issue (Wu and Rawal). Therefore, there is clearly a need to determine the best current option for language services for specific situations and locations and how these options

may be improved while monitoring the extensive growth in the Hispanic/Latino population of Mississippi.

I. Participants:

The participants involved in providing answers to my survey questions are future medical personnel (undergraduate pre-medical students, pharmacy students, physician assistant students, physical therapy students, speech therapy students, and nursing students) who are 18 years old or older (see Table 1). After survey data was collected, professors from health-related fields were asked to comment on the results.

Table 1: Participants Completing Survey

Participant Classification	**Number of Respondents from Each Classification**
Pre-Medical Students	39
Pharmacy Students	5
Physician's Assistant Students	4
Physical Therapy Students	2
Speech Therapy Students	4

Nursing Students	5

II. Instruments:

Prior to participation, participants will receive an informed consent form which they completed before proceeding (see Appendix A). This form notified them of their right to accept or decline survey participation and their right to withdraw their participation or decline to answer questions at any time. When participants consented to participate in the study after receiving and agreeing to the informed consent form, they received a link to the survey via text message and read and answered electronic survey questions (see Appendix B). Their responses were recorded via Survey Monkey®, and the aggregate data of all responses were used to determine the perceptions of language services from future health professionals in Mississippi. The combined data was used for noting results and discussing the highlights.

The survey was created by a website called Survey Monkey® (*SurveyMonkey*), composed of 8 multiple choice questions and 2 sliding scale questions (see Appendix B). The purpose of the first question of the Survey Monkey (see Appendix B) was to ensure that participants met the standards of the Institutional Review Board. This study was limited to participants at or above the age of 18 who are considered legal adults. Furthermore, prior to completion of this survey, participants were made aware of their right to withdraw or decline participation at any point. The survey did not ask participants their names or personal medical histories, and their responses were entirely anonymous. Participants were not photographed,

recorded, or seen taking the survey. The second survey question (see Appendix B) assessed whether participants met the qualifications for this study. Because this study was limited to undergraduate students at the University of Mississippi pursuing health professions, it was necessary to verify that participants fit these criteria before continuing with the survey. Because participants indicated in question two that they were pursuing health-related professions, Question 3 (see Appendix B) aimed to identify exactly within which facet of the health sector they planned to work. Data from this question helped to pinpoint how the results of this study were reflective of specific areas in the healthcare field. Next, the objective of Question 4 (see Appendix B) was to determine the quantity of participants entering into future health professions that speak Spanish. Data from this question was necessary to assess potential causes for shortages in bilingual healthcare providers and was helpful for analysis of different perceptions of future healthcare providers. Question 5 of the survey (see Appendix B) was designed to evaluate participants' perceptions of their Spanish proficiencies and success levels if asked to interpret in clinical setting. The objective of the subsequent question (see Appendix B) was to assess the willingness of future healthcare providers to learn the Spanish language in order to eliminate linguistic barriers arising due to lacking Spanish proficiency. Question 7 (see Appendix B) assessed the perceptions of future healthcare providers about whether a need for clinical interpretation services exists, and Question 8 (see Appendix B) determined future medical personnel's current perceptions about the effectiveness of existing interpretation services. Finally, the objective of Question 9 was to evaluate how accessible participants believed the interpretation service that they marked most effective in the prior question. Data collected from this question helped in analyzing whether perceptions of future healthcare providers matched with existing data.

The Survey Monkey automatically collected and compiled responses online, notifying me via e-mail when a new response was submitted. The survey was first sent out to participants on October 7, 2019, and closed to new responses on November 7, 2019, allowing a one-month time frame for data collection. After data from the Survey Monkey was collected, professors and advisors from health-related fields (see Table 2) were asked to provide commentary via e-mail or personal interviews on the results. Their responses highlighted the significant results provided by survey participants.

Table 2: Commentators

Professor/Advisor #	**Field of Expertise**
Dr. LA (Pharmacy)	Instructional Assistant Professor of Pharmacology
Dr. RT (Health Professions)	Director of the Health Professions Advising Office

Analysis

After receiving participants' responses and professors' commentaries, I began the data analysis process. Because this study is qualitative in nature, the data analysis process involves the extraction of repeated themes, key words, and trends from the results (see Tables 3A and 3B).

Table 3A: Key Words, Themes, Trends in the Survey *

Key Word	**# of Mentions**
Interpret	8
Effective	4
Accessibility	1
Affordability	1
Proficiency	1

* Key Words Also Include Word Variations, such as plurals or adjectival/adverbial forms, past tenses or other inflectional forms

Table 3B: Key Words, Themes, Trends in the Professor/Advisor Interviews*

Key Word	**# of Mentions**
Interpret	11
Effective	4
Accessibility	2
Affordability	1
Proficiency	1

* Key Words Also Include Word Variations, such as plurals or adjectival/adverbial forms, past tenses or other inflectional forms

The results are stored under a private account under my name. Survey Monkey allows the option to preserve anonymity of participants' responses. Therefore, participants' names and answer choices remain completely confidential.

The professors whom I interviewed agreed to have their comments taped in order to facilitate the transcription process. However, their names have been replaced by non-representative initials in this report so that their anonymity may be maintained.

The document from Survey Monkey will be deleted after the presentation of this research in order to preserve total confidentiality and privacy.

The following chapter, Results, will describe in detail the survey responses and the commentaries. The Discussion chapter will then focus on those critical elements from the survey results.

RESULTS

I. Participants:

During the one-month period of data collection, 61 responses to the 10-question electronic survey in total were collected. Two participants submitted incomplete responses. Therefore, in order to ensure effective data analysis, only the 59 responses that indicated compliance with the informed consent form, that they were at or above the age of 18, and that they were pursuing future health professions will be utilized when reviewing the data.

II. Instruments

The first question of the Survey Monkey (see Appendix 1) was a multiple-choice question that read, “Are you at or above the age of 18? Have you read and agreed to the informed consent form?” This question had three possible answer choices that read as following: 1) “Yes and yes!,” “No to the 18 or above: Thank you but you do not need to continue with this survey at this time,” “No to informed consent form: please review and agree to the informed consent before continuing with this survey.” A total of 61 participants responded to this question, two of whom submitted incomplete survey responses. All 61 respondents indicated “yes” to this question, assuring that they met the qualifications to proceed with the survey.

The second question asked participants the following: “Are you planning to enter into a health-related profession in the future?” The available answer choices for this multiple-choice

question read as follows: “Yes,” “No: Thank you, but you do not need to continue with this survey at this time.” Out of the 61 respondents to this question, 60 answered “Yes,” indicating that they should proceed with the survey. One participant responded “No: Thank you, but you do not need to continue with this survey at this time” and did not proceed to answer further survey questions.

