ENHANCING THE ANESTHESIA PROVIDERS' AWARENESS OF RESOURCES, POLICIES, & PROCEDURES SURROUNDING PATIENTS WITH LANGUAGE COMMUNICATION BARRIERS

by

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ABSTRACT

TAYLOR MARTIN. Enhancing the Anesthesia Providers' Awareness of Resources, Policies, & Procedures Surrounding Patients with Language Communication Barriers.
(Under the direction of DR. LUFEI YOUNG)

Background: Patients with limited English proficiency (LEP) are facing significant communication challenges in peri-operative settings, spanning from understanding anesthesia-related information to obtaining informed consent. These language-based obstacles lead to decreased quality of care, lower patient satisfaction, and a heightened risk of adverse healthcare outcomes. The **purpose** of this study is to investigate if a web-based educational program can increase the anesthesia providers' awareness of resources, policies, and procedures available for LEP patients. **Methods:** This quantitative, quasi-experimental project uses a pretest-posttest design sampling from a level II healthcare facility in Charlotte, NC. **Results:** Twenty-six individuals participated in this study. There was significant pretest-posttest difference on question 2 (language service resources) ($\chi^2(1) = 7.24$, $p = .007$); question 4 (language service procedure) ($\chi^2(1) = 16.50$, $p < .001$); question 5 (policy location) ($\chi^2(1) = 10.00$, $p = .002$); and question 7 (resource location) ($\chi^2(1) = 28.40$, $p < .001$). The average number of correct answers significantly increased from 3.77 ± 1.34 to 6.15 ± 0.46 ($t = 8.58$, $p < .001$). **Conclusion:** The result of this data serves as evidence that a short, simple education module can profoundly impact the anesthesia provider's understanding of resources and policies surrounding language communication barriers. Future projects should emphasize the importance of bilingual teammates avoiding obtaining pre-operative consent without the presence of a certified interpreter.

Keywords: Keywords: Limited English Proficiency (LEP), Anesthesia Providers, Educational Intervention, Quality Improvement, Language Communication Barriers, Perioperative Settings, Cultural Competence, Interpretive Services, Patient Safety, Healthcare Education.

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DEDICATION

This project is dedicated to all those who have supported me over the last three years on the greatest endeavor of my life. To be able to produce a piece of work that is not only meaningful to me, but to my community, is more than I could've ever hoped for. Thank you to my husband, Asa, for holding my hand in the valley and cheering me on at the mountain top. Your unwavering support has made all the difference over the last three years. To my mother, Jennifer, thank you for showing me what hard work and perseverance looks like. You were always the standard for women that I compared myself to. I've seen you do the impossible, and that has given me the courage to try and achieve that for myself. To my father, Chris, if I have one fan it's you, and if I have no fans, you are dead. Thank you for always believing in me. Finally, to my book club, thank you for immersing me in worlds that are not our own, during a time when I felt trapped in my own reality. I hope the people I have mentioned above, and those who I didn't get a chance to, know I am forever indebted to them for making this project and all my successes possible.

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LIST OF ABBREVIATIONS

CRNA	Certified Registered Nurse Anesthetist
EMR	Electronic Medical Record
HIPAA	Health Insurance Portability and Accountability Act
IRB	Internal Review Board
LEP	Limited English Proficiency
NC	North Carolina
NORA	Non-Operating Room Anesthesia
SPO	Structure Process Outcome
SRNA	Student Registered Nurse Anesthetist

SECTION I: INTRODUCTION

Background

One of the most critical aspects of delivering high-quality patient care is ensuring effective communication. Clear and effective communication during the pre-operative evaluation can help improve rapport, reduce patient anxiety, and improve the patient's overall experience. It is also vital in avoiding surgical delays, preventable complications, improving surgical outcomes (Joo et al., 2023). Growing numbers of surgical patients exhibit limited English proficiency (LEP), leading to communication challenges between patients and providers (Improving Patient Safety Systems for Patients with Limited English Proficiency, 2012). Language barriers contribute to the increased risks of adverse events, undesired patient experience, reduced quality of patient education, leading to poor surgical outcomes (Improving Patient Safety Systems for Patients with Limited English Proficiency, 2012). To avoid preventable complications and improve quality of care, the Affordable Care Act (ACA) mandates healthcare organizations to provide meaningful access to patients with LEP (Tan-McGrory et al., 2022). The Department of Justice and the Department of Health and Human Services have stated that failure to provide appropriate interpreter services may be deemed discriminatory, potentially resulting in administrative fines and penalties (Betancourt et al., 2012).

Problem Statement, Purpose, & Clinical Question

Despite the laws, regulations, and policies governing high-quality care for patients with LEP, many anesthesia providers lack knowledge and awareness about these regulations and policies. They may also be unaware of how to access the available hospital resources, services, and established procedures designed to assist them in providing care for LEP patients. To promote clear and effective interactions between anesthesia providers and patients with Limited

English Proficiency (LEP), the purpose of this project was to investigate the effectiveness of a web-based education program on the anesthesia providers' awareness of resources, policies, and procedures for language services for patients with LEP. Through this project, we hoped to answer the following question: compared to current education processes, is a single-session web-based module effective to improve anesthesia providers' awareness of resource, policies, and procedures of language services for patients with LEP? The long-term goal was to have empowered anesthesia providers to quickly access language services, promoting utilization in the preoperative setting. This aligned with hospital policy and upheld patients' legal rights to such services, thus improving the quality of care and ensuring the equity and safety of LEP patients.

SECTION II: LITERATURE REVIEW

Background and Significance

About 21.6% of the U.S. population, or almost 66 million people, speak a language other than English at home. This number has nearly tripled since 1980, when only 23.1 million people spoke a language other than English at home. Over 300 languages are spoken in North Carolina (Diamond et al., 2019). Studies showed the prevalence of communication difficulties and the disproportioned risk of poor health outcomes in patients with limited English proficiency (LEP) (Schiaffino et al., 2014). About 42% to 84% of patients with LEP experience communication difficulties in peri-operative healthcare settings, including the apprehension of anesthesia-related education and informed consent (Patel et al., 2016; Shapeton et al., 2017; Singh et al., 2013). Communication difficulty was reported to be critical in caring for patients with LEP. Language barriers significantly decrease the quality and satisfaction of care and healthcare outcomes and increase the risk of incorrect or insufficient treatment and adverse and safety events. (Burkle et al., 2017; Green et al., 2005; Soleimani et al., 2022; Ali & Watson, 2018; Karliner et al., 2010; Kasten et al., 2020).

Among the previously mentioned articles, ten articles were returned on the effects of proper utilization of interpretative services on the quality of care of LEP patients. By using the correct policies and procedures surrounding the adequate interpretation of all communication for LEP patients, anesthesia providers are doing what is suitable for the patient and improving the quality of care they provide. Appropriately using interpretive services ensures an open, two-way communication road. It allows LEP patients to understand the intricacies of the care they receive throughout their operative stay while being able to voice their concerns and pose their questions

in response to anesthesia providers. By keeping an open line of dialogue between themselves and their LEP patients, anesthesia providers can confirm that they are not sacrificing quality care.

