Title

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Journal

Journal of health care for the poor and underserved, 21(1)

ISSN

1049-2089

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Publication Date

2010-02-01

DOI

10.1353/hpu.0.0269

Peer reviewed

Published in final edited form as:
J Health Care Poor Underserved. 2010 February ; 21(1): 301–317. doi:10.1353/hpu.0.0269.

Clinician Ratings of Interpreter Mediated Visits in Underserved Primary Care Settings with *Ad hoc*, In-person Professional, and Video Conferencing Modes

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Abstract

Language interpretation ameliorates health disparities among underserved limited English-proficient patients, yet few studies have compared clinician satisfaction with these services. Self-administered clinician post-visit surveys compared the quality of interpretation and communication, visit satisfaction, degree of patient engagement, and cultural competence of visits using untrained people acting as interpreters (*ad hoc*), in-person professional, or video conferencing professional interpretation for 283 visits. Adjusting for clinician and patient characteristics, the quality of interpretation of in-person and video conferencing modes were rated similarly (OR=1.79; 95% CI 0.74, 4.33). The quality of in-person (OR=5.55; 95% CI 1.50, 20.51) and video conferencing (OR=3.10; 95% CI 1.16, 8.31) were rated higher than *ad hoc* interpretation. Self-assessed cultural competence was better for in-person *versus* video conferencing interpretation (OR=2.32; 95% CI 1.11, 4.86). Video conferencing interpretation increases access without compromising quality, but cultural nuances may be better addressed by in-person interpreters. Professional interpretation is superior to *ad hoc* (OR=4.15; 95% CI 1.43, 12.09).

Keywords

Quality of health care; cultural competency; physician-patient communication; medical interpretation; limited English proficiency

Introduction

A major contributor to disparities in health care and associated outcomes among racially and ethnically diverse groups in the U.S. is lack of language concordant health care services. A growing body of literature supports the view that limited access to language assistance in health care settings results in worse processes and outcomes of care for limited English-proficient (LEP) patients. [1, 2] Among LEP patients, language-discordant health care services are associated with poorer communication,[3, 4] less understanding of their condition,[5] and lower satisfaction compared with language-concordant care.[6–8] During medical visits, the ineffective exchange of information between patient and clinician results in less adherence

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to clinical recommendations.[9, 10] Language barriers also have cost implications related to more resource utilization, such as greater diagnostic testing in the emergency department setting[11, 12] and higher hospitalization rates or costs, compared with LEP patients having a bilingual physician or professional interpreter.[11, 13] Finally, LEP patients tend to rely more heavily on emergency departments, and are less likely to use preventive and primary care services compared to language concordant or English speaking-patients.[2, 10, 14]

One of the most obvious interventions for eliminating disparities in health care and outcomes among LEP patients is the provision of language concordant services. Evidence is accumulating that the availability of language concordant clinicians and professional interpreters results in higher quality communication and health care. Language-concordant health care, provided through bilingual physicians or interpreters, results in greater use of preventive services;[15] less use of emergency departments;[16] better physical functioning, psychological well-being, and health perceptions;[17] fewer missed appointments;[10] and better adherence to recommended clinical tests.[18] Furthermore, LEP patients seen in an emergency department with professional interpreters had lower costs for testing and lower admission rates compared to LEP patients with no interpreter.[19] Adequate provision of language services to LEP patients could significantly reduce health and health care disparities, and help mitigate costs associated with language barriers. However, to inform policy and funding recommendations, we need additional evidence from multiple perspectives comparing the effectiveness of specific types of language assistance strategies.

Demographic trends in the U.S. indicate that the need to develop language assistance practices and policies to address health and health care disparities for LEP patients will continue to grow. The 2000 U.S. Census identified 47 million people (18% of the total U.S. population) who spoke a language other than English in their home. California was the state with the largest proportion of people who spoke a language other than English at home (39%).[20] Of those who spoke a language other than English at home, over 21 million (45%) reported they spoke English less than very well. Between 1980–2000, the proportion of the U.S. population aged 5 and over who spoke English less than very well almost doubled to over 8%.[20] These population trends signal the importance of language services for health care, especially when one considers the shortage of clinicians from minority ethnic and linguistic groups. Despite these population trends, wide gaps in the funding, availability, and use of professional interpretation services for delivery of health care continue.[21, 22]

Medical interpretation may be classified along three dimensions. The level of training of the person interpreting (*ad hoc* vs. professional) is the first dimension. The term *ad hoc interpretation* commonly refers to untrained family, friends, or staff providing impromptu interpretation, in contrast with professional interpretation by people who have received formal training in medical interpretation. The location of the interpreter (either in person during the medical visit or remotely *via* telephone or video conferencing technology) constitutes the second dimension. Finally, the manner or timing of the interpretation is either simultaneous where the interpreter relays the interpreted message as quickly as possible after the utterance by the physician or patient, or consecutive interpretation where the interpreter starts the interpreted message after the physician or patient has finished a block of speech. In this study, we compare consecutive interpretation modes that vary by level of training (*ad hoc* versus professional) and location (professional interpreter in the exam room versus professional interpreter via video conferencing from a remote location). The three modes we compare are *ad* hoc, in-person professional, and video conferencing interpretation. Previous studies have found that visits in which professional interpreters were used were associated with greater patient satisfaction with clinicians and quality of care [23] and fewer interpretation errors,[24] compared to *ad hoc* interpreted visits. However, a

limitation of these studies is that, at most, they compare only two types of interpretation, or one type with usual or no interpretation.

Another limitation of previous research comparing language services is that few studies have taken the perspective of clinicians.[25] Two studies that did examine clinician ratings of interpretation found that they were more satisfied with professional than with *ad hoc* interpreters.[21, 26] Developing linguistic services for a particular health care site requires synthesizing data across various perspectives (patient, clinician, administration, interpreter, and other staff) using a systems approach to identify the best mix of language services.[27] Clinician-reported data, in combination with other sources, can aid in the development of language access systems that balance costs, demand for a specific language, access to health care, and quality of interpretation.

Finally, few studies have evaluated the use of emerging technologies for language services, with one notable exception, which evaluated remote simultaneous medical interpretation through wireless headsets compared to usual care.[28] Another pilot study of 36 patients, which compared video conferencing with hands-free telephone language assistance, found that patient satisfaction was similar for telephone and video conferencing.[29] Thus, there is a paucity of data on which to base decisions about funding and implementation of language assistance services.[14] Video conferencing medical interpretation is a new modality that uses video conferencing technology (*via* mobile, closed-circuit televisions) to interpret in real time from a remote location while maintaining three-way non-verbal communication among the patient, interpreter, and clinician. Through centralization of shared language services, video conferencing interpretation offers great potential for increasing language access and reducing costs across health care sites and systems. It is essential to determine whether use of this interpretation