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

by

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ABSTRACT

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

Background: Patients who have limited proficiency in English (LEP) face significant communication challenges in perioperative settings. These obstacles range from difficulties in understanding anesthesia-related information to obtaining informed consent. These language-based barriers result in a decreased quality of care, lower patient satisfaction, and a heightened risk of adverse healthcare outcomes.

Purpose: The goal of this study is to determine if a web-based educational program can enhance anesthesia providers' knowledge of available resources, policies, and procedures for LEP patients.

Methods: We conducted a quasi-experimental study with a pre- /post-test design. The study was conducted in a surgical center located in the southeastern region of the United States. A digital survey was given before and after the online education intervention. The effect of web-based education was examined by comparing the differences between the pre- and post-education survey scores.

Results: In this study, 40 participants were predominantly female (65%), including 87.5% CRNAs and 12.5% anesthesiologists. A significant improvement in knowledge was observed in the post-education survey score. The average number of correct answers increased from 3.78 (SD = 1.61) to 5.89 (SD = 0.84), $t = 8.69$, $p < .001$. Demographic factors did not significantly impact question accuracy at the pretest or posttest. These findings underscore the educational program's effectiveness in enhancing anesthesia providers' knowledge across diverse professional and demographic groups.

Conclusion: The web-based educational program significantly improved anesthesia providers' knowledge of resources, policies, and procedures for LEP patients.

Keywords: Limited English Proficiency (LEP), Anesthesia Providers, Web-Based Learning

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DEDICATION

This scholarly project is dedicated to my mother, Doralice, a woman of immense strength and perseverance. Mom, you have demonstrated that any obstacle can be overcome if one sees the opportunity and lesson in everything God sends us. Your light heart and ever-present smile in the face of challenges inspire me daily. I am endlessly grateful for every second you have spent guiding me through life, for my success is undeniably rooted in your unwavering support. Nothing could have been accomplished without your focus and encouragement. Thank you for instilling in me my pride and love for our Hispanic heritage. I promise to lead a life dedicated to breaking down barriers, mentoring others, and opening possibilities for those who follow. ¡Gracias, madre mía, te amo y aprecio tanto!

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LIST OF ABBREVIATIONS

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

CHAPTER 1: INTRODUCTION

Background

One of the most critical aspects of delivering high-quality patient care was ensuring effective communication. Clear and effective communication during the pre-operative evaluation could help improve rapport, reduce patient anxiety, and improve the patient's overall experience. It was also vital in avoiding surgical delays, preventing complications, and improving surgical outcomes (Joo et al., 2023). Growing numbers of surgical patients exhibited 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 contributed to the increased risks of adverse events, undesired patient experiences, and reduced quality of patient education, leading to poor surgical outcomes (Lee et al., 2017). To avoid preventable complications and improve the quality of care, the Affordable Care Act (ACA) mandated 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 stated that failure to provide appropriate interpreter services could 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 that govern high-quality care for patients with LEP, many anesthesia providers need to gain knowledge and awareness of these regulations and policies. They also needed to learn how to access available hospital resources, services, and established procedures designed to assist them in providing care for LEP patients. This project investigated 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 to promote transparent and compelling interactions between anesthesia providers and LEP patients. The primary question addressed in this study was whether a single-session web-based module effectively improved anesthesia providers' awareness of resources, policies, and procedures for language services for patients with LEP compared to the current education processes. The long-term goal was to empower 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, ultimately improving the quality of care and ensuring the equity and safety of LEP patients.

CHAPTER 2: LITERATURE REVIEW

Background and Significance

Per Diamond et al. (2019), about 21.6% of the U.S. population, or almost 66 million people, spoke a language other than English at home. This number had nearly tripled since 1980, when only 23.1 million people spoke a language other than English at home. Over 300 languages were spoken in North Carolina. Studies have shown 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 had experienced 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 decreased the quality and satisfaction of care and healthcare outcomes and increased 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 were doing what was suitable for the patient and improving the quality of care they provided. Appropriately using interpretive services ensured an open, two-way communication road. It allowed LEP patients to understand the intricacies of the care they received 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 could confirm that they were not sacrificing quality care.

