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ORIGINAL RESEARCH

Increased Access to Professional Interpreters in the Hospital Improves Informed Consent for Patients with Limited English Proficiency

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BACKGROUND: Language barriers disrupt communication and impede informed consent for patients with limited English proficiency (LEP) undergoing healthcare procedures. Effective interventions for this disparity remain unclear.

OBJECTIVE: Assess the impact of a bedside interpreter phone system intervention on informed consent for patients with LEP and compare outcomes to those of English speakers.

DESIGN: Prospective, pre-post intervention implementation study using propensity analysis.

SUBJECTS: Hospitalized patients undergoing invasive procedures on the cardiovascular, general surgery or orthopedic surgery floors.

INTERVENTION: Installation of dual-handset interpreter phones at every bedside enabling 24-h immediate access to professional interpreters.

MAIN MEASURES: Primary predictor: pre- vs. post-implementation group; secondary predictor: post-implementation patients with LEP vs. English speakers. Primary outcomes: three central informed consent elements, patient-reported understanding of the (1) reasons for and (2) risks of the procedure and (3) having had all questions answered. We considered consent adequately informed when all three elements were met.

KEY RESULTS: We enrolled 152 Chinese- and Spanish-speaking patients with LEP (84 pre- and 68 post-implementation) and 86 English speakers. Post-implementation (vs. pre-implementation) patients with LEP were more likely to meet criteria for adequately informed consent (54% vs. 29%, $p = 0.001$) and, after propensity score adjustment, had significantly higher odds of adequately informed consent (AOR 2.56; 95% CI, 1.15–5.72) as well as of each consent element individually. However, compared to post-implementation English speakers, post-implementation patients with LEP had significantly lower adjusted odds of adequately informed consent (AOR, 0.38; 95% CI, 0.16–0.91).

CONCLUSIONS: A bedside interpreter phone system intervention to increase rapid access to professional interpreters was associated with improvements in patient-reported informed consent and should be considered by hospitals seeking to improve care for patients with LEP; however, these improvements did not eliminate the language-based disparity. Additional clinician educational interventions and more language-concordant care may be necessary for informed consent to equal that for English speakers.

KEY WORDS: limited English proficiency; informed consent; medical interpreters; physician-patient relations; communication barriers; language access.
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Informed consent for invasive healthcare procedures is a fundamental ethical and legal obligation for clinicians.[1] Clear communication is essential for clinicians to accurately convey the purpose, risks, benefits and alternatives of a procedure to enable informed decision making and ensure patient safety.[2] Over 25 million people in the US speak English "less than very well" and have limited English proficiency (LEP).[3] Previous studies have demonstrated that patients with LEP experience health disparities including higher error and readmission rates in the hospital setting and less health education and healthcare utilization in the ambulatory setting.[4–8] Language barriers between the clinician and patient can disrupt effective communication and comprehension of healthcare information and place this growing population of vulnerable patients at heightened risk of inadequate informed consent.[7,9,10]

Our prior systematic review found that professional interpreters improve patient-clinician communication for patients

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with LEP.[11] Patient perceptions of the quality of clinician communication have also been associated with improvements in patient outcomes including adherence to treatment and satisfaction.[12–16] In contrast, patient perception of poor communication has been linked to malpractice litigation.[17,18] While federal guidelines mandate the use of qualified interpreters for patients with LEP,[19] this is an unfunded mandate, and multiple studies have demonstrated low rates of professional interpreter utilization during hospital encounters, including during informed consent discussions.[20–26]

Time constraints and lack of immediate availability have been implicated by clinicians as major barriers to use of professional interpreters in the hospital.[27] A recent study demonstrated that surgeons' decisions to use professional interpreters for informed consent discussions depended in large part on the rapid availability of interpreter services.[21] Best practices to overcome these barriers remain unclear; however, it stands to reason that convenient and rapid access to professional interpreter services could be effective.[28] A previous pilot study to increase easy access to professional interpreters demonstrated a substantial increase in professional interpreter utilization via interpreter phones, without a decrement in in-person professional interpreter utilization.[29] We investigated the impact of a bedside interpreter phone system intervention to increase rapid access to professional interpreters on three central patient-reported elements of informed consent for patients with LEP undergoing invasive procedures in the hospital.