Impacts LEP on Care Quality, Safety, and Equity

There is a significant association between the quality of care and anesthesia providers' proper use of interpretive services for LEP patients (VanderWielen et al., 2014). The factors related to the improper use of interpretive services include the lack of awareness of the proper use of interpretive services (Brooks et al., 2016; Sharpton et al., 2017), using an untrained interpreter (VanderWielen et al., 2014; Fatahi et al., 2010; Soleimani et al., 2022; Brooks et al., 2016), failing to use a certified interpreter (Brooks et al., 2016; Burkle et al., 2017; Fatahi et al., 2010; Green et al., 2005; VanderWielen et al., 2014).

Per Hospital Policy, obtaining informed consent on an LEP patient must be done with a certified interpreter. Lee et al. (2017) attributed the lack of professional interpretative service for informed consent to persistent disparities among LEP patients in the hospital setting. Furthermore, it was reported that using uncertified interpreters to obtain informed consent increases medical errors and compromises safety, legality, and policy (Nápoles et al., 2015). The primary reason for using untrained interpreters is the lack of awareness to access the certified interpreter (Hudelson et al., 2009). Satisfaction of care, favorable outcomes, and equity in care is much more feasible when language congruency between patient and provider occurs (Weech-Maldonado et al., 2008). Professional interpreters helped increase LEP patients' autonomy through well-informed education and rights. Professional interpreters can also facilitate understanding of cultural differences, preferences, awareness, and sensitivity, enhance patients' comprehension, and allow patients to voice their decisions and safety concerns, leading to the implemented empathic tools (Gutierrez et al., 2019; Wu et al., 2017).

To reduce healthcare disparities and provide equitable care among LEP patients, it is critical to educate anesthesia providers about the proper use and access to interpretive service for LEP patients, which prepares them to evaluate patient's needs, consult their wishes, explain their rights, involve family members, provide emotional support and opportunity (Bischoff et al., 2010; Hadziabdic et al., 2014; Locatis et al., 2010; Hsieh et al., 2015; VanderWielen et al., 2014).

In sum, the literature evidence showed that our project should have highlighted the need for more awareness and knowledge to use professional interpretive services among anesthesia providers properly. Adequate education of anesthesia providers could have increased awareness of this critical issue. When performing education in our project, it was essential to have emphasized the risk of using non-certified interpreters.

Areas Improved by Proper Utilization of Interpretive Services

Quality

Many anesthesia providers underutilize interpretive services they have direct access to and are undereducated on the appropriate situations to employ interpretive services for LEP patients (VanderWielen et al., 2014). Undereducation in the proper use of interpretive services for LEP patients leads to decreased quality of care an anesthesia provider provides. Brooks et al. (2016), a study in which focus groups of LEP patients were surveyed, suggests that the quality of care would be improved if more certified interpreters were accessible. This information showed that our project should’ve highlighted proper resource utilization and timing of interpretive services in our educational material.

Similarly, Sharpton et al. (2017) add that education in anesthesia departments is necessary and beneficial to resolve misconceptions about interpretive services to improve

interactions and the quality of patient care. In this survey of both anesthesia providers and interpretive service members, the research suggests several false impressions by both departments may hinder patient care. Proper education could improve patient communication (Shapeton et al., 2017). Adequate education of anesthesia providers could increase awareness of critical situations to utilize interpretive services, what interpretive services do, and why the service is essential to LEP patients.

Communication with an LEP patient while using an untrained ad hoc interpreter, such as coworkers or patient family members, was more likely to contribute to errors of clinical consequence and was more likely to be unsuccessful in interpretive communications due to their inability to translate medical jargon and was shown to impact interpretation negatively, therefore, compromising communication between anesthesia providers and LEP patients (VanderWielen et al., 2014; Fatahi et al., 2010; Soleimani et al., 2022; Brooks et al., 2016). Although there was currently no standard in the United States for the use of a certified interpreter in communicating with an LEP patient, VanderWielen et al. (2014) points out that facilities that receive federal funding are in direct violation of federal law when insufficient care is provided to an LEP patient because of a language barrier. When performing education in our project, it was essential to emphasize this information about ad-hoc interpretation and discourage non-certified interpretation.

A decreased quality of care was a recurring theme perceived among LEP patients surveyed when a certified interpreter was not utilized (Brooks et al., 2016). Likewise, Burkle et al. (2017) found that using interpreter services correlated with improved quality of care for LEP patients and increased patient satisfaction without delaying start times for operations. A survey conducted by Green et al. (2005) found that LEP patients who experienced communication

difficulties had a perceived decreased quality and satisfaction of care. Not only is patient satisfaction improved when using a certified interpreter, but overcoming an LEP patient's difficulty communicating with healthcare staff can improve healthcare outcomes (Soleimani et al., 2022; Burkle et al., 2017).

A qualitative survey about the impact of language barriers in providing care found that communication was the most critical aspect of patient care. Language barriers were the biggest obstacle to providing quality care (Ali & Watson, 2018). Brooks et al. noted the utilization of interpreters who spoke different dialects of Spanish than the LEP patients leading to difficulty communicating and misinterpretations (2016). Therefore, Fatahi et al. offered the solution of prior scheduling of an interpreter in the LEP patient's native language to assist with communication (2010).

Safety & Provider Satisfaction

Wu et al. (2017) described how professional medical interpreters can "help prevent adverse events involving patients with LEP." They do so by contributing the following three things to the interaction with non-English speaking patients: "1) facilitating communication and enhancing patients' comprehension, 2) giving voice to patients, and 3) speaking up about safety concerns" (Wu et al., 2017). When creating our education, we emphasized the congruence between proper interpretation and patient safety.

Informed consent is an essential factor we wanted to educate our project participants on. Per Hospital Policy, obtaining informed consent on an LEP patient must be done with a certified interpreter. Patel et al. (2016) found that "surgeons reported relying on their non-English language skills, bilingual staff, and family and friends of patients to obtain informed consent from LEP patients."

Ad-hoc interpreters play a role in compromising safety, legality, and policy. These are people who speak the native language of the patient (family, providers, etc.) but are not professionally certified to do so. This is described by Nápoles et al. (2015) through their cross-sectional study results. They found that "inaccurate interpretation occurred at twice the rate for AH (54% of coded TUs) versus IP (25%) and VC (23%) interpretation, due to more errors of omission ($p<0.001$) and answers for patient or clinician ($p<0.001$)" (Nápoles et al., 2015).