Impacts LEP on Care Quality, Safety, and Equity

There was 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 included 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), and 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 had to 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 increased medical errors and compromised safety, legality, and policy (Nápoles et al., 2015). The primary reason for using untrained interpreters was the lack of awareness to access the certified interpreter (Hudelson et al., 2009). Satisfaction of care, favorable outcomes, and equity in care were much more feasible when language congruency between the patient and provider occurred (Weech-Maldonado et al., 2008). Professional interpreters helped increase LEP patients' autonomy through well-informed education and rights. Professional interpreters could 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 implementation of empathic tools (Gutierrez et al., 2019; Wu et al., 2017).

To reduce healthcare disparities and provide equitable care among LEP patients, it was critical to educate anesthesia providers about the proper use and access to interpretive service for LEP patients, which prepared them to evaluate the 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 highlight the need for more awareness and knowledge among anesthesia providers to use professional interpretive services properly. Adequate education of anesthesia providers could increase awareness of this critical issue. When performing education in our project, it was essential to emphasize the risk of using non-certified interpreters.

Areas Improved by Proper Utilization of Interpretive Services

Quality

Many anesthesia providers underutilized interpretive services they had direct access to and were 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 led to decreased quality of care provided by anesthesia providers. Brooks et al. (2016), a study in which focus groups of LEP patients were surveyed, suggested that the quality of care would be improved if more certified interpreters were accessible. This information showed that our project should highlight proper resource utilization and timing of interpretive services in our educational material.

Similarly, Sharpton et al. (2017) added that education in anesthesia departments was 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 suggested several false impressions by both departments might 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 did, and why the service was 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) pointed out that facilities that received federal funding were in direct violation of federal law when insufficient care was 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 was patient satisfaction improved when using a certified interpreter, but overcoming an LEP patient's difficulty communicating with healthcare staff could 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). By providing thorough education to anesthesia providers on the importance of adequately utilizing interpretive services and the available resources, the education intervention could have the long-term effect of decreasing costs to the healthcare facility.

Safety & Provider Satisfaction

Wu et al. (2017) described how professional medical interpreters could "help prevent adverse events involving patients with LEP." They did 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 unity between proper interpretation and patient safety.

Informed consent was an essential factor we wanted to educate our project participants on. Per Hospital Policy, obtaining informed consent on an LEP patient had to 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 played a role in compromising safety, legality, and policy. These were people who spoke the native language of the patient (family, providers, etc.) but were not professionally certified to do so. This was described by Nápoles et al. (2015) through their cross-Chapteral 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 were 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 (patients' families 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 had 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 "experienced challenges accessing health care and were 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 faced barriers to care in general, but there were language and regional differences in their care assessments." This presented that satisfaction of care, favorable outcomes, and equity in care were much more feasible when language congruency between the patient and provider occurred.

Another problem, as described by Bischoff et al. (2010), was that more than the availability of professional interpretation was needed to guarantee its use. Inequity became the standard of care if this continued to prevail in healthcare. Most respondents from this study found professional interpreters helped with "increasing patients' autonomy (80%) and by ensuring that immigrants were generally well informed (80%) and knew 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 led to a disconnect since the "technology directed their speech to the interpreter, not each other" (Locatis et al., 2010, p. 346). Furthermore, telephone interpretation was highly dissatisfactory for both parties since it took longer to set up, and "the significantly shorter phone interviews raised 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 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 recorded patients' interpreter needs, which could significantly reduce waiting time as an interpreter could 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 indicated the need for professional interpretation for informed consent throughout hospitalization. We have seen a rise in professional interpreter use for informed consent since it was both a "fundamental and legal obligation for clinicians" (Lee et al., 2017). However, there was a need to improve upon culturally shifting and continuing education on why interpretation was required throughout the patient experience in the hospital. These hurdles must be overcome before we see enough significant change to reduce the disparity in LEP patient care.

Gutierrez et al. (2019) expanded on this topic, which "highlighted the importance of viewing medical interpreters as more than invisible conduits of information" to optimize the LEP patient and provider experience. When professional interpreters were acknowledged as more than word-for-word interpreters, they could shift from a limited role to one that was culturally sensitive, facilitated understanding, and implemented several empathic tools.