METHODS

Overall Design

This was a prospective, pre-post study, taking advantage of a natural experiment in which a large academic medical center implemented a hospital-wide intervention to increase rapid access to professional interpreters in the hospital. We investigated patient-reported informed consent elements for hospitalized patients with LEP undergoing invasive procedures during the 6-month periods before and after intervention implementation. We also assessed the same informed consent elements in an English-speaking comparison group post-implementation. The affiliated academic institutional review board approved the study.

Study Population

This study is part of a larger communication study focused on knowledge of discharge instructions in which we prospectively recruited hospitalized patients from the cardiovascular, general surgery and orthopedic surgery floors who were primarily Chinese (Cantonese and Mandarin) or Spanish speaking and age ≥40 for 6 months before (June–November 2012) and after (March–August 2013) system-wide bedside interpreter intervention implementation, which began in December 2012. Recruitment for the post-intervention phase began 3 months after interpreter phone implementation to allow for staff training and integration of the bedside interpreter phones into clinical care. For this analysis, we included all enrolled participants who reported that they either were awaiting or had completed a procedure at the time of enrollment.

Bilingual-bicultural research assistants identified eligible patients daily by reviewing the census list for patients with Chinese or Spanish listed as their preferred language in the medical record. Research assistants administered a screening questionnaire and confirmed the patient's age, used a validated LEP identification algorithm[30] and administered the Mini-Cog cognitive screen to assess the patient's ability to answer questions and participate in the study.[31] We excluded patients with cognitive impairment, unless they met all other inclusion criteria and a primary caregiver was present and consented to participate in the study as the patient's surrogate. We similarly recruited a comparison group of English speakers during the post-intervention implementation period using the same eligibility criteria.

Bedside Interpreter Intervention

The bedside interpreter intervention consisted of placement of a dual-handset telephone at the bedside in every room. For the three study floors this ranged from 32 to 45 phones according to the number of beds on each floor. The phone had programmed buttons enabling 24-h access to remote professional medical interpreters for more than 100 languages in less than 1 min (Fig. 1).

Prior to intervention implementation, availability of professional interpreter services on the study floors included in-person staff interpreters who could be scheduled during weekdays from 8 a.m. to 5 p.m. and 1–3 dual-handset interpreter

Figure 1 Visual depiction of bedside interpreter phone intervention providing rapid phone access to remote professional interpreters

phones. The phones were usually on mobile carts at the nursing station or in locked cabinets and had to be brought to the patient's room. Once connected, they were as easy to use as the intervention phones but took additional time to locate and bring to the patient's room.

Prior to hospital-wide implementation of the interpreter phones, Interpreter Services staff met with all hospital nurse managers to plan the implementation and communication with nursing staff. Nurse managers educated nurses about the phones at all staff meetings, daily rounds and through floor-specific newsletters. Additionally, the physician champion contacted all clinical Chiefs of Service about the phones, who in turn communicated by email with their attending and resident physicians. An article describing the phones was posted in the internal Graduate Medical Education online newsletter. No other system interventions targeting patients with LEP or informed consent discussions occurred during the course of the study.

Data Collection

Using structured interviews with patients or their caregiver surrogates during hospitalization, we collected data on patient age, sex, primary language, educational attainment, health literacy, self-reported health and English proficiency. Health literacy was defined as inadequate or adequate using a previously validated screening tool developed by Chew et al.[32] During these interviews, we also asked patients about clinician language ability and professional and untrained ad-hoc interpreter use during the encounter when the consent form was signed. The patient's procedure type, procedure status at the time of interview (awaiting vs. completed) and recruitment floor were collected through chart review by trained abstractors. We categorized procedure types as major (abdominal, orthopedic, vascular, cardiothoracic, head and neck surgery), moderate (cardiac catheterization, electrophysiology study or ablation, pacemaker placement, endoscopy) and minor (biopsy, enteral tube or central line placement, any interventional radiology procedure). Additional variables collected and used in propensity score development are available in the Online Appendix.