Mayo et al. (2016) identified why ad-hoc providers are often inappropriately utilized. They stated, "The most important factors related to the likely use of ad hoc interpreters (cutting corners) included locating a qualified interpreter, having to wait for a qualified interpreter, and technical difficulties regarding phone and video technology" (May et al., 2016). Hudelson et al. (2009) stated, "66% of respondents said they preferred working with ad hoc interpreters (patient's family and bilingual staff), mainly because these were easier to access." These studies affirmed the need to capture the utilization of ad-hoc interpretation in our pre and post-surveys.

Several articles spoke about translational errors encountered during the interpretation process. Flores et al. (2012) revealed that "the proportion of errors of potential consequence was significantly lower for professionals (12%) versus ad hoc (22%) versus no interpreters (20%)". Schwei et al. (2019) also stated, "use of professional medical interpreters has been shown to improve communication and decrease medical errors in pediatric LEP patients." Other articles addressed the difference in care received between English-speaking and LEP patients. It was noted that LEP patients "experience challenges accessing health care and are at higher risk of receiving suboptimal health care than native English speakers" (Kasten et al., 2020).

Some of the limitations of using interpretation services were addressed by Lundin et al. (2018) and included availability, accessible areas to maintain confidentiality and technical issues

associated with remote interpretation services. Schiaffino et al. (2014) found that only "64% of hospitals provided language services." Availability, accessibility, and confidentiality were all addressed when surveying our project participants.

Equity

Weech-Maldonado et al. (2008) found that "Hispanics in Medicare managed care face barriers to care in general, but there are language and regional differences in their care assessments." This presents the point that satisfaction of care, favorable outcomes, and equity in care are much more feasible when language congruency between patient and provider occurs.

Another problem, as described by Bischoff et al. (2010), is that more than the availability of professional interpretation is needed to guarantee its use. Inequity becomes the standard of care if this continues to prevail in healthcare. Most respondents from this study found professional interpreters helped with "increasing patients' autonomy (80%) and by ensuring that immigrants are generally well informed (80%) and know their rights (86%)" (Bischoff et al., 2010, p. 18).

Locatis et al. (2010) described how Ad Hoc interpreters "may not adequately understand technical information providers give and may unintentionally omit parts of the conversation or distort it out of embarrassment." Another issue described in this article was that video interpretation leads to a disconnect since the "technology directs their speech to the interpreter, not each other" (Locatis et al., 2010, p. 346). Furthermore, telephone interpretation was highly dissatisfied by both parties since it took longer to set up, and "the significantly shorter phone interviews raise questions about the prospects of miscommunication in telephonic interpretation" (Locatis et al., 2010). Considering this information and evaluating the most optimal method to

provide the best care and not shorten the patient's experience was considered when forming our education plan.

Hsieh et al. (2015) proposed that the various interpreting modalities should complement professional interpreters since each has distinct strengths and weaknesses. Hsieh et al. (2015) also found that “only 72% of hospitals routinely record patients’ interpreter needs, which can significantly reduce waiting time as an interpreter can be requested ahead of appointments.” This emphasized the importance of surveying respondents on where to find interpretation needs in the chart and educating them accordingly.

As Lee et al. (2017) noted, persistent disparities among LEP patients indicate the need for professional interpretation for informed consent throughout hospitalization. We have seen a rise in professional interpreter use for informed consent since it is both a “fundamental and legal obligation for clinicians” (Lee et al., 2017). However, we need to improve upon culturally shifting and continuing education as to why interpretation is required throughout the patient's experience in the hospital. Until these hurdles are overcome, we will not see enough meaningful change to reduce the disparity in LEP patient care.

Gutierrez et al. (2019) expanded on this topic, which “highlights the importance of viewing medical interpreters as more than invisible conduits of information” to optimize the LEP patient and provider experience. When professional interpreters are acknowledged as more than word-for-word interpreters, they can shift from a limited role to one that’s culturally sensitive, facilitates understanding, and implements several empathic tools.

Intervention to Enhance Knowledge of Existing Interpretive Service

While many anesthesia providers may understand the importance of being able to communicate with patients who experience language communication barriers adequately, many

anesthesia providers need to be made aware of the numerous resources available to enhance communication and break down the barriers between themselves and patients with communication barriers. Brooks et al. (2016) and Sharpton et al. (2017) pointed out that one barrier to utilization is a lack of awareness of the proper use of interpretive services; they stated this can be overcome by applying an intervention to enhance the knowledge of the existing interpretive services and resources within a facility. As was previously stated, Hudelson et al. (2009) found that the primary reason for utilizing an untrained interpreter was the need for more awareness to access the certified interpreter. Anesthesia providers have been found to be undereducated on the proper use of interpretive services (VanderWielen et al., 2014). Providing an educational intervention to increase awareness of the availability and importance of resources when providing care for LEP patients is essential. By enhancing the knowledge of anesthesia providers through intervention, there is a great opportunity to provide safer, more equitable, and higher quality care. The benefits above are stripped from the care of patients with language communication barriers by allowing current practices to become a standard of deviance.

SECTION III: METHODOLOGY

Conceptual /Theoretical Framework

The SPO model was an essential concept to the quality of healthcare services. The structure, process, and outcome were the foundations for this concept and ensured all quality aspects were met. This model allowed for the efficient and effective evaluation of given healthcare services. For this quality improvement project, the SPO model improved communication barriers among anesthesia providers and patients across Hospital facilities. Our project increased the ease of utilization of language services and mainstreamed facility-specific resources; our outcome focused on improving the quality, equity, and safety of limited English proficiency patients (LEP).

Project Design

This quality improvement project utilized a quantitative, quasi-experimental design that employed a pretest-posttest study design. The study was conducted in a level II regional healthcare facility in Charlotte, NC. The aim was to assess the effectiveness of a single session web-based educational intervention on the awareness of resources, policies, and procedures of language services for patients with LEP among anesthesia providers. This project was approved by the Wake Forest School of Medicine and University of North Carolina at Charlotte internal review boards (see appendix D and E for approval letters). SQUIRE 2.0 guidelines were followed when reporting this scholarly project (Ogrinc et al., 2016).

Project Participants

Those who participated in this project include board-certified anesthesia providers and student registered nurse anesthetists. Participants were identified through the available outlook contact list for that facility. The investigator excluded temporary employees, such as those

considered a “locum” or “traveler,” because of their unpredictable exposure to resources and policies.

Setting

The project took place within a surgical center associated with a comprehensive healthcare system situated in the southeastern region of the United States. The health system is the largest hospital in the region, boasting a world-class facility that offers a comprehensive range of services. The entire health system, including the associated surgical center, also operates as one of five teaching facilities, providing residency training for more than 200 physicians across 15 specialties. The surgical center boasts a proficient team of surgeons delivering comprehensive care within a multidisciplinary team setting. All board-certified surgical and anesthesia providers have undergone sub-specialty training in various areas, including general, acute care surgery, and surgical critical care in cardiac and vascular conditions. It also operates multiple non-operating room anesthesia (NORA) sites. Furthermore, the surgical center serves as a referral hub for both national and international patients and physicians. The surgical center operates in three locations. The location where this project was conducted has an average of 50 surgical cases daily. There were approximately 60 certified registered nurse anesthetists (CRNAs) and 7 anesthesiologists at this site. Typical daily staffing included 23 CRNAs and four anesthesiologists.