Intervention to Enhance Knowledge of Existing Interpretive Service

While many anesthesia providers may have understood the importance of being able to communicate with patients who experienced language communication barriers adequately, many anesthesia providers needed 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 was a lack of awareness of the proper use of interpretive services; they stated that this could 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 were 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 was essential. As Sharpton et al. (2017) pointed out, anesthesia departments could benefit from education on interpretive services to enhance care quality and improve communication with patients with language barriers. Creating an educational intervention to enhance the knowledge of existing interpretive services would have been mutually beneficial for providers and patients. Enhancing the anesthesia providers' knowledge through educational intervention is an excellent opportunity to provide safer, more equitable, and higher-quality care. The benefits above were stripped from the care of patients with language communication barriers by allowing current practices to become a standard of deviance.

Conceptual /Theoretical Framework

The SPO model was an essential concept for the quality of healthcare services. The structure, process, and outcome were the basis for this concept to ensure all quality aspects were met. This model allowed for the efficient and effective evaluation of given healthcare services. The SPO model improved communication barriers among anesthesia providers and patients across Level 1 Trauma Center facilities for this quality improvement project. 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 patients with limited English proficiency (LEP).

CHAPTER 3: METHODOLOGY

Project Design

This quality improvement project utilized a quantitative, quasi-experimental project with a pretest-posttest study design. The study was conducted in a Level I 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 the 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 included the board-certified anesthesia providers. 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 sustained exposure to resources and policies.

Setting

The project occurred within a surgical center associated with a comprehensive healthcare system in the southeastern region of the United States. The health system was the largest hospital in the region, boasting a world-class facility that offered a comprehensive range of services. With over 1,100 specialized physicians and providers covering all areas of medicine, it stood as the region's only Level 1 trauma center. Additionally, it was an approved transplant center for heart, kidney, pancreas, and liver procedures. The entire health system, including the associated surgical center, also operated as one of five teaching facilities, providing residency training for

more than 200 physicians across 15 specialties. The surgical center boasted a proficient team of surgeons delivering comprehensive care within a multidisciplinary team setting. All board-certified surgical and anesthesia providers had undergone sub-specialty training in various areas, including general, acute care surgery, and surgical critical care in cardiac and vascular conditions. The study site comprised 46 operating rooms, multiple catheterization labs, and non-OR anesthesia (NORA) sites, which included interventional radiology, CT, and endoscopy suites. Each operating room was capable of handling between 1 and 5 cases daily. This surgical center could handle the most extensive surgeries, including those involving trauma and patients with higher ASA statuses. The facility employed 158 Certified Registered Nurse Anesthetists (CRNAs) and 30 adult non-OB anesthesiologists who collaboratively provided perioperative care. Daily staffing typically included approximately 60 CRNAs and 20 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 remained indefinitely accessible. The educational intervention was designed to help anesthesia providers gain quick and easy access to the resources needed to facilitate seamless patient encounters with LEP patients and 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 included: 1) resource links to the hospital system's web pages related to language services; 2) health facility-specific policies and procedures regarding providing language services to LEP patients. The exhibition highlighted the appropriate steps when encountering an LEP patient 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 content validity of the education intervention was established by the dissertation committee members who had 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 be accessed via a laptop, computer, smartphone, or tablet with an internet connection.

The following strategies were used to enhance and maintain the intervention fidelity. We developed a clear and detailed intervention protocol for a study design that outlined specific education components and expected outcomes. We provided standardized education materials that aligned with the intervention protocol. To improve the intervention fidelity, all team members participated in training to develop online surveys and web-based education modules. To ensure delivery and receipt, we regularly monitored 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, provided guidance on accessing the web-based learning module, and identified areas needing further clarification. For enactment, we included handouts to encourage participants to apply the knowledge and skills they had gained from the intervention. By addressing these components in the design, training, delivery, receipt, and enactment stages of the educational intervention, we tried 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 chapter 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 where they were employed. The subsequent portion of both surveys comprised 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, assigning each answer choice a numerical value (yes as one and no as two). Participants were to answer 'yes' if they were aware of policies, procedures, and resources 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 distributing the educational intervention. The final surveys were 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 to the anesthesia providers via mass emails. 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 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 about the project using a yes-no-answer format 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’ were scored as ‘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 respondents' identities 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 four weeks, beginning August 7th, 2023, and ending September 4th, 2023. The project team allowed for 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 were 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. The university and the clinical site had a uniform policy on protecting patient privacy that incorporated 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 the university and the clinical site's 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. The project data did not contain any patient data or information.