The third question reads, “What future health-related profession are you pursuing?”. This multiple-choice question has six possible answers including: “Physician (MD/DO),” “Pharmacist,” “Physician’s Assistant,” “Physical Therapist,” “Speech Therapist,” and “Nurse.” A total of 59 participants responded to this question, while two participants did not answer. The one participant who did not answer this question proceeded to answer the rest of the survey questions and previously indicated that he or she fit study qualifications and was compliant. Therefore, the remaining questions will be analyzed based on a total of 60 participants (see Table 4). Out of the 59 respondents to this question, 39 participants selected “Physician (MD/DO),” indicating their intent to pursue this area. These 39 participants constitute the majority (66.1%) of respondents to the survey, making obtained data adequately reflective of perceptions of current aspiring physicians. The options for “Nurse” and “Pharmacist” obtained the next highest number of selections (5 participants for each), making obtained data less reflective of these sectors than perceptions of aspiring physicians. The five participants who selected that they were aspiring nurses constitute 8.47% of the total 60 respondents. Likewise, the five participants that indicated their intent to become pharmacists constituted 8.47% of the total 60 participants. Moreover, equal numbers of participants (four) selected “Physician’s Assistant” and “Speech Therapist,” indicating that obtained data is less indicative of these areas than from aspiring

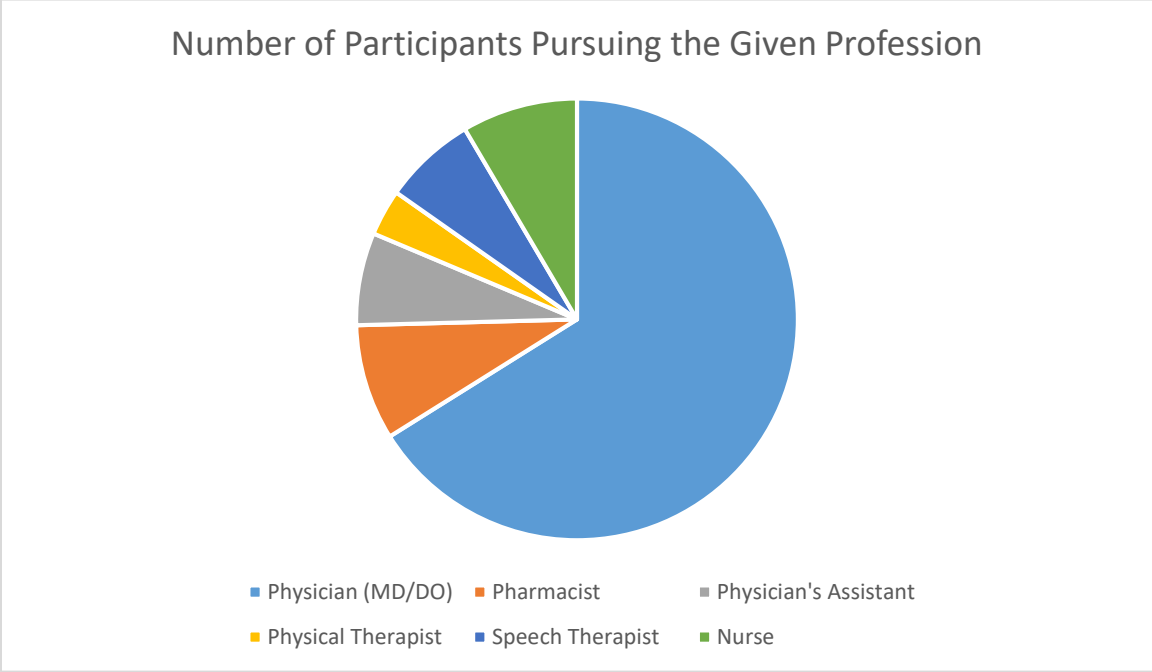
physicians, nurses, and pharmacists. However, the data is more reflective of these areas than the physical therapy field. Four participants who indicated future plans to become physician's assistants constitute 6.78% out of the total 60 respondents. Likewise, the four respondents who specified their intent to become speech therapists constitute 6.78% of the total participants. Finally, the least number of participants (two) selected "Physical Therapist". These two participants constitute 3.39% of the total 60 participants.

Table 4: Question 3—Health Professions

Future Health-Related Profession Participants are Pursuing	**Number of Participants Pursuing the Given Profession**	**Percentage of Respondents to Question 3 Pursuing the Given Profession***
Physician (MD/DO)	39	66.1%
Pharmacist	5	8.47%
Physician's Assistant	4	6.78%
Physical Therapist	2	3.39%
Speech Therapist	4	6.78%
Nurse	5	8.47%

*59 out of 61 participants responded to question 3, with 2 participants skipping the question

Chart 1: Professions



The fourth question of the survey asks: "Do you speak Spanish?". The objective of this question is to determine the quantity of participants entering into future health professions that speak Spanish. This multiple-choice question had two possible responses, "Yes" and "No." The majority of respondents selected "No" to this survey question. In fact, 44 out of the total 60 participants, or 73.3% of participants, indicated that they did not speak Spanish (see Table 5). Therefore, the remaining 16 participants, or 26.67% of the total number of respondents, selected "Yes" to this survey question, indicating that they do speak Spanish.

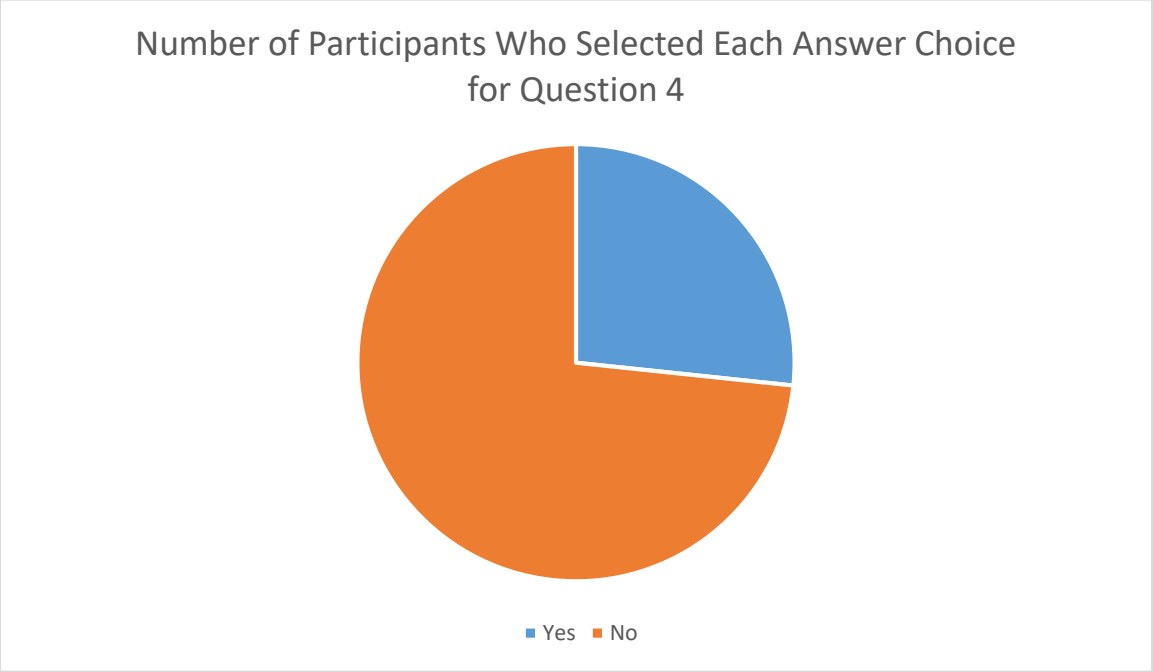
Table 5: Results of Question 4—Spanish Speakers

Potential Answer Selections for Question 4 ("Do you	**Number of Participants Who Selected Each Answer**	**Percentage of Respondents to Question 4 who Selected**

speak Spanish?")	Choice	Each Answer Choice*
Yes	16	26.67%
No	44	73.33%

*60 out of 61 total participants responded to question 4, with 1 participant skipping the question

Chart 2: Spanish Speaking?