Study Outcomes

Our primary outcome was a patient-centered evaluation of informed consent, which was developed based on previous studies[33–38] and the following three central informed consent elements: patient-reported understanding of the (1) reasons for and (2) risks of the procedure and (3) having had all questions answered. Specifically, we asked participants the following questions: (1) How well do you understand the reasons you need to have the procedure/surgery? (2) How well do you understand the risks of the procedure/surgery? (3) Did you get all of your questions answered? For the first two elements, patients were asked to rate their understanding using four ordered response options (very well, well, not well, not at all), and for the third element patients were asked to respond yes or no. We considered consent to be adequately informed if the participant reported they understood the reasons and the risks very well and had all of their questions answered.

Statistical Analysis

We used chi-squared and t-tests to compare patient characteristics and the frequency of patient-reported professional interpreter use during the consent discussion between the pre- and post-implementation LEP groups. We used the same methods to compare characteristics of the post-implementation LEP patients and the post-implementation English-speaking comparison group.

We investigated the impact of the bedside-interpreter phone intervention on informed consent for patients with LEP using logistic regression analyses. To control for non-random assignment of patients to the pre- and post-implementation groups, and thus non-random exposure to the intervention, we estimated propensity scores representing the probability of being in the pre- vs. post-implementation group as a proxy for being exposed to the intervention. Propensity score models included as potential confounding variables all of the previously described demographic and clinical variables (see Online Appendix for a complete list of variables included in propensity score estimation). We calculated odds ratios for the informed consent outcomes using logistic models adjusted for propensity score quintiles; preliminary models found no significant interaction effects between the pre-post indicator and propensity quintiles. Additional diagnostics suggested the estimated propensity scores had sufficient overlap across the pre- and post-implementation groups.

Finally, we also compared informed consent between the post-implementation LEP group and the English-speaking group using multivariable logistic regression, adjusting for age, sex, health literacy, hospital floor and procedure type. We conducted all statistical analyses using Stata 11.2 (College Station, TX). Two-sided P-values <0.05 were considered statistically significant.

RESULTS

For the LEP cohorts, 107 of 135 (79.3%) eligible patients in the pre-implementation period and 107 of 119 (90.0%) eligible patients in the post-implementation period agreed to participate. Of these participants enrolled in the larger communication study, 84 (78.5%) in the pre-implementation period and 68 (63.6%) in the post-implementation period were awaiting or had completed a procedure at the time of the interview and were included in this analysis. Overall, these patients had a mean age of 66.6 years (SD 12.5), 55.9% were women, 57.9% spoke Chinese, and 42.1% spoke Spanish (Table 1). Caregivers were interviewed alone as patient surrogates for 44 (28.6%) patients. Patients in the pre-implementation group were more likely to have inadequate health literacy ($p =$

Table 1 Selected Characteristics of Pre- and Post-Bedside Interpreter Phone Implementation Patients with Limited English Proficiency at an Academic Medical Center, June 2012 to August 2013