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 Micheaux, Drouilhet, & Liquet, 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 occurred when the questionnaires were 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 results. We ensured that participants were asked to complete the questionnaires thoroughly. If some data items remained missing, these issues were resolved in consultation with the statistician and a 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 were typically distributed.

The $\chi 2$ tests were performed to describe and compare frequencies. The Student t-tests 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 completed in April 2023. Following the proposal defense, approvals from the clinical site and the university Institutional Review Boards were obtained in July 2023. Data collection and intervention occurred 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).

CHAPTER 4: SURVEY RESULTS

Sample Characteristics

Forty individuals participated in this study. Among them, 65.0% were female, 32.5% were male, and 2.5% did not report their gender; 87.5% were CRNA, and 12.5% were anesthesiologists; 37.5% had 0 to 2 years of experience, 30.0% had 3 to 5 years of experience, 2.5% had 6 to 9 years of experience, and 30.0% had ten or more years of experience; 20.0% speak a language other than English, while 80.0% did not speak a second language.

There was significant pretest-posttest difference on question 2 ($\chi^2(1) = 16.30$, $p < .001$); question 4 ($\chi2(1) = 11.40$, $p < .001$); question 5 ($\chi^2(1) = 21.50$, $p < .001$); question 6 ($\chi^2(1) = 5.16$, $p = .023$); and question 7 ($\chi^2(1) = 30.20$, $p < .001$). There were higher percentages of correct answers on these questions in the post-test. Overall, the average number of correct answers increased from 3.78 (SD = 1.61) to 5.89 (SD = 0.84), $t = 8.69$, $p < .001$. 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, $ps > .096$.