The fifth question of the survey asks, "If you speak Spanish, do you think you could effectively communicate with Spanish-speaking patients with your current Spanish proficiency?". This question allows three possible answer choices for participants: "Yes," "No," and "Not applicable." Out of the 60 respondents to this question, the majority of participants responded, "Not applicable," specifying that they did not think that they could or would speak Spanish with patients. To be exact, 39 of the total 60 respondents (65%) indicated no useful

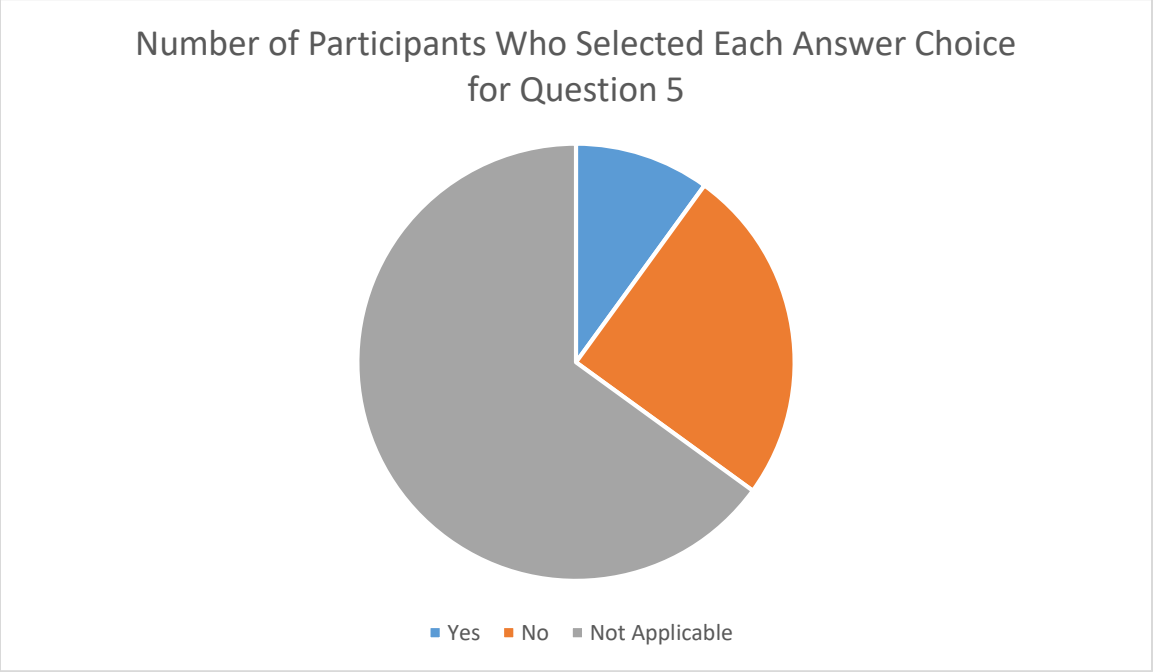
Spanish proficiency. compared to the prior question, in which 44 participants responded that they do not speak Spanish. Furthermore, 15 of the total 60 respondents (25%), selected "No," designating that they do not perceive their current Spanish proficiencies advanced enough to interpret in a medical setting. Finally, 6 participants (10% of the total 60 respondents) chose "Yes," perceiving their Spanish proficiencies adequate to provide interpretation services (see Table 6).

Table 6: Results of Question 5—Effective Communication in Spanish

Potential Answer Selections for Question 5 ("If you speak Spanish, do you think you could effectively communicate with Spanish-speaking patients with your current Spanish proficiency?")	**Number of Participants Who Selected Each Answer Choice**	**Percentage of Respondents to Question 5 who Selected Each Answer Choice***
Yes	6	10%
No	15	25%
Not Applicable	39	65%

*60 out of 61 participants responded to question 5, with 1 participant skipping the question

Chart 3: Ability to Communicate Effectively in Spanish



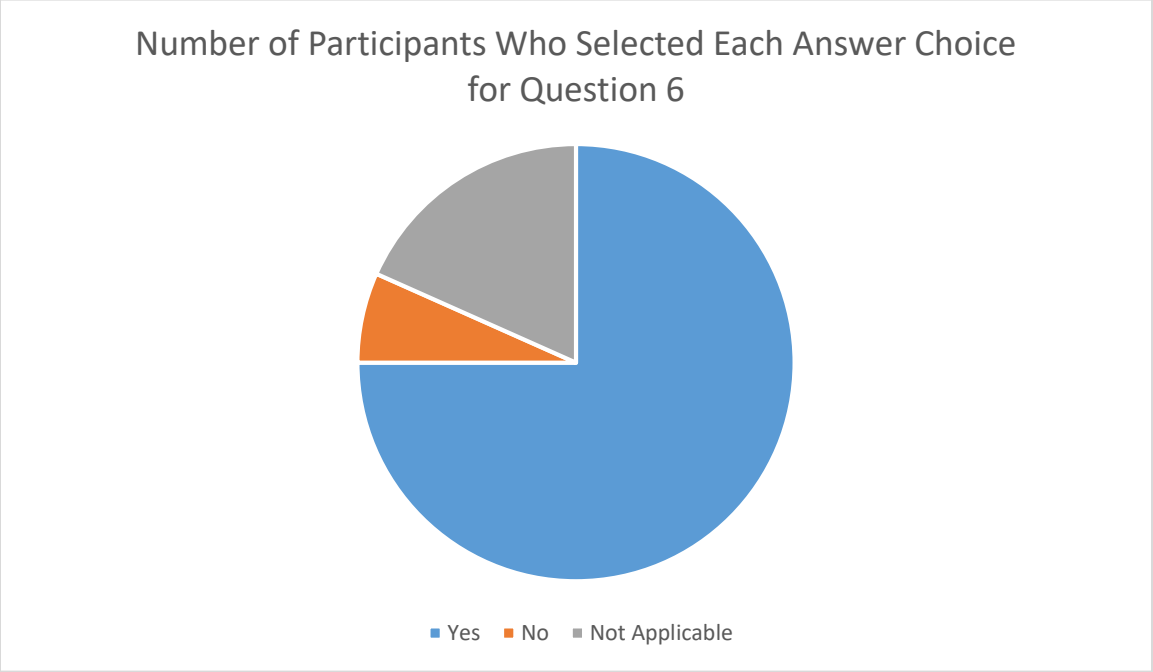
The sixth survey question asks participants, “If you do not currently speak Spanish, would you be willing to learn how in order to communicate with Spanish-speaking patients?”. This multiple-choice question had three answer choice options for respondents: “Yes,” “No,” and “Not applicable.” A total of 60 participants responded to this question, with a majority of respondents answering “Yes.” In fact, 45 participants (75% of the total) designated a willingness to learn the Spanish language to facilitate patient communication. On the other hand, 6.67%, or 4 participants, selected “No,” saying that they would not be willing to learn Spanish, and 18.33%, or 11 participants, selected “Not applicable” (see Table 7).