Patient characteristics	Implementation group		*P*-value
	Pre *N* = 84 n (%)*	Post *N* = 68 n (%)*	
Age, years, mean (range)	66 (41–93)	68 (45–95)	0.33
Female	48 (57.1)	37 (54.4)	0.74
Preferred language			
Spanish	34 (40.5)	30 (44.1)	0.65
Chinese	50 (59.5)	38 (55.9)	
Hospital floor			
Cardiology	39 (46.4)	36 (52.9)	0.69
Orthopedics	17 (20.3)	11 (16.2)	
General surgery	28 (33.3)	21 (30.9)	
Procedure type†			
Major	54 (64.3)	40 (58.8)	0.22
Moderate	13 (15.5)	18 (26.5)	
Minor	17 (20.2)	10 (14.7)	
Procedure status at time of interview			0.07
Awaiting	24 (28.6)	11 (16.2)	
Completed	60 (71.4)	57 (83.8)	
Interview participants			
Patient alone	49 (58.3)	47 (69.1)	0.37
Surrogate alone	28 (33.3)	16 (23.5)	
Both patient and surrogate	7 (8.3)	5 (7.4)	
Inadequate health literacy‡	68 (87.2)	41 (67.2)	0.005
Highest level of education			
Elementary school or less	34 (41.5)	22 (32.3)	0.59
Middle or some high school	22 (26.8)	23 (33.8)	
High school diploma	16 (19.5)	12 (17.7)	
Some college or more	10 (12.2)	11 (16.2)	
Self-rated health over past month			
Excellent/very good/good	32 (38.1)	22 (32.8)	0.50
Fair/poor/very poor	52 (61.9)	45 (67.2)	
English proficiency			
How well do you speak English?			
Not at all	38 (45.2)	30 (44.1)	0.49
Not well	31 (36.9)	30 (44.1)	
Well	15 (17.9)	8 (11.8)	
How well can you discuss your symptoms with your doctors in English?			
Not at all	48 (57.1)	33 (48.5)	0.18
Not well	24 (28.6)	22 (32.4)	
Well	9 (10.7)	13 (19.1)	
Very well	3 (3.6)	0	
How well can you understand your doctors' recommendations in English?			
Not at all	48 (57.1)	30 (44.1)	0.37
Not well	22 (26.2)	22 (32.3)	
Well	12 (14.3)	15 (22.1)	
Very well	2 (2.4)	1 (1.5)	

**Denominators are based on the entire 152 patient population except for health literacy, educational achievement and self-rated health where data were available for 139 (91%), 150 (99%) and 151 (99%) patients, respectively*

†Procedure types categorized as major (abdominal, orthopedic, vascular, cardiothoracic, head and neck surgery), moderate (cardiac catheterization, electrophysiology study or ablation, pacemaker placement, endoscopy) and minor (biopsy, enteral tube or central line placement, any interventional radiology procedure)

‡Inadequate health literacy defined as an answer of somewhat/a little/not at all to the question, "How confident are you filling out medical forms by yourself?"

0.005). The pre- and post-implementation groups were otherwise similar with regard to demographic characteristics, educational attainment and English proficiency.

As shown in Table 2, patient-reported use of professional interpreters at the time informed consent forms were signed

Table 2 Clinician Language Concordance and Professional and Untrained Interpreter Use During Informed Consent Discussions with Patients with Limited English Proficiency at an Academic Medical Center, June 2012 to August 2013*

Language concordance and interpreter use†	Implementation group	
	Pre N = 84 n (%)	Post N = 68 n (%)
Concordant	8 (9.5)	3 (4.4)
Discordant, no interpreter used	13 (15.5)	9 (13.2)
Discordant, untrained ad-hoc interpreter used	28 (33.3)	23 (33.9)
Discordant, professional interpreter used	25 (29.8)	27 (39.7)
Unknown	10 (11.9)	6 (8.8)

**Data on language concordance and interpreter use were based on patient report. Overall chi-squared p-value = 0.57*

†Encounters were categorized as concordant if the patient reported that the clinician spoke their non-English language (Chinese or Spanish) well or very well. All others were considered discordant encounters

increased from 29.8% during pre-implementation to 39.7% during post-implementation, with both fewer language-concordant encounters (patient and clinician speak the same language) and fewer un-interpreted discordant encounters (patient and clinician do not speak the same language) contributing to the difference in the post-intervention period. Use of ad-hoc non-professional interpreters (92.2% family members) remained largely unchanged (33–34%). Overall utilization of professional telephone interpreters throughout the medical center, including floors not exposed to the intervention, increased by 14% during the post- vs. pre-implementation periods.