Intervention

The single-session web-based educational intervention consisted of a PowerPoint-style presentation that included information about the resources, policies, and procedures of language services available at the study site. Handouts were provided along with the virtual presentation and remain indefinitely accessible. The educational intervention was designed to help anesthesia

providers gain quick and easy access to the available resources needed to facilitate seamless patient encounters with LEP patients, and to emphasize the proper policies and procedures related to language services. To ensure equitable care in line with the standards of practice for anesthesia providers, the educational content includes: 1) resource links to the hospital system's web pages related to language services; 2) health facility-specific policies and procedures regarding the provision of language services to LEP patients.

The exhibition highlighted the appropriate steps when encountering an LEP patients and addressed the legalities of providing LEP patients with a certified interpreter. Materials within the intervention included pictures, text, and links to the healthcare organization's sourced material regarding policies and procedures on LEP patients, the utilization of certified patient interpreters, and available resources for anesthesia providers. The education intervention's content validity was established by the dissertation committee members who have expertise in language services for LEP individuals and CRNA faculties.

The web-based educational module was a self-paced, PowerPoint-style presentation that took approximately 10 minutes to complete. The accompanying handouts were distributed through facility email with a direct link to the handout. The web-based education module could've been accessed via a laptop, computer, smartphone, or tablet with an internet connection.

The following strategies were used to enhance and maintain the intervention fidelity. For study design, we developed clear and detailed intervention protocol that outlined specific education components and expected outcomes. We provided standardized education materials that align with the intervention protocol. To improve the intervention fidelity, all team members participated in training in developing online surveys and web-based education modules. To ensure the delivery and receipt, we regularly monitor the average time spent on completing the

online education modules and scheduled team meetings to identify and troubleshoot any challenges encountered by the participants in completing the online learning module. We also sent out regular emails to encourage active participation and completion, provide guidance on how to access the web-based learning module, and identify areas that may need further clarification. For enactment, we included handouts to encourage participants to apply the knowledge and skills they have gained from the intervention. By addressing each of these components in the design, training, delivery, receipt, and enactment stages of the educational intervention, we made an effort to improve the intervention fidelity, ensuring that the intervention was implemented as intended and produced meaningful outcomes.

Variables and Measures

The project team constructed identical pre- and post-education surveys to collect demographic information and knowledge-based responses from survey participants. The demographic section of the survey included five questions about each participant’s anesthesia role, the number of years in their current role, their gender, if they spoke a language other than English, and the location for which they are employed. The subsequent portion of both surveys comprised of seven questions assessing the knowledge of survey participants on the policies and procedures set forth by their facility regarding the utilization of interpretive services when encountering an LEP patient. Questions used a yes-no format, with each answer choice assigned a numerical value (yes as one and no as two). Participants were to answer 'yes' if they were aware of policies, procedures, and resources in place for providers to use when encountering an LEP patient in their practice setting. Conversely, participants were to select 'no' if they needed to be informed about these policies, procedures, and resources. The pre- and post-education surveys were identical to evaluate the participants' knowledge of policies, procedures, and resources

before and after the distribution of the educational intervention. The final surveys are digital versions accessible via the SurveyMonkey website. These surveys were developed and validated by committee members and CRNAs before being distributed.

Data Collection Procedure

Both pre- and post-education surveys were sent via mass emails to the anesthesia providers. The link in the email directed the participants to the digital surveys on the SurveyMonkey website. The study site had a group contact on Outlook containing all the anesthesia providers that were currently on staff. Response rates were calculated based on the number of surveys sent and compared to those received that were fully completed. Incomplete survey data was reported but ultimately excluded from the final statistical analysis. The target goal for the response rate was 60%.

The subsequent portion of the post-education surveys requested survey participants to respond to questions, using a yes-no answer format, about the project and their knowledge of the facility's policies and procedures for utilizing interpretative services when encountering an LEP patient. ‘Yes’ responses were scored as ‘1’ while ‘no’ responses were scored as a ‘2.’ Scores from this portion of the surveys were summed to assess respondents' overall awareness of facility policy and procedures. Scores were given to survey facilitators as a spreadsheet of individual answers to each question with the identity of the respondent hidden. The pre-education and post-education surveys were identical to assess the effectiveness of the educational intervention after comparing pre- and post-education surveys.

Data collection spanned over four weeks beginning August 7th, 2023, and ending September 4th, 2023. The project team allowed roughly four weeks to complete the pre-education survey, the educational intervention, and the post-education survey. An email reminder

to complete the surveys and educational module was sent two and three weeks after the original emails were sent. The project team also reminded participants to review the educational intervention via face-to-face interactions. Data was collected through the SurveyMonkey website, negating the necessity for in-person data collection.

Data Management and Security

Each participant was assigned a unique study code (ID) number for data entry, tracking, and analysis. All questionnaires were anonymized and assigned with participant ID. The participant ID associated with the participant's name was stored in a secure IT-created, IRB-approved web-based folder, password-protected and accessible only by project personnel. The consent form included the participant ID number, name, and other identifiers. In addition, only the study ID number was found in the data collection forms (pre and post-tests). All data was stored in a password-protected cloud-based online data storage site. Data by subject ID was entered into a secure database that is password protected and accessible only by project personnel. The only persons who had access to the data are the project personnel, the sponsor of this research, the Institutional Review Board (IRB), and any other persons or agencies required by law. The information from this project was to be published in scientific journals or presented at scientific meetings, but the participants' identities were kept strictly confidential. Both the University and the clinical site have a uniform policy on protecting patient privacy that incorporates all requirements of the HIPAA (the Health Insurance Portability and Accountability Act of 1996) Privacy Rule. The clinical site had a HIPAA compliance training program for all employees and additional training for all employees with access to patient information. The proposed project and research personnel abided by both university and the clinical site ethical policies, including detailed protection of human subjects regarding potential data analysis

(presented in consent). Finally, the participants were provided the alternative not to participate in the study. Data security measures were accomplished via anonymous surveys on SurveyMonkey. Project data did not contain any patient data or information.

Data Process and Evaluation

All surveys sent out were done through the SurveyMonkey platform. Access to the collected information was limited to committee members through this password-protected account. The SurveyMonkey platform is an essential data analysis tool that is intuitive for secure sites but has limited use. After data collection, the information required further analysis through a secondary site, Excel. Before transferring the information for advanced analysis, the committee ensured to remove any duplicate or incomplete surveys.