Table 7: Results of Question 6—Willingness to Study Spanish

Potential Answer Selections for Question 6 ("If you do not currently speak Spanish, would you be willing to learn how in order to communicate with Spanish-speaking patients?")	**Number of Participants Who Selected Each Answer Choice**	**Percentage of Respondents to Question 6 who Selected Each Answer Choice***
Yes	45	75%
No	4	6.67%
Not Applicable	11	18.33%

*60 out of 61 participants responded to question 6, with 1 participant skipping the question

Chart 4: Willingness to Study Spanish for the Profession



Question seven reads, “Do you think you will see patients in the future who will need interpreting?”. This multiple-choice question had two possible answer choices, “Yes” and “No.” A total of 60 participants responded to this question, with the vast majority selecting “Yes.” Specifically, 59 respondents (98.33% of the total participants) indicated a perceived need for translation services. In contrast, one respondent selected “No,” specifying that he or she does not anticipate future interactions with Spanish-speaking patients in the healthcare field (see Table 8).

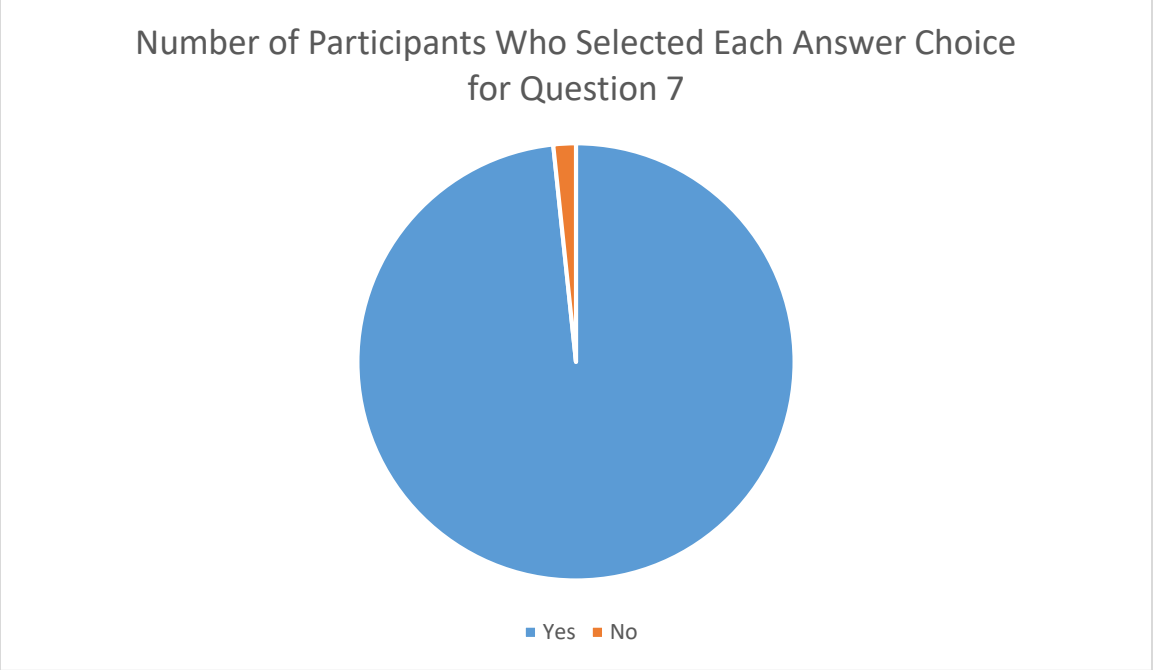
Table 8: Results of Question 7—Likelihood of Seeing Future Hispanic Patients

Potential Answer Selections for Question 7 (“Do you think you will see patients	**Number of Participants Who Selected Each Answer Choice**	**Percentage of Respondents to Question 7 who Selected Each Answer Choice***

in the future who will need interpreting?")		
Yes	59	98.33%
No	1	1.67%

*60 out of 61 participants responded to question 7, with 1 participant skipping the question

Chart 5: Likelihood of Seeing Future Hispanic Patients



The eighth question is a follow-up question from the prior, asking participants: "If you believe you will have future patients in need of interpreting, which of the listed options do you believe would be the most effective?". This multiple-choice question offers the following answer choices: "In-person professionally trained interpreters," "Electronic programs serving as interpreters (ex. apps)," "Google translate as an interpreter," "Family members as interpreters,"

and “Bilingual doctors as interpreters.” A total of 60 participants responded to this question, and the one participant who did not meet the qualifications skipped it. The majority of the responses to this question (44) were “In-person professionally trained interpreters,” indicating participants’ beliefs that this is the most effective existing interpretation method. These 44 respondents constitute 73.3% of the total 60 participants. Furthermore, 36 responses (60% of the total 60 respondents) marked “Bilingual doctors as interpreters” as the most effective interpretation service. Additionally, 12 responses (20% of the total 60 respondents) indicated “Family members as interpreters,” also known as *ad hoc* interpreters, as the most effective interpretation service available. Contrarily, 9 (15% of the 60 respondents) marked “Electronic programs serving as interpreters (ex. apps),” indicating they believe these programs are the most effective options. Finally, 6 responses (10% of the 60 respondents) selected “Google translate as an interpreter” as the most effective interpretation service (see Table 9). When adding the percentages indicated in Table 9 below, it is evident that the total value exceeds 100%. This skewed participant demographic is due to the fact that several respondents submitted multiple responses to this question.

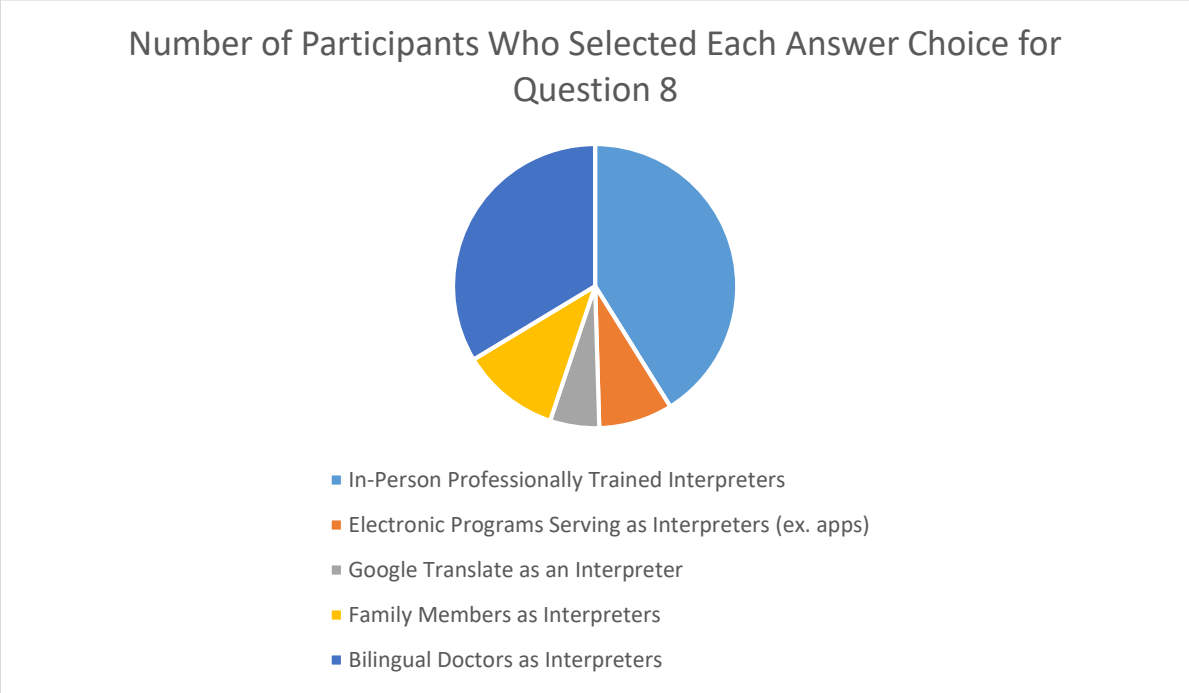
Table 9: Results of Question 8—Effective Interpreting Options