Unadjusted Informed Consent Outcomes Among Patients with LEP

Outcome data were available for 151 (99%) patients. As shown in Figure 2, the proportion of patients meeting criteria for adequately informed consent was significantly higher in the post-bedside interpreter phone implementation group compared to the pre-implementation group (post 54% vs. pre 29%, $p = 0.001$). This significant increase was present for each of the three individual informed consent elements. In sensitivity analyses, we found similar trends for the subgroups of participants interviewed with vs. without a surrogate and for those awaiting vs. having completed their procedure (see Online Appendix).

Propensity Quintile-Adjusted Informed Consent Outcomes Among Patients with LEP

After adjustment for estimated propensity score quintiles, patients in the post-implementation group had statistically significantly higher odds of adequately informed consent compared to patients in the pre-implementation group (adjusted odds ratio, 2.56; 95% CI, 1.15–5.72) (Table 3). For individual informed consent elements, patients in the post-implementation (vs. pre-implementation) group had

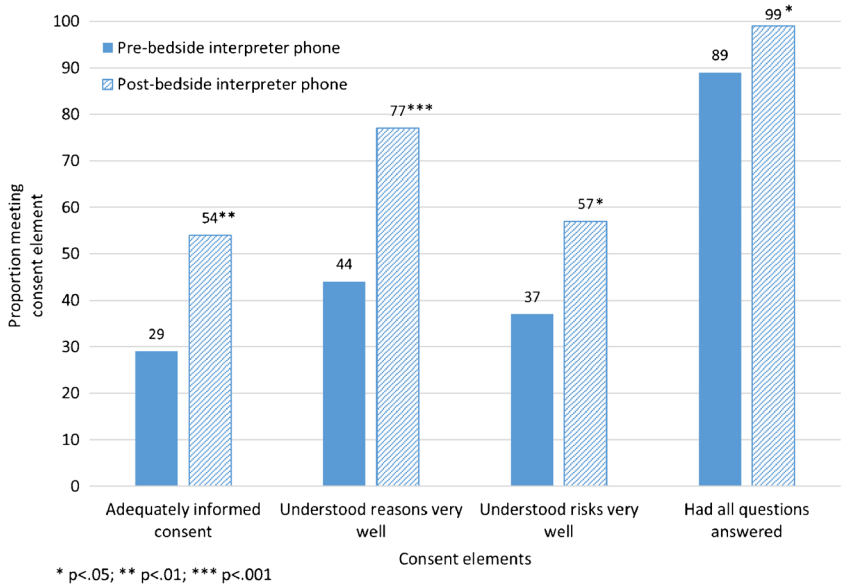

Figure 2 Comparison of informed consent between pre- ($N = 84$) and post-bedside ($N = 68$) interpreter phone implementation patients with limited English proficiency

statistically significantly higher odds of understanding the reasons for their procedure (adjusted odds ratio, 3.60; 95% CI, 1.52–8.56), risks of their procedure (adjusted odds ratio, 2.39; 95% CI, 1.08–5.29) and having all questions answered (adjusted odds ratio, 14.1; 95% CI, 1.43–139.0).

Comparison to English-Proficient Patients

A total of 86 English-speaking patients who were awaiting or had completed a procedure were enrolled after intervention implementation. As compared to the post-implementation patients with LEP, English speakers were younger, had greater health literacy and were more likely to be undergoing major procedures. As shown in Figure 3, post-implementation patients with LEP were significantly less likely than English-speaking patients to have adequately informed consent (54% vs. 74%, $p = 0.01$). In multivariable modeling, post-implementation patients with LEP had 62% lower odds of adequately informed consent compared to English-speaking patients (adjusted odds ratio, 0.38; 95% CI, 0.16–0.91).

DISCUSSION

In this study of hospitalized patients with LEP undergoing invasive procedures, we found significant improvements in overall adequacy and individual elements of informed consent following implementation of a bedside interpreter phone system intervention to increase rapid access to professional interpreter services. While causality cannot be proven, our results suggest that the bedside interpreter phone intervention contributed to the observed improvements in informed consent. Thus, this intervention should be considered as a mechanism to decrease communication disparities for hospitalized patients with LEP.