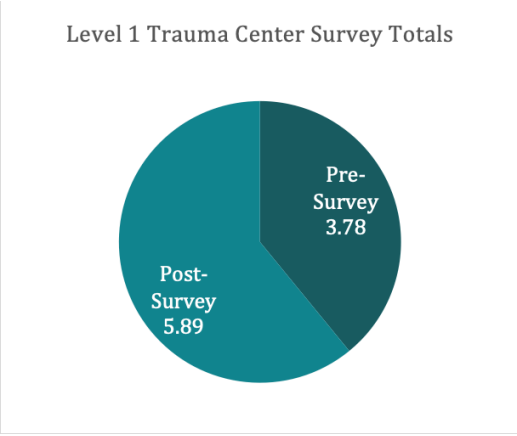

Figure 1 Standard Deviation Comparison of Pre-Survey to Post-Survey Results

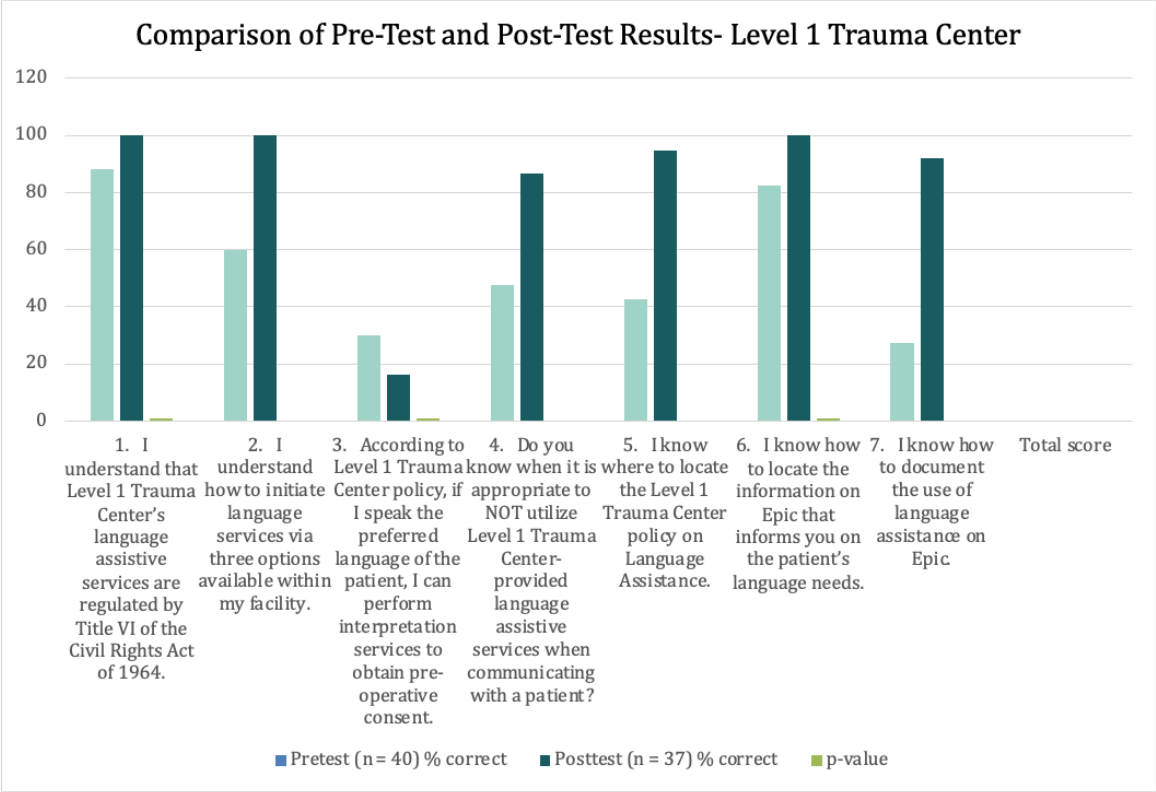

Figure 2 Breakdown of Survey Questions Comparing Pre-Test to Post-Test.

Survey Results

Table 1. Pretest and posttest comparison for each question and total score

	Pretest (n = 40) % correct	Posttest (n = 37) % correct	p-value
1. I understand that Hospital Policy is regulated by laws regarding Language Assistive Services (LAS).	88.0	100	.078
2. I understand how initiate LAS resources via three options available within my facility.	60.0	100	< .001
3. According to Hospital policy, if I speak the preferred language of the patient, I can perform interpretation services to obtain pre-operative consent.	30.0	16.2	.247
4. Do you know when it is appropriate to NOT utilize Hospital guidelines for LAS when communicating with a patient?	47.5	86.5	< .001
5. I know where to locate the LAS policy	42.5	94.6	< .001
6. I know how to locate LAS policy in the EMR that informs you on the patient's language needs.	82.5	100	.023
7. I know how to document LAS usage on EMR.	27.5	91.9	< .001
Total score	3.78 (1.61)	5.89 (0.84)	< .001

Note. p-values for the individual questions were based on chi-squared tests. The p-value for testing total score difference was based on paired t-test.

Distributing educational materials and conducting subsequent surveys among Level 1 Trauma Center anesthesia personnel, consisting of approximately 164 Certified Registered Nurse Anesthetists (CRNAs) and 73 Medical Doctor Anesthesiologists (MDAs), played a pivotal role in tackling language communication barriers in the healthcare setting. Out of this diverse group, responses were received from 35 CRNAs and 5 MDAs, with two individuals unspecified in their profession, and five incomplete surveys, totaling 40 completed surveys.

Analysis of participant demographics revealed that most were English-speaking CRNAs, with a significant portion having 3 to 5 years or over 10 years of experience. The examination of pretest-posttest results demonstrated noteworthy advancements in knowledge, particularly in key areas related to language communication barriers. Participants exhibited an improved understanding of initiating interpretive services (question 2), documenting language assistance on Epic (question 7), and locating hospital policies regarding language services (question 5). These enhancements underscore the positive impact of the educational materials on raising awareness and knowledge concerning language communication barriers.

The successful knowledge increase observed in the pretest-posttest results can be attributed to the targeted implementation of educational materials within the anesthesia department. This educational intervention effectively equipped anesthesia personnel with essential tools to navigate language communication barriers in healthcare, addressing critical aspects such as initiation, documentation, and policy awareness. The engagement of CRNAs and MDAs in the survey ensures a comprehensive understanding of the impact of language communication barriers across different roles and experience levels within the anesthesia team.