Potential Answer Selections for Question 8 (“If you believe you will have future patients in need of interpreting, which of the listed options do you believe	**Number of Participants Who Selected Each Answer Choice**	**Percentage of Responses to Question 8 that Selected Each Answer Choice***

would be most effective?")		
In-Person Professionally Trained Interpreters	44	73.33%
Electronic Programs Serving as Interpreters (ex. apps)	9	15%
Google Translate as an Interpreter	6	10%
Family Members as Interpreters	12	20%

*60 out of 61 participants responded to question 8, with 1 participant skipping the question

Chart 6: Effective Interpreting Options



The ninth question is a sliding scale question that reads, “Please rank the language service you previously selected as most effective in terms of accessibility (using whatever current knowledge you have)?” This question is a follow-up related to the interpretation service participants selected as most effective in question 8. This question is sliding scale rather than multiple choice to allow participants open-ended access to indicate their perception directly of this accessibility on a scale from zero to one hundred. A total of 59 participants responded to this question, with one qualified participant declining to respond and one self-perceived unqualified participant declining to answer. The average of these responses is a 64 out of 100, or 64% accessibility (see Table 10).

Table 10: Results of Question 9—Most Accessible Option

Average of Participants' Responses on a Scale of 1-100 for Question 9 ("Please rank the language service you previously selected as most effective in terms of accessibility (using whatever current knowledge you have)."	**Number of Participants Who Responded to Question 9**
64	59

Table 11: Breakdown of Sliding Scale Results of Question 9

Sliding Scale Ranges	**Number of Participants Who Selected Each Answer Choice Range on a Scale of 1-100 for Question 9 ("Please rank the language service you previously selected as most effective in terms of accessibility (using whatever current knowledge you have)."**
0-10	0

11-20	3
21-30	5
31-40	7
41-50	4
51-60	9
61-70	5
71-80	8
81-90	9
91-100	9

Finally, the tenth question is also a sliding scale question, allowing participants a more open-ended response on a scale from zero to one hundred, that reads, “Please rank the language service you previously selected as most effective in terms of affordability (using whatever current knowledge you have)?”. This is a follow-up from question 8, asking participants’ perceptions about the level of affordability of the interpretation service they marked most effective. A total of 59 participants responded to this question, with one qualified participant skipping the question. The average response on a scale from zero to one hundred was a 59, or 59% accessibility (see Table 11).

Table 12: Results of Question 10—Most Affordable Option

Average of Participants’ Responses on a Scale of 1-100 to Question 10 (“Please	**Number of Participants Who Responded to Question 10**

rank the language service you previously selected as most effective in terms of affordability (using whatever current knowledge you have).”	
58	59

Table 13: Breakdown of Sliding Scale Results of Question 10

Sliding Scale Ranges	**Number of Participants Who Selected Each Answer Choice Range on a Scale of 1-100 for Question 10 (“Please rank the language service you previously selected as most effective in terms of affordability (using whatever current knowledge you have).”**
0-10	0
11-20	1
21-30	5
31-40	11
41-50	13
51-60	7
61-70	2
71-80	9

81-90	3
91-100	8

In conclusion, the results show that pre-health students at the University of Mississippi recognize a need for effective interpretation services and believe that professionally trained in-person interpreters and bilingual doctors serving interpreting functions are the most effective interpretation options currently available, with somewhat high participant rankings of affordability and accessibility.

The next chapter will discuss the most salient results from the survey and demonstrate how these results are both supported by and contradicted by previous studies.

DISCUSSION

Several key points from the detailed results presented above will be emphasized in this chapter. The key points will be useful in the conclusion to highlight the necessity for further research in this area, as well as modifications to existing interpretation options and teaching initiatives for pre-health students.

Beginning with the participant demographic from Table 4 (referring to Question 3 of Appendix B), the vast majority of the 59 survey respondents for this study (66.1%) were pre-medical students at the University of Mississippi, which has an approximate undergraduate population of 18,007 students *(Usnews.com).*

The results collected from survey question 4 of this study (see Appendix B) reflect that the majority (73.33%) of the surveyed pre-health students did not speak Spanish (see Table 5). Similarly, a mixed-methods study (Vela et al.) reviewing the interpretation abilities of senior medical students graduating from the University of Chicago and the University of Illinois found that only 18.97% of respondents indicated fluencies in Spanish. The indication of low numbers of Spanish-speaking pre-health undergraduate students found in my study follows this trend.

The low percentages of students with Spanish proficiencies in this study potentially indicate that participants may not have had access to resources that would allow them the opportunity to learn the Spanish language, or they may not have had time thus far to dedicate to learning a language. According to page 86 of the “Mississippi World Languages Teaching

Guide," created by the Mississippi Department of Education, "[i]n general in Mississippi, students can graduate without a world language credit. However, most colleges and universities require one world language credit." Therefore, a lack of a standard requirement for world language credits in Mississippi high schools may cause students to neglect to take Spanish courses. Dr. LA (Pharmacy), the Instructional Assistant Professor of Pharmacology at the University of Mississippi, states that "Spanish is not a prerequisite to enter into pharmacy school, and this is not ideal." She advocates for curriculum adjustments to include Spanish courses for students who want them: "We need to offer the course. I think that having these courses as options is necessary." In fact, Dr. LA (Pharmacy) teaches a Spanish course for pharmacy students at the university developed in order to address this need. Similarly, Dr. RT, Director of the Health Professions Advising Office at the University of Mississippi, mentions the university's responsiveness to the need for more language courses for aspiring pre-health professionals: "We've recently added a medical Spanish course, SPAN 399, to the curriculum." While these professionals in healthcare education opine that it is "highly desirable" for students to learn Spanish, Dr. LA (Pharmacy) also recognizes there are limitations when considering whether these courses should be universally required: "I think that making these courses mandatory is another discussion that might depend on the given area or the available resources." Dr. RT (Health Professions) supports this opinion by suggesting students go beyond simply taking language courses, encouraging them to pursue international studies programs, helping them to solidify the knowledge they have obtained through lectures: "There's a large discrepancy in someone knowing what words mean and actually being able to use them in a full-on conversation. I think that's where people lack that don't do either abroads for a semester or the international studies programs where they have to be fluent to have conversations with the

people around them." Furthermore, he suggests that pre-health students at the University of Mississippi attend the Atlantis abroad summer trip, an initiative developed to "allow students to shadow Spanish doctors in hospitals for three weeks and help them to pick up on Spanish terms and culture." Dr. LA (Pharmacy) agrees with this claim, stating, "I think it is necessary to have language courses available, but I think what students really need is practice. I think the implementation of opportunities where students are allowed to practice Spanish will help."