To our knowledge, this is the first study to investigate the effects of a system intervention to increase rapid access to professional interpreters on informed consent. However, our results are supported by previous studies documenting greater patient-reported comprehension of medical discussions with language concordance and professional interpreter use.[9,22] In one study of Spanish-speaking patients in the emergency department, patient-reported understanding of their disease and treatment plan was significantly greater when an interpreter of any kind was used compared to no interpretation.[22] Similarly, in a previous study by our group, professional interpretation at discharge was associated with equal understanding of discharge instructions compared with English speakers.[39] Professional interpreters may further enhance patient comprehension of potentially complex informed consent discussions as previous studies have demonstrated that professional interpreters make fewer language interpretation errors compared to ad-hoc interpreters during medical encounters.[40,41]

Prior to hospital-wide implementation of the bedside interpreter phone intervention, a pilot study conducted on a single hospital floor demonstrated an overall four-fold increase in provider-reported interpreter phone use after implementa-

Table 3 Propensity Quintile-Adjusted Odds of Informed Consent in Pre- vs. Post- Bedside Interpreter Phone Implementation Patients with Limited English Proficiency

Consent element	Adjusted OR (95% CI)*
Adequately informed consent†	2.56 (1.15–5.72)
Understood reasons very well	3.60 (1.52–8.56)
Understood risks very well	2.39 (1.08–5.29)
Had all questions answered	14.1 (1.43–139.0)

**Odds ratios use pre-implementation group as reference for all outcomes, adjusted for propensity score quintile*

†Adequately informed consent defined as meeting all three central consent elements

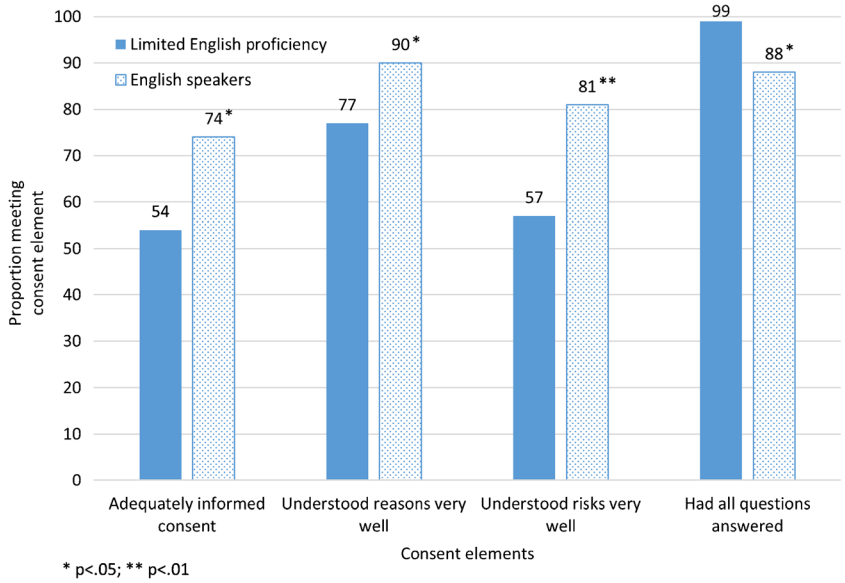

Figure 3 Comparison of informed consent between post-bedside interpreter phone implementation patients with limited English proficiency ($N = 68$) and English speakers ($N = 86$)

tion.[28,29] In this study, we again observed an increase in overall interpreter phone use throughout the hospital, and while we cannot be sure, this increase may have been even greater on the intervention floors. We also observed an increase in patient-reported professional interpreter use during informed consent discussions after implementation and a decrease in the proportion of discussions occurring without any interpretation. While these changes were not statistically significant, there were a number of participants for whom we had missing data on interpreter use, and there was no change in the proportion of discussions for which a family member acted as an ad-hoc interpreter.