Data Analysis

All statistical analyses were performed using R (version 4.0.2, R Foundation for Statistical Computing, Vienna, Austria) with a significance level of 0.05 (de Michaeux et al., 2013). Pre-analysis data screening was performed before statistical analysis to examine coding errors, outliers, and data skewness to determine if any data cleaning procedures were needed. Coding errors often occur when the questionnaires are used as assessment tools. The statistician was consulted to reduce coding errors, and statistical procedures were used to recode the study questionnaires. Additionally, the missing data caused by unanswered questions were reviewed for patterns that would introduce bias in the result. We ensured to go back to ask participants to fill out the questionnaires completely. If some data items remained missing, these issues were resolved in consultation with the statistician and significant advisor.

Descriptive statistics (means, standard deviations, median, interquartile range, numbers, percentages, and frequencies) were calculated for all variables. Demographic characteristics

(age, gender, work type, and years of experience of survey participants) of the study population were analyzed as means and standard deviations (SD) for continuous variables and as frequencies and percentages for categorical variables. All statistical tests were 2-tailed. The variables were checked for normality, and the mean and standard deviation were used to measure central tendency since the data are typically distributed.

The $\chi 2$ were performed to describe and compare frequencies. The students t-test were utilized to test for significant differences between pre- and post-survey scores. Pearson's correlation coefficients were used to determine the relationships between key concepts. Univariate and multivariate logistic regression or linear regression analyses were performed to determine the relationships between the pretest and posttest.

Project Timeline

The project topic was finalized in December 2022. A literature review was conducted in March 2023. The proposal defense was successfully completed in April 2023. Following the proposal defense, approvals from both the clinical site and the university Institutional Review Boards were obtained in July 2023. Data collection and intervention took place in August and the first part of September 2023. Data analysis and report generation were finished at the end of September 2023 (Appendix F: a detailed timeline).

Ethical Considerations

This project gathered information surrounding the knowledge of policies and procedures relating to LEP patients. LEP patients are considered a vulnerable population. There was no direct contact with this population in the making of or implementation of this project. LEP patients remained completely separate from the information being collected, and direct interaction with this population was not required.

SECTION IV: RESULTS

Sixty-three potential participants received the recruitment emails. Of these 63, seven were anesthesiologists, 54 were CRNAs, and two were SRNAs. Twenty-six individuals participated by completing both pre- and post-education surveys. Among them, 73.1% were female, and 26.9% were male; 80.8% were CRNA, 11.5% were SRNA, and 7.7% were anesthesiologists. There was varied experience among the survey respondents. About 15.4% of them had 0 to 2 years of experience, 23.1% had 3 to 5 years of experience, 11.5% had 6 to 9 years of experience, and 50.0% had 10 or more years of experience; 11.5% speak a language other than English, while the majority (88.5%) did not speak a second language.

There was significant pretest-posttest difference on question 2 (language service resources) ($\chi^2(1) = 7.24$, $p = .007$); question 4 (language service policy) ($\chi^2(1) = 16.50$, $p < .001$); question 5 (location of policy) ($\chi^2(1) = 10.00$, $p = .002$); and question 7 (documentation policy) ($\chi^2(1) = 28.40$, $p < .001$). There were higher percentages of correct answers on these questions posttest. Overall, the average number of correct answers increased from 3.77 (SD = 1.34) to 6.15 (SD = 0.46), $t = 8.58$, $p < .001$. Table 1 presents the percentage of correct answers for each question.

Demographic variables did not relate to the number of questions answered correctly, at either pretest or posttest, ps > .079.

Table 1: Results

	Pretest (n = 40) % correct	Posttest (n = 37) % correct	p-value
1. I understand that hospital's language assistive services are regulated by Title VI of the Civil Rights Act of 1964.	88.5	100	.234
2. I understand how to initiate language services via three options available within my facility.	69.2	100	.007
3. According to hospital policy, if I speak the preferred language of the patient, I can perform interpretation services to obtain pre-operative consent.	11.5	19.2	.701
4. Do you know when it is appropriate to NOT utilize Hospital-provided language assistive services when communicating with a patient?	46.2	100	< .001
5. I know where to locate the hospital policy on Language Assistance.	61.5	100	.002
6. I know how to locate the information in the EMR that informs you on the patient's language needs.	80.8	100	.060
7. I know how to document the use of language assistance in the EMR.	19.2	96.2	< .001
Total score	3.77 (1.34)	6.15 (0.46)	< .001