It is also possible that the low number of students who indicated Spanish fluencies could be explained by a lack of interest in learning the Spanish language because of the intense time commitment that Spanish study requires. According to the Foreign Service Institute (FSI), Spanish is considered a category one language, meaning it should take approximately 575 to 600 instructional hours for students to learn the language (*https://www.clozemaster.com/blog/how-long-does-it-take-to-learn-a-language)*. Therefore, even if students do enroll in Spanish courses during high school, "they might remember some, but it is definitely not enough" (LA). Furthermore, Dr. RT (Health Professions) emphasizes the need for students to learn Spanish before entering into their professional medical careers: "I think pre-health is the time to learn because once students are in medical school there isn't enough time for doing much anything else than focusing on that curriculum. However, if they learn prior, it's easier for them to keep their skills strong, as opposed to learning the language." Dr. LA (Pharmacy) adds that students need to learn Spanish before enrolling in professional school because "their proficiencies will probably stay the same until they finish whatever health profession or studies they choose because there's not language courses during pharmacy school, medical school, etc." Dr. LA

(Pharmacy) mentions the key word "proficiency" to indicate that students' understandings of and abilities to utilize the language will not progress in professional schools.

In Question 4, some students indicated a lack interest in learning Spanish, which is somewhat overcome by the results collected from Question 6 (see Appendix B), that show that the majority of respondents would be willing to learn how to speak Spanish in order to communicate with Spanish-speaking patients (see Table 7). Furthermore, this explanation is also challenged by the lively "class interest" Dr. LA's pharmaceutical Spanish elective has generated and her assertion that "[s]tudents see the value" in learning Spanish. When asked to comment on the results of Question 6, Dr. RT (Health Professions) indicated satisfaction with the willingness of students "to learn Spanish to communicate across cultures," maintaining that "[t]he lack of knowledge of other cultures is very damaging to our society . . . allow[ing] people to be lazy and depend on stereotypes."

Finally, it is also possible that some participants had not previously considered the benefits of learning Spanish and may have realized the importance of communicating with Spanish-speaking patients when entering the pre-med program or when coming upon Question 6, causing them to respond positively regarding their willingness to learn Spanish.

More of the surveyed pre-health students indicated that they would not be able to communicate with Spanish-speaking patients using their current proficiencies. This finding suggests that a shortage of bilingual pre-health students at the University of Mississippi exists. Dr. LA (Pharmacy) supports the results of Question 5, maintaining that students enrolled in her

Spanish pharmacy elective typically have “very low” proficiencies of Spanish and that “they are not ready to have conversations with patients,” recognizing the need for students to spend more instructional hours learning Spanish.

Data (see Table 8) obtained from Question 7 (see Appendix B) indicates that the vast majority of respondents do anticipate working with patients in the future who will need interpreting. This finding is significant in that future health providers recognize a need for adequate interpretation services for patients and that they foresee issues related to language barriers in the future. When asked to comment on the results of Question 7, healthcare professionals believed that pre-health students should be cognizant of the widespread need for interpretation services: “It is surprising to me that even one participant stated that they did not think they would see patients who would need interpreting in the future because the truth is there already many patients that need interpreting . . . Everyone should be aware of this” (RT).

After establishing that participants see interpretation as a necessary undertaking in patient care, Question 8 (see Appendix B) allows participants to express their perceptions of interpretation services by selecting which option they believe is most effective. For this question, some participants selected multiple responses because they believed that the options they selected were equally effective. 73.33% of participants selected “in-person professionally-trained interpreters” as the most effective (or equally effective, if they made further selections) interpretation option of the given answer choices. However, many participants (60%) also indicated that they perceived bilingual doctors as the most (or equally) effective answer choice. There is a dramatic drop in the percentage of participants who chose the remaining options, but

the next most chosen answer selection was “family members as interpreters” (chosen by 20% of participants) serving as *ad hoc* interpreters This lower rating for *ad hoc* interpreters when compared to professional interpreters is supported by previous research, showing higher levels of patient satisfaction (Kamikura et al.) and fewer errors of potential clinical consequence committed in the clinical interaction (Flores et al.) when professional interpreters were used rather than *ad hoc* interpreters. Furthermore, healthcare professionals at the University of Mississippi agree that the utilization of *ad hoc* interpreters (and even bilingual doctors without interpreter training) in clinical settings can be problematic due to their lack of official training: “Even if someone feels comfortable with Spanish, small details can make a huge difference. The fact that someone knows a little, doesn’t meant they know it all, and it’s difficult to know which situations require ok Spanish and which situations require excellent Spanish” (LA).

Fewer participants selected “[e]lectronic programs serving as interpreters (ex. apps)” and “Google Translate as an interpreter” as effective interpretation choices than those who selected ad hoc interpreters. The surveyed pre-health students indicated preferences for in-person interpreters rather than computerized interpretation services and greater preferences for individuals who had received either interpretation or medical training (in-person professionally-trained interpreters and bilingual doctors). Their preferences parallel previous research, which shows the advantages of utilizing in-person interpretation services for patients.

Prior to analyzing the results of this study, I anticipated that professionally-trained in-person interpreters would receive the largest number of votes by participants, due to the fact that interpreters have received formal training on how to maneuver clinical interpretations properly

and have likely proven high language proficiencies in order to achieve this profession. A systematic literature review of 28 relevant sources analyzing the effectiveness of professional interpreter use supports this hypothesis, revealing that the majority of reviewed studies found positive associations between limited English proficiency patient satisfaction ratings and the utilization of a professional interpreter (Karliner et al.). Similarly, the majority of reviewed journals found that the use of a professional interpreter decreased the occurrence rate of clinically significant errors resulting from language barriers (Karliner et al.). Furthermore, an investigation at the Intermountain West free clinic found that professional interpreter services increased patients' overall levels of satisfaction (Kamikura et al.). However, there are disadvantages to using professional interpreters. For instance, the excessive costs of in-person professional interpretation services force many LEP patients to suffer from a reduced quality of healthcare due to having no choice but to resort to alternative interpretation options or no interpretation at all (Vela et al.). There is a lack of standardization when determining when a professional interpreter is needed, and much of the decision-making power for this decision lies in the hands of doctors and nurses (Wu et al.). For these reasons, interpreter services are often dismissed, due to the perception that medical professionals do not know how to request interpreter services and that there is not sufficient time or funds to use their services (Wu et. al). Dr. RT (Health Professions) also recognizes the fact that "[h]ealthcare is already expensive. Patients are already struggling to afford healthcare, so it is not their job to solicit interpreters. However, at the same time, physicians may see only one or two Spanish-speaking patients a day, and they're paying for interpreters all day because they don't know what time they'll being see these patients. I don't understand how this could be a cost-effective option." The key word "afford" is an important factor to consider when determining the most effective interpretation

option. Recall that, according to Davidson, interpreters often assume the role as timekeepers, keeping all appointments “on track” no matter the cost. Furthermore, Morales et al. cites previous research in an emergency department that showed lower levels of overall patient satisfaction among limited English proficiency Spanish-speaking patients than English-speaking patients even in instances when an interpreter was used, demonstrating that interpreters did not equalize disparities in care between these language groups. Additionally, healthcare professionals at the University of Mississippi applied to the study results showing higher effectiveness ratings for professional interpreters when compared with bilingual doctors, stating that “[i]n regards to the quality of care and the limitations of interpreters, of course, they are better than nothing” (LA), but that they would have “hoped that more students would’ve chosen bilingual doctors as the most effective interpretation option” (RT). Dr. RT (Health Professions) uses the key word "effective" to indicate that his opinion that bilingual doctors are the best interpretation options available.