In conclusion, the strategic deployment of educational materials, accompanied by a thoughtful survey process, has proven instrumental in enhancing the knowledge of Level 1

Trauma Center anesthesia personnel regarding language communication barriers. The positive outcomes observed underscore the efficacy of targeted educational interventions in addressing specific challenges within healthcare settings. This success not only showcases the dedication of anesthesia personnel to continuous learning but also represents a significant step forward in improving communication and, consequently, patient care within the diverse linguistic landscape of healthcare.

CHAPTER 5: DISCUSSION

Communication barriers affected LEP patient care's safety, equity, and quality. 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. The study findings served as evidence that a short, simple education module could profoundly impact the anesthesia provider's understanding of resources and policies surrounding language assistance services.

Furthermore, online education effectively improved 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 spoke English as their primary language, they might have been unfamiliar with policies specific to those providers who could speak a language other than English. There was also no significant difference between pre-and post-education tests regarding the law and regulations of language assistive services provided in all healthcare settings.

Implication for Practice

Despite extensive evidence showing that language barriers impact perioperative care, little research is available that investigates effective strategies to reduce language barriers in patients with LEP. This study held significant implications for enhancing patient care quality within the anesthesia setting, particularly in addressing language communication barriers. The identified issue revolved around the limited awareness among anesthesia providers regarding

hospital policies and available resources for overcoming language barriers. With the increasing cultural diversity in the southeastern area of the United States and the multitude of languages spoken, the potential for miscommunication and compromised patient care was substantial. This study was vital as it sought to bridge this gap by evaluating the impact of centralizing education and resources on anesthesia providers' awareness of policies and procedures related to language communication barriers. The study aimed to improve the equity, safety, and overall quality of care for Limited English Proficiency (LEP) patients by empowering providers with knowledge of accessing language services and aligning with hospital policies. Ultimately, the research addressed a critical aspect of healthcare communication, offering insights that could lead to more inclusive and patient-centric anesthesia practice, contributing to safer preoperative interactions and informed consent processes.

Language communication barriers in healthcare were a significant issue, especially in anesthesia settings, affecting patients with limited English proficiency (LEP). Studies revealed that LEP patients faced a high prevalence of communication difficulties, resulting in poor health outcomes, increased risks of errors, and compromised patient safety. The improper use of interpretive services was often linked to decreased quality of care, illustrating the importance of professional interpreters in enhancing patient autonomy and facilitating effective communication. The literature strongly advocates educating anesthesia providers to use interpretive services appropriately and addressing issues such as translational errors, suboptimal care, and disparities to improve patient-provider interactions and healthcare outcomes. Our study showed significant improvements in post-test scores following an intervention targeting communication barriers. Participants showed an enhanced understanding of initiating language services, appropriate utilization of language assistive services, and knowledge of institutional

policies and documentation practices. The findings highlighted the success of the intervention in addressing communication barriers within the healthcare setting, marking positive strides toward improved patient care and provider awareness.

Strengths

Our study successfully implemented existing literature recommendations, particularly emphasizing the role of education in enhancing the awareness of hospital personnel to utilize interpretive services effectively and consistently. A thorough literature review revealed that individuals with limited English proficiency often received suboptimal care during hospitalization due to misconceptions surrounding language services, reliance on ad hoc interpreters, and pressures related to hospital production. This led to a notable disconnect in the quality, safety, and equity of care provided to limited-English proficiency patients. In response, our study heeded the literature's call for hospital-wide education to dispel misconceptions about language services, clarify hospital and legal policies, and drive a transformative shift in how anesthesia providers cater to patients with limited English proficiency.

This quality improvement project was the first within the hospital system and was among the few documented in the literature explicitly targeting anesthesia providers. The positive outcomes of the educational implementation were noteworthy, contributing significantly to reshaping the broader narrative. This underscored the pivotal role of education in elevating the quality, safety, and equity of care for patients with limited English proficiency. In doing so, our study aligned with existing literature. It established a valuable precedent within the hospital system, allowing continued improvements in addressing the unique needs of limited-English proficiency patients.