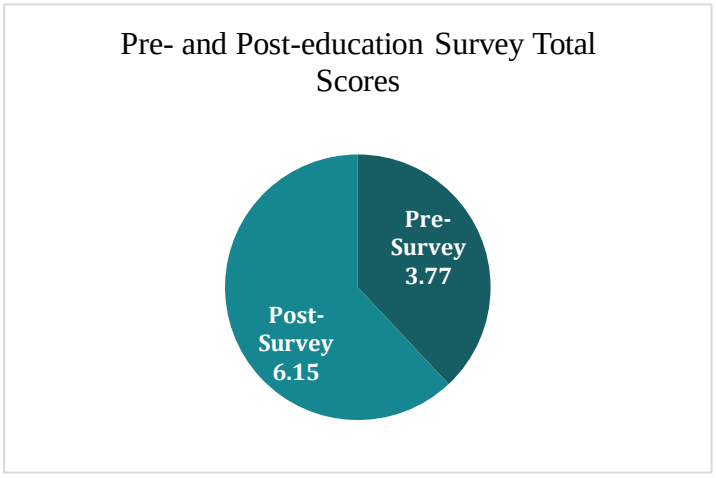

Figure 1: Standard Deviation Comparison of Pre- and Post-Survey Results

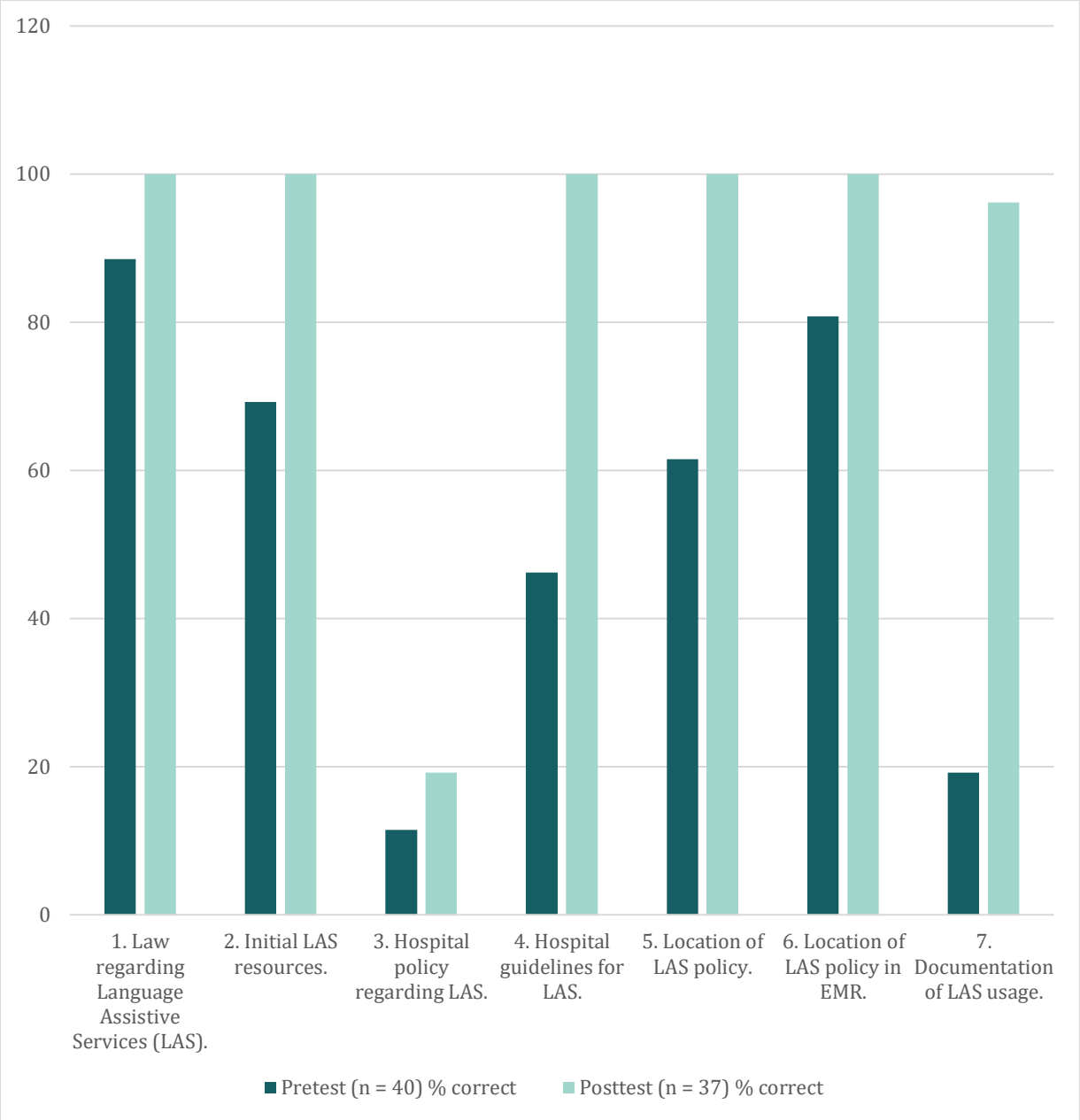

Figure 2: Comparison of Individual Item Scores in Pre- and Post-Education Survey

SECTION V: DISCUSSION

Communication barriers affect the safety, equity, and quality of LEP patients care. The purpose of this study was to examine the effect of a single-session web-based education program on anesthesia providers' awareness of resources, policies, and procedures for language assistance services at a surgical facility in the Southeastern region of the United States. The descriptive analysis indicated varied levels of experience among the anesthesia providers. The majority did not speak a second language other than English. These study findings serve as evidence that a short, simple education module can profoundly impact the anesthesia provider's understanding of resources and policies surrounding language assistance services. Furthermore, the online education was effective in improving anesthesia providers' ability to document the use of language assistance in the electronic medical record (EMR). On the other hand, there was no significant difference between pre- and post-education tests regarding whether the provider who can speak the LEP patient's preferred language can act as the interpreter. Since most providers speak English as their primary language, it is possible they are not familiar with policies specific to those providers who can speak a language other than English. There was also no significant difference between pre- and post-education tests regarding locating patients' language needs on the EMR. It was assumed that most providers knew how to locate a patient's preferred language in the EMR at baseline.

Despite extensive evidence showing that language barriers impact perioperative care, there is little research available that investigates effective strategies to reduce language barriers in patients with LEP. Much of the available literature was conducted in settings such as outpatient offices and the emergency department. Along with that, prior research has put priority emphasis on patient and provider satisfaction surrounding interpretation modality.

Sharpton et al. (2017) is an important resource we used in forming the foundation of our project. Their research emphasized the importance of educating anesthesia providers in an effort to promote equitable communication with LEP patients. With this in mind, we created a project that focused on educating providers with the hope of seeing tangible knowledge growth. The results of our project captured this and showed that education can create changes in communication with LEP patients.

Locatis et al. (2010) is a study that concentrated on the consequences of ad-hoc interpretation. We took evidence from this study and attempted to put emphasis on this type of stand-in interpretation. It is common in our setting to see bilingual teammates and patient families step in to perform interpretation. Whether it be out of convenience or lack of resources, this type of interpretation is detrimental to patients. In our pre-test survey we asked about provider ad-hoc interpretation but saw the least amount of growth between the pre-test and post-test on this question. We did, however, see significant growth when asked about when it's appropriate to *not* utilize certified interpreters for consent (this being during emergencies).

Overall, this project is unique because it's the first to take current hospital policies and resources and educate the anesthesia staff on such. Instead of trying to re-invent ways that we can make our practice more equitable to patients with communication barriers, we decided to focus on what was already available at that facility. This proved to be highly effective as the data demonstrated growth in knowledge between the pre-test and post-test. This project has many current anesthesia and nursing implications as the healthcare setting where we operate becomes more diverse. It is our responsibility as healthcare providers to ensure that every patient we care for receives equal care regardless of how they communicate.

Limitations

There are several limitations in our project. We employed a pretest-posttest study design. The most significant limitation of this type of design is the lack of a control group, potentially introducing bias and threats from confounding factors. Although we were unable to include many important providers' characteristics that could have confounded our outcomes, the providers' characteristics we collected (e.g., gender, years of service, role, and ability to speak a language other than English) were not significantly correlated to the survey scores. As a result, the included demographic data were not accounted for as significant confounders. The study participants were from one urban, large tertiary academic teaching hospital and therefore the findings of the study may not be generalizable to other settings. Our project was conducted with facility-specific resources, policies, and procedures related to language assistance service. Each healthcare facility might have different resources, policies, and procedures, further affecting the generalizability of results. We used a convenient sample with a small size. Our initial goal for survey response rate was greater than 60%. The final response rate was around 40%. The facility where this project was conducted has experienced recent staffing issues and rapid turnover. Because of this, there are limited numbers of full-time staff. This, among other things, contributed to our limited sample size. Finally, our study is limited by measuring the short-term effect of the online education program. Due to feasibility and time constraints, we were unable to assess the long-term effect of the online education program.