Additionally, participants’ high effectiveness ratings for bilingual doctors as interpreters may be attributed to the conversational methods doctors typically use in the patient consultations (Hardin). Utilizing bilingual doctors as interpreters diminishes the need to include an individual outside of the medical team (a professional interpreter), in turn creating a more comfortable setting for both the doctor and the patient (Wu et al.). This less complicated dynamic avoids problems arising from doctors lacking knowledge on how to properly implement interpretation services (Wu et al.). Healthcare professionals at the University of Mississippi back this claim, stating, “[n]ot only does being a bilingual doctor make someone’s skillset more marketable, it also allows them to be a better doctor and avoid complicated dynamics that may lead to

important information getting lost in translation" (RT). Moreover, the role of bilingual doctors as interpreters allows doctor to better respect patient privacy codes and to form more tightly-knit bonds with patients ("Chronic Shortage"). Dr. LA (Pharmacy) supports the notion that "having bilingual doctors or bilingual pharmacists allows patients to feel trust with their providers that they cannot get with interpreters," also going on to say that "[h]ealthcare is one of those fields where personal relationships are so important, and it dramatically changes the experience for the patient if their provider is able to speak a common language." By using their language abilities, bilingual doctors are able to save time and make diagnoses more quickly than when an interpreter has to be sought out and filled in (Vela et al). Finally, a bilingual doctor gets one salary, whereas a doctor plus an interpreter requires more money, making bilingual doctors a more cost-effective interpretation option. Nonetheless, bilingual doctors are not widely available ("Chronic Shortage") due to the fact that "[t]here are very few professionals that can speak Spanish with their patients" (LA).

On the other hand, it is interesting that family members serving as interpreters received higher effectiveness ratings from participants than the electronic interpretation services, even though these individuals have not received formal interpretation training. Recall that according to Kratochvil, children of immigrants living in the United States are often called upon to translate for their parents.

The results from Question 8, in conjunction with the data found in Questions 3 and 6 (that shows that the majority of respondents were aspiring doctors who indicated a willingness to learn Spanish to eliminate language barriers with patients) demonstrates that my participants

recognize their future interest in aiding patients by becoming bilingual. Unfortunately, previous studies have shown low rates of foreign language proficiencies for senior medical students, potentially contradicting the notion that pre-health students are increasingly learning Spanish to counteract the disparities in healthcare arising from language barriers (Vela et al.).

Because pre-health students will be navigating interpretation services, it is important to note that the respondents to this survey believed that in-person interpretation would be more effective than electronic interpretation. However, judging from the pre-med curriculum at the University of Mississippi, it is also likely that many pre-health students have not yet been exposed to several of the interpretation options, which could potentially affect their answer choices.

Question 9 is closely related to the prior in that it assesses participants' perceptions of the interpretation service that they previously selected as most effective, but more specifically asks participants to identify the effectiveness of this service in terms of accessibility. Because Question 8 had a response rate over 100, it is probable that some participants based their answer for Question 9 on several interpretation options they saw as equally effective. Because the most commonly selected answer choices in Question 8 were in-person professionally-trained interpreters and bilingual doctors, I was surprised to see an accessibility rating of higher than 50%, due to evidence illuminated by recent studies about the lack of accessibility of professionally-trained in-person interpreters (Nathenson et. al) and the current deficiency of bilingual doctors in the workforce ("Chronic Shortage"). In addition, the data was especially surprising in that low percentage values of participants selected Google Translate as an

interpreter (10%) and electronic programs as interpreters such as apps (15%) for Question 8. However, according to the sources "Try Google Translate to Overcome Language Barriers" (Wade) and "5 New Medical Interpreting Apps – Language Connections Blog," these interpretation options are quite accessible, especially when compared with the shortages of in-person interpreters. Therefore, the high accessibility statistic that predominantly pertained to in-person interpreters may indicate a knowledge gap among pre-health students or that students have formed some other opinions not tapped in this survey.

Question 10 (see Appendix B) was also closely associated with Question 8, but more specifically addressed effectiveness levels in terms of affordability. Similar to the results of Question 9, data obtained from Question 10 (see Table 11) revealed a surprisingly high perceived level of affordability; on the sliding scale, the participants reported an average response of 58% affordability of their preferred interpretation method. As with the results from Question 9, this result is unforeseen, due to the fact that respondents' affordability rating corresponded with the interpretation option they marked as most effective in Question 8. Because the majority of participants selected in-person interpreters rather than electronic interpretation options for Question 8, affordability ratings from Question 10 are more correspondent with participants' perceptions of in-person interpreters. Therefore, the 58% affordability rating from participants was surprisingly high, due to the higher reported costs elsewhere associated with in-person interpreters, as opposed to electronic interpreters. However, data from existing studies shows that many patients are unable to receive healthcare at all due to high costs (Gertz et al.). For LEP patients already struggling to afford healthcare in general, in-person interpretation services are not a fiscally plausible option. However, applications like

Google Translate® (Wade) and MediBabble® ("UCSF Medical Students")—which can be utilized even without Internet connection— are free services that aim to combat the high costs of professionally-trained in-person interpreters, and would be expected to receive high ratings of effectiveness in terms of affordability.

In conclusion, the most significant results of this study support previous research on Spanish interpreters in the health care professions. Pre-med students at the University of Mississippi are indeed following the norms for the rest of the nation in recognizing a need for Spanish bilingual doctors and professionally trained in-person interpreters in the clinical setting.

The surprising results, however, indicate that pre-med students at the University of Mississippi believe that Spanish bilingual doctors and professionally trained in-person interpreters offer more accessible and affordable services than previous research signifies.

CONCLUSION

This study supports previous research indicating the unprecedented need for Spanish-English interpretation services in the United States, with 60% of the U.S. LEP population being Spanish-speaking and 80% foreign born. The study's focus specifically on Mississippi is significant in that Mississippi is an upcoming "emerging destination," meaning that it will experience the immigration of the LEP Spanish-speaking population from traditional Hispanic/Latino enclaves into new areas in the near future (Nathenson et. al). With 81,481 Hispanic/Latino residents out of the total reported number of residents (2,967,297) in the years 2018-2019 living in Mississippi, the current LEP population will likely experience an upward trend of growth (Current Hispanic or Latino Population in Mississippi). According to healthcare professionals, limited English proficiency Spanish-speaking "patients report feeling discriminated against and report a lower quality of healthcare than English-speaking patients" (LA).

The objective of this study is to provide a basis of research regarding the perceptions of pre-health students in Mississippi in order to, in combination with future research, be able to predict trends of interpretation services and improve these services prior to this influx of Hispanic/Latino residents. By determining the most effective interpretation options and making modifications, it is possible that the low healthcare and communication satisfaction levels found among LEP patients can be curbed (Morales et. al). Analyzing the data presented in my survey can aid in filling some existing knowledge gaps in this field for Mississippi.

There is a need for this study because, although a study evaluating behaviors and comfort of senior medical students regarding interpretation practices (Vela et. al) and applications proposed by senior medical students in order to address language barriers in the clinical setting ("UCSF Medical Students") exist, no studies involving the perceptions of undergraduate pre-health students regarding available interpretation options could be found. Healthcare professionals also emphasize the need for this investigation: "There are studies that I have read that similarly assess perceptions regarding interpretation options, but the participants of these studies have already entered into their professional fields rather than being pre-health" (LA). This study may serve as pilot study, indicating the need for further research in this area.