Limitations

Our study has notable limitations that warrant consideration. The predominant participation of Certified Registered Nurse Anesthetists (CRNAs) over Medical Doctor Anesthesiologists (MDAs) raises concerns about the generalizability of our findings to the broader anesthesia provider population. The small sample size further restricts the applicability of our results to the larger population of healthcare professionals. Additionally, the presentation of survey questions, particularly those addressing awareness of hospital policies prohibiting bilingual employees from interpreting for legal consent, was narrow and could have benefited from more comprehensive elaboration to capture a more nuanced understanding. These limitations underscore the need for caution in interpreting and applying the results, emphasizing the potential for bias in the observed outcomes and suggesting avenues for improvement in future research endeavors.

Recommendation

Several recommendations are proposed to enhance the robustness and generalizability of future research on language communication barriers among anesthesia providers. Firstly, obtaining a larger and more diverse sample size would contribute to more representative findings. Efforts should be made to encourage greater participation from medical doctor anesthesiologists (MDAs) to ensure a balanced representation of different provider types. Additionally, research should delve into barriers unique to CRNAs compared to MDAs regarding the consistent utilization of language services for every patient encounter involving limited English proficiency (LEP) patients. It is crucial to explore the impact of biases among anesthesia providers and their role in hindering the consistent use of language services. Furthermore, addressing the observed reliance and interdependence between MDAs and CRNAs

in utilizing language services is paramount. This may involve emphasizing the importance of each provider independently utilizing language services for every patient interaction to establish and maintain a strong provider-patient bond, a fundamental aspect of anesthesia care.

Conclusion

In conclusion, the survey results highlighted the positive impact of a targeted web-based education program on anesthesia providers' awareness of language assistance services and policies. The study, involving 40 participants, predominantly CRNAs, demonstrated a significant improvement in knowledge, particularly in language assistance services, policy awareness, and documentation. This educational intervention's success underscored the potential of centralized education and resources in addressing communication barriers within healthcare, ultimately improving equity, safety, and quality of care for Limited English Proficiency (LEP) patients.

The study's implications for practice emphasized the importance of addressing language communication barriers in healthcare, particularly in anesthesia settings, to enhance patient safety and the quality of care. While the study had strengths, such as its alignment with existing literature and establishing a valuable precedent, it also had limitations, including the need for a more diverse sample and broader participation from different provider types. Addressing biases among anesthesia providers and promoting independent language service utilization for every patient interaction are essential to improving patient care and communication in linguistically diverse healthcare settings.

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APPENDIX A: PRE-EDUCATION SURVEY

1. Please choose the facility you primarily work at below:
    a. Level 1 Trauma Center
    b. Level 3 Center
    c. Level 2 Center
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 Level 1 Trauma Center?
    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 Level 1 Trauma Center'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 Level 1 Trauma Center 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 Level 1 Trauma Center provided language assistive services when communicating with a patient?
   a. Yes
   b. No
10. I know where to locate the Level 1 Trauma Center policy on Language Assistance.
   a. Yes
   b. No
11. I know how to locate the information on Epic 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 Epic.
   a. Yes

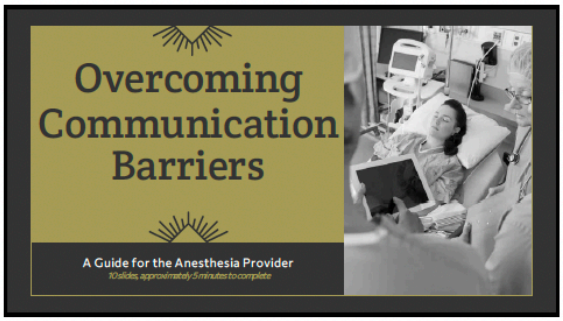
b. No

APPENDIX B: POST-EDUCATION SURVEY

1. I completed the Overcoming Communication Barriers pre-education survey.
    a. Yes
    b. No
2. I understand that Level 1 Trauma Center'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 Level 1 Trauma Center 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 Level 1 Trauma Center provided language assistive services when communicating with a patient?
    a. Yes
    b. No
6. I know where to locate the Level 1 Trauma Center policy on Language Assistance.
    a. Yes
    b. No

7. I know how to locate the information on Epic 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 Epic.
    a. Yes
    b. No