Recommendations

After analyzing the results of this project, it is our recommendation that facilities who are trying to increase anesthesia providers adherence to policy and utilization of resources should create and distribute an education module. This module can be guided by a pre-education survey

to see where gaps in knowledge lie. In contrast, the module could simply be created with no prior knowledge of problem areas. Regardless, the material must emphasize approved channels of communication with LEP patients and provide clear instructions on how to utilize these resources.

This project gave an in-depth look at the knowledge gap that anesthesia providers have when it comes to available resources and policies surrounding LEP patients. Many providers make up the anesthesia team, however, depending on the state you work in, pre-operative consent is primarily obtained by an Anesthesiologist. Because of this, future projects could focus efforts on this specific population since they drive the consent process. Along with that we should continue to focus efforts on eliminating ad-hoc interpretation performed by anesthesia providers. Subsequent work should be done that emphasizes the safety concerns that ad-hoc interpretation puts on LEP patients.

CONCLUSION

In conclusion, this project has shown the importance and overall effectiveness of a web-based education module in promoting safe and charitable care for LEP patients. Our results show significant growth between pre-test and post-test knowledge on topics such as understanding of laws, location of policy, and documentation of language assistance needs in the electronic medical record (EMR). Due to limited results, further investigation should be done on the knowledge of appropriate times to utilize ad-hoc interpretation for the pre-operative consent process. Overall, the implications of this project are far-reaching. Understanding how to effectively communicate with LEP patients as an anesthesia provider is a critical step in the direction of increasing equitable care for this population. The operative arena is a fast-paced environment that relies on clear pathways of communication to prevent mistakes from being made. Closed-loop communication should not only apply to those who speak the native language of the providers. It is our hope that the progress made through this project does not stop here, but that change continues to be made based on the results we have presented.

Disclosures:

There was no financial support or funding provided for this project.

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APPENDIX A: PRE-EDUCATION SURVEY

1. Please choose the facility you primarily work at below:
    a. CMC Main
    b. Mercy
    c. Pineville
2. Please select your gender below:
    a. Male
    b. Female
    c. Prefer not to answer
3. Please select the role that describes you best:
    a. CRNA
    b. SRNA
    c. Anesthesiologist
4. How many years of experience do you have at hospital?
    a. 0-2
    b. 3-5
    c. 6-9
    d. 10 and above
5. Do you speak a language other than English?
    a. Yes
    b. No
6. I understand that Hospital ’s language assistive services are regulated by Title VI of the Civil Rights Act of 1964.

   a. Yes
   b. No

7. I understand how to initiate language services via three options available within my facility.
   a. Yes
   b. No
8. According to Hospital policy, if I speak the preferred language of the patient, I can perform interpretation services to obtain pre-operative consent.
   a. Yes
   b. No
9. Do you know when it is appropriate to NOT utilize Hospital provided language assistive services when communicating with a patient?
   a. Yes
   b. No
10. I know where to locate the Hospital policy on Language Assistance.
   a. Yes
   b. No
11. I know how to locate the information on the EMR that informs you on the patient's language needs.
   a. Yes
   b. No
12. I know how to document the use of language assistance on the EMR.
   a. Yes

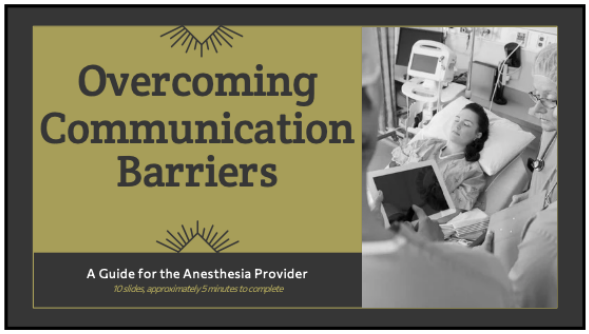
b. No

APPENDIX B: POST-EDUCATION SURVEY

1. I completed the Overcoming Communication Barriers pre-education survey.
    a. Yes
    b. No
2. I understand that Hospital's language assistive services are regulated by Title VI of the Civil Rights Act of 1964.
    a. Yes
    b. No
3. I understand how to initiate language services via three options available within my facility.
    a. Yes
    b. No
4. According to Hospital policy, if I speak the preferred language of the patient, I can perform interpretation services to obtain pre-operative consent.
    a. Yes
    b. No
5. Do you know when it is appropriate to NOT utilize Hospital provided language assistive services when communicating with a patient?
    a. Yes
    b. No
6. I know where to locate the Hospital policy on Language Assistance.
    a. Yes
    b. No

7. I know how to locate the information on the EMR that informs you on the patient's language needs.
    a. Yes
    b. No
8. I know how to document the use of language assistance on the EMR.
    a. Yes
    b. No

APPENDIX C: EXAMPLE EDUCATION



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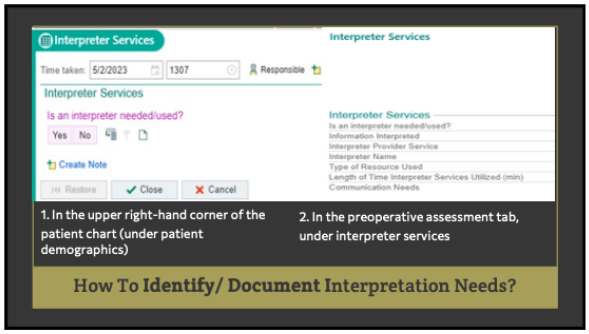

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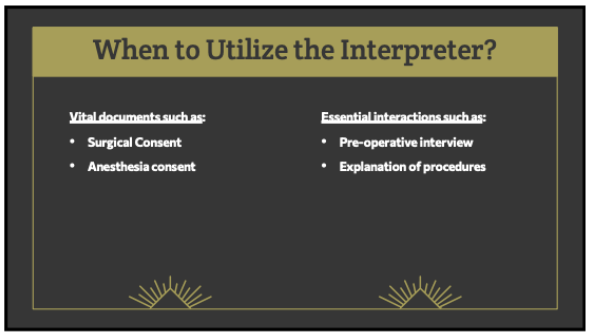

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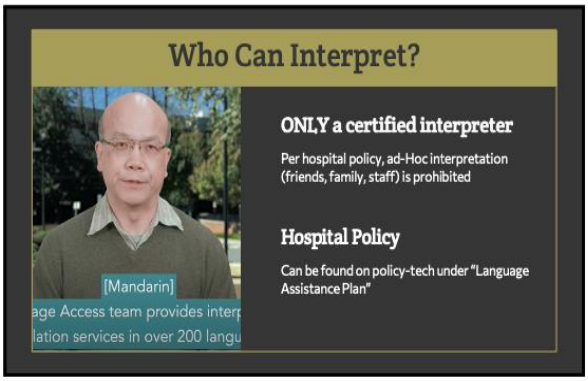
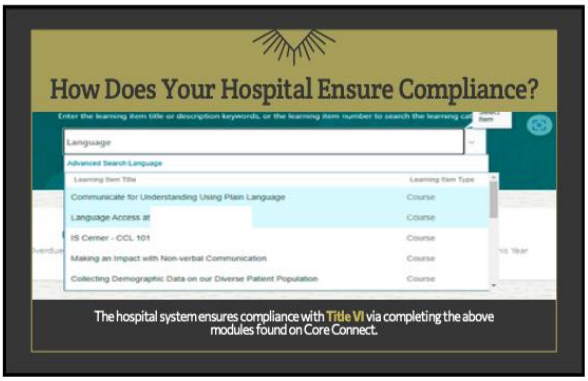
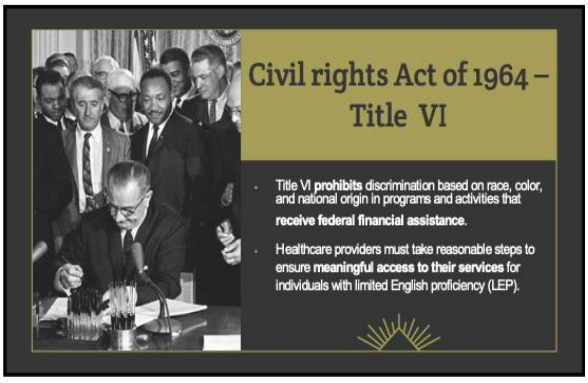

Who Can Interpret?
[Mandarin]
ONLY a certified interpreter
Per hospital policy, ad-Hoc interpretation (friends, family, staff) is prohibited
Hospital Policy
Can be found on policy-tech under "Language Assistance Plan"

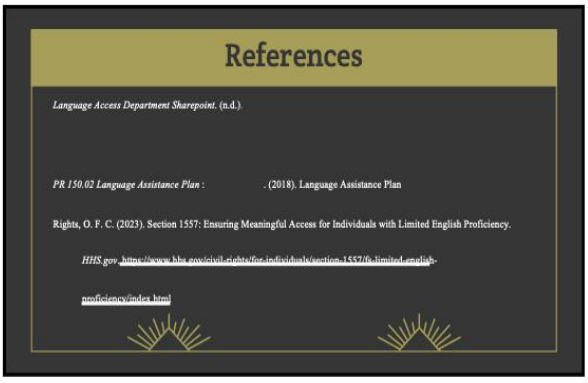
5


How Does Your Hospital Ensure Compliance?
Language
Advanced Search Language
Communicate for Understanding Using Plain Language
Language Access at
IS Cerner - CCL 101
Making an Impact with Non-verbal Communication
Collecting Demographic Data on our Diverse Patient Population
Course
The hospital system ensures compliance with Title VI via completing the above modules found on Core Connect.

6


Civil rights Act of 1964 – Title VI
Title VI prohibits discrimination based on race, color, and national origin in programs and activities that receive federal financial assistance.
Healthcare providers must take reasonable steps to ensure meaningful access to their services for individuals with limited English proficiency (LEP).

7


References
Language Access Department Sharepoint. (n.d.).
PR 150.02 Language Assistance Plan : . (2018). Language Assistance Plan
Rights, O. F. C. (2023). Section 1557: Ensuring Meaningful Access for Individuals with Limited English Proficiency.
HHS.gov. https://www.hhs.gov/civil-rights/for-individuals/section-1557/fs-limited-english-proficiency/index.html

8

APPENDIX D: IRB APPROVAL- UNCC

CHARLOTTE
DIVISION OF RESEARCH

To:	Taylor Martin University of North Carolina at Charlotte
From:	Office of Research Protections and Integrity
Approval Date:	25-Jul-2023
RE:	Notice of Determination of Exemption
Exemption Category:	1
Study #:	IRB-23-1071
Study Title:	Communication Barriers

This submission has been reviewed by the Office of Research Protections and Integrity (ORPI) and was determined to meet the Exempt category cited above under 45 CFR 46.104(d). This determination has no expiration or end date and is not subject to an annual continuing review. However, you are required to obtain approval for all changes to any aspect of this study before they can be implemented and to comply with the Investigator Responsibilities detailed below.

Your approved consent forms (if applicable) and other documents are available online at Submission Page.

Investigator's Responsibilities:

1. Amendments **must** be submitted for review and the amendment approved before implementing the amendment. This includes changes to study procedures, study materials, personnel, etc.
2. Researchers must adhere to all site-specific requirements mandated by the study site (e.g., face mask, access requirements and/or restrictions, etc.).
3. Data security procedures must follow procedures as described in the protocol and in accordance with OneIT Guidelines for Data Handling.
4. Promptly notify the IRB office (uncc-irb@charlotte.edu) of any adverse events or unanticipated risks to participants or others.
5. Five years (5) following this approval/determination, you must complete the Admin-Check In form via Niner Research to provide a study status update.
6. Be aware that this study is included in the Office of Research Protections and Integrity (ORPI) Post-Approval Monitoring program and may be selected for post-review monitoring at some point in the future.
7. Reply to the ORPI post-review monitoring and administrative check-ins that will be conducted periodically to update ORPI as to the status of the study.
8. Complete the Closure eform via Niner Research once the study is complete.

APPENDIX E: IRB APPROVAL- WAKE FOREST

WAKE FOREST
UNIVERSITY
HEALTH SCIENCES

The Wake Forest School of Medicine IRB is duly constituted, has written procedures for initial and continuing review of clinical trials; prepares written minutes of convened meetings, and retains records pertaining to the review and approval process; all in compliance with requirements of FDA regulations 21 CFR Parts 50 and 56, HHS regulations 45 CFR 46, and International Conference on Harmonisation (ICH) E6, Good Clinical Practice (GCP), as applicable. WFSM IRB is registered with OHRP/FDA; our IRB registration numbers are IRB00000212, IRB00002432, IRB00002433, IRB00002434, IRB00008492, IRB00008493, IRB00008494, and IRB00008495.
WFSM IRB has been continually fully accredited by the Association for the Accreditation of Human Research Protection Programs (AAHRPP) since 2011.

APPENDIX F: PROJECT TIMELINE

☐	December 2022	Topic Proposal
☐	January- March 2023	Literature Review
☐	April 2023	Oral Defense
☐	May-August 2023	Wake Forest School of Medicine and University of North Carolina at Charlotte IRB approval
☐	August 7th 2023	Initial survey distribution
☐	August 21st - 2023, August 28th 2023	Reminder emails sent
☐	September 4th 2023	Survey closed
☐	September 5th 2023	Raw data sent to statistician
☐	October 6th 2023	Begin data analysis
☐	November 3rd 2023	Final scholarly paper returned to committee
☐	November 17th 2023	Deadline for scholarly committee to accept completed project
☐	December 1st 2023	Defend scholarly project to committee
☐	To Be Determined	Public Dissemination of Results