Professionals in the medical field also reiterated the need for more culturally and linguistically aware healthcare professionals. Both Dr. LA (Pharmacy) and Dr. RT (Health Professions) favored bilingual doctors as the most effective choice for serving interpretation functions, citing that patients are able to form more tightly-knit bonds with their physicians if they are able to speak Spanish and that the elimination of a third-party in the clinical setting (such as an *ad hoc* interpreter or a professionally-trained interpreter) facilitates communication and avoids mistakes that may arise from this complicated dynamic. However, these professionals also recognize the existing limitations for students attempting to learn Spanish. For instance, Dr. LA (Pharmacy) mentions that she only knows of very few pharmacy schools that require students to speak Spanish. The pharmacy schools to which she refers are located in areas consisting of large Hispanic populations. However, she notes that many areas do not have ample resources to mandate these courses, and Dr. RT (Health Professions) mentions that there is no room in the medical school curriculum for Spanish courses. Therefore, both Dr. LA (Pharmacy)

and Dr. RT (Health Professions) strongly advocate for students to learn Spanish by taking courses and seeking opportunities to practice Spanish prior to entering their professional schools.

I. Limitations:

This study is limited in scope in that it takes place solely at the University of Mississippi and only involved undergraduate students at the University of Mississippi. Therefore, data obtained from the survey can compare but not be generalized to undergraduate students at other universities and is not reflective of the perceptions of all United States' pre-health students.

Furthermore, the study is limited in that it does not ask demographic information about participants such as age, gender, race, ethnicity, social class, etc. It is possible that the data obtained was affected by external factors. For example, Morales et al. describe an investigation that found connections between language, ethnicity, and satisfaction with healthcare. The findings of this study reported lower levels of satisfaction with provider communication and healthcare as a whole among Latino patients (Morales et. al). Therefore, participants from different backgrounds may report distinctive answer choices based on their own unique experiences with healthcare.

The data obtained from this study is also limited in that some participant confusion arose while answering survey questions, resulting in some participants skipping questions, selecting multiple answers for a given question, or not fully reading and comprehending answer choices.

Results collected from Question 5 (see Table 6) reveal that participants may have experienced confusion when selecting answer choices because of discrepancies in the number of respondents who indicated Spanish proficiencies between questions 4 and 5. Interestingly, in question 4, 44 participants indicated that they did not speak Spanish; however, in question 5, 39 participants selected "not applicable," indicating that the preface of question 5 ("[i]f you speak Spanish) did not apply to them. Similarly, participants may have experienced confusion when responding to Question 6 containing the preface "[i]f you do not currently speak Spanish." While 16 participants designated that they spoke Spanish in question 4, only 11 participants marked "not applicable" for question 6, indicating that the question did not apply because they did speak Spanish. This discrepancy may be attributed to participants selecting "[y]es" to question 6 in order to indicate a willingness to learn more and improve their current Spanish proficiencies rather than learn the language from the novice level. Moreover, for the sliding scale Questions 9 and 10, Survey Monkey compiled participant data into an average. However, averages made the results of these questions difficult to interpret, due to the fact that the accessibility and affordability ratings assessed in these two questions pertained to whichever answer choice a participant selected as the most effective interpretation option in Question 8. When reviewing the results of this investigation, Dr. LA (Pharmacy) noted the importance of this limitation: "I guess my concern is if you get an average for rating the accessibility or affordability, then the answers will be very different depending on what they chose. For instance, if someone chose Google, accessibility would be expected to be 100%, but if someone chose bilingual doctors, it would be expected to be a lot less."

II. Suggestions for Future Research:

This study provides a basis for future research in the area of Spanish interpreting in health care. Although many initiatives to diminish health disparities for LEP patients due to language barriers have been proposed, it is still evident that further research is needed in order to determine which solutions are actually effective. For instance, some initiatives that were proposed to address the lack of standardization, affordability, and accessibility of professional interpretation services include applications such as MediBabble®, developed by senior medical students at UCSF ("UCSF Medical Students"), Canopy Apps®, eCaring®, Starling Health®, and VerbalCare® (5 New Medical Interpreting Apps). Likewise, Google Translate also is able to address many of the downsides of in-person interpretation because it is widely accessible and free. However, the results of this study reveal a preference for in-person interpretation to avoid interpretation errors and facilitate patient comfort, rather than the utilization of electronic services.

Future research to determine the effectiveness of initiatives to increase the number of bilingual health care professionals could help in making necessary improvements to the University of Mississippi curriculum, which, in turn, could aid in producing more medical staff members with advanced language proficiencies.

Additionally, future research regarding perceptions of pre-health students regarding existing interpretation options would be beneficial to supplement and expand upon the results obtained from this study. Furthermore, healthcare professionals emphasize the need for further

research regarding patients' perceptions of interpretation options: "I also think that there is future research needed concerning the perceptions of Hispanic patients about interpretation options. There is some literature that exists about this, but it is limited" (LA). If this future research is conducted, it will allow researchers to take a more holistic approach when determining how to move forward with clinical interpretation options.

In conclusion, this study is valuable in that it provides information regarding how pre-health students perceive the existing interpretation options. These perceptions are important in that these pre-health students will be navigating interpretation services in the near future, so it is extremely valuable to know what they are more comfortable with and what they perceive as most effective. The survey assesses pre-health students' self-perceptions of their own communication abilities in Spanish, which is significant in that it can help prepare for the future interactions of bilingual healthcare providers, or the lack thereof, allowing for adjustments prior to the anticipated immigration of Hispanic patients to Mississippi (as it is an upcoming emerging area) (Nathenson et al.).

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APPENDICES

APPENDIX A: INFORMED CONSENT FORM

As a resident of the United States, I, _____, agree to answer survey questions to benefit research assessing the effectiveness of varying clinical language services. I acknowledge that I am 18 years old or older. I note that my responses will contribute to aggregate data that will be published only as a University of Mississippi Honors College student research study. As a participant in this survey, I recognize that I will not receive any form of compensation, monetary or non-monetary. I am aware of my right to decline to answer any questions that make me feel uncomfortable during the course of the survey, as well as my right to withdraw my participation in the study at any time. I recognize that I will answer all study questions honestly and to the best of my ability and that I will notify those conducting the survey if I am confused at any point during the course of the survey. Because I am able to decline to answer any questions, there are no risks associated with this study. However, data obtained from this study will be beneficial to healthcare providers and the Spanish-speaking population by providing information about the effectiveness of medical translation systems and may be useful in making improvements in clinical language services. I understand that my personal information and responses will remain confidential during this process. By consenting to this form, I note my willingness to participate in this survey.

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

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APPENDIX B: SURVEY QUESTIONS

1. Are you at or above the age of 18? Have you read and agreed to the informed consent form?
2. Are you planning to enter into a health-related profession in the future?
3. What future health-related profession are you pursuing?
4. Do you speak Spanish?
5. If you speak Spanish, do you think you could effectively communicate with Spanish-speaking patients with your current Spanish proficiency?
6. If you do not currently speak Spanish, would you be willing to learn how in order to communicate with Spanish-speaking patients?
7. Do you think you will see patients in the future who will need interpreting?
8. If you believe you will have future patients in need of interpreting, which of the listed options do you believe would be most effective?
9. Please rank the language service you previously selected as most effective in terms of accessibility (using whatever current knowledge you have)?
10. Please rank the language service you previously selected as most effective in terms of affordability (using whatever current knowledge you have)?