APPENDIX C: EXAMPLE EDUCATION



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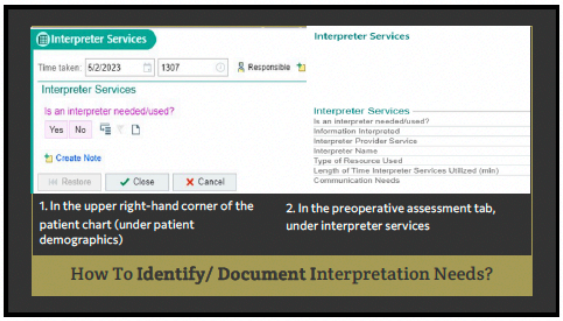

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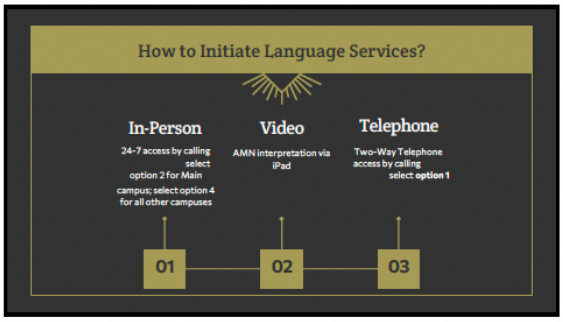

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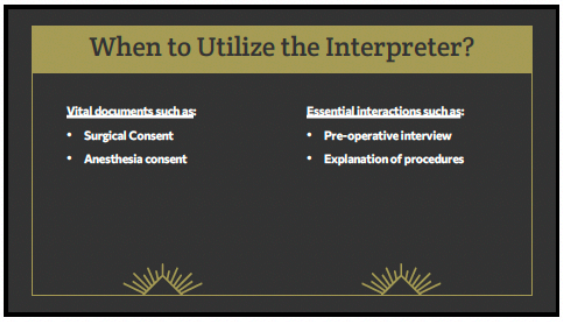


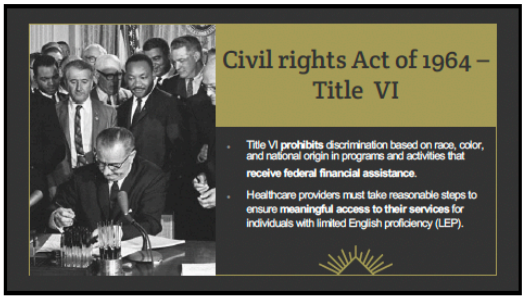
4


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"

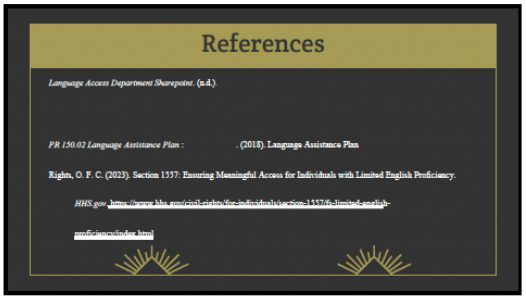
5


How Does Your Hospital Ensure Compliance?
Language
Advanced Search: Language
Learning Item Title
Learning Item Type
Communicate for Understanding Using Plain Language
Course
Language Access at
Course
IS Cerner - CCL 101
Course
Making an Impact with Non-verbal Communication
Course
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.

8

APPENDIX D: IRB APPROVAL - UNIVERSITY OF NORTH CAROLINA AT CHARLOTTE

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

Office of Research
INSTITUTIONAL REVIEW BOARD

MEMORANDUM

To: Lorraine Schoen
Atrium/Carolinas Healthcare System

From: Jeannie Sekits, Senior Protocol Analyst
Institutional Review Board

Date: 7/18/2023

Subject: Exempt Protocol: IRB00098114
Quality Improvement Project to Address Communication Barriers in LEP Patients

No protected health information will be used or disclosed in this research proposal; therefore the requirement for individual Authorization does not apply.

Note that only the Wake Forest University School of Medicine IRB can make the determination for its investigators that a research study is exempt. Investigators do not have the authority to make an independent determination that research involving human subjects is exempt. Each project requires a separate review and approval or exemption. The Board must be informed of any changes to this project, so that the Board can determine whether it continues to meet the requirements for exemption.

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