The continued use of ad-hoc family interpreters despite the availability of professional phone interpreters demonstrates the continued need for educational campaigns and cultural shifts in both patient and clinician understanding of the benefits and importance of working with a professional interpreter. In addition, the bedside interpreter phone intervention was designed to provide access to professional interpreters throughout hospitalization and not just during the specific encounter at which a consent form was signed. Thus, patients in the post-implementation period may have had multiple prior opportunities to discuss risks and benefits of an upcoming procedure as well as get their questions answered with professional interpretation. This could explain the larger improvement in patients reporting adequately informed consent than those reporting professional interpretation when the consent form was signed. Additionally, intervention components other than the interpreter phones such as education from hospital leadership emphasizing the importance of careful communication with patients with LEP may also have contributed to this difference.

Despite the observed improvements after interpreter phone implementation, post-implementation patients with LEP still had significantly lower odds of adequately informed consent compared to English speakers. While health literacy was higher in the English-speaking group compared to the LEP group, differences in adequately informed consent persisted in analyses adjusting for health literacy. This finding of persistent communication disparities is different from other studies reporting similar healthcare utilization and clinical outcomes for patients with LEP using professional interpreters compared to English-speaking counterparts.[11,22] Our finding suggests that increasing rapid access to interpreters alone may not be sufficient to eliminate disparities related to informed consent comprehension for patients with LEP and further suggests the need for additional interventions targeting patient comprehension during the informed consent process. Disparities may also be perpetuated by the continued use of ad-hoc family interpreters for informed consent discussions. While having a family advocate present for these discussions may be beneficial even for English-speaking patients, there is evidence that ad-hoc family interpreters commit a higher rate of errors[41] and may also attempt to shield the patient from information they are uncomfortable discussing with their loved ones.[42,43]

Our findings have important implications for hospital systems seeking to improve quality and decrease disparities for patients with LEP. First, the impact of the bedside interpreter phone intervention may be generalizable to other hospital systems with similar patient populations and should be considered as an effective method to improve informed consent and decrease communication disparities for patients with LEP. Second, concurrent educational campaigns are needed to shift clinician culture away from the use of ad-hoc family interpreters and toward the use of professional interpreters for all encounters with patients with LEP. Third, although we did not evaluate the cost or cost-effectiveness of the intervention, our prior work and that of others has demonstrated that the cost of

interpreter services represents a small fraction of overall inpatient costs and may even reduce overall healthcare expenditures related to hospitalization.[28,44] Fourth, additional interventions such as continual assessment of comprehension and teach-to-goal methods may be needed to further enhance comprehension for patients with LEP up to the levels of English speakers.[45] Finally, a national effort to enrich the pipeline of bilingual clinicians with language proficiency certification that matches the needs of the US population would allow for more direct communication comparable to English speakers.[46–48]

Our study has limitations. First, as a small pre-post nonrandomized study, the data are observational and subject to potential confounding. We utilized propensity score adjustment to help bolster the basis for drawing causal inferences; however, this approach can only account for measured confounders. Second, it is possible that secular trends in informed consent discussions affected our results, although no other relevant interventions took place during the study period. Third, we did not have objective measures of professional interpreter use during informed consent discussions, and we relied on patient-reported comprehension, which represents patient perception and may not correlate with objective measures of knowledge. However, the patient's perception is a crucial, even if imperfect, measure of whether consent was actually informed.

In conclusion, implementation of a bedside interpreter phone system intervention to increase rapid access to professional interpreters was associated with improvements in patient-reported informed consent for patients with LEP undergoing invasive procedures and should be considered for all hospitals seeking to improve quality and decrease disparities for patients with LEP. Given the persistent disparities for patients with LEP compared with English speakers, there is a need for both more certified bilingual clinicians and enhanced clinician education about working with professional interpreters.

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Compliance with Ethical Standards: *The findings and conclusions in this article are those of the authors and do not necessarily represent the views or the official position(s) of the National Institutes of Health or any of the sponsoring organizations and agencies of the US government.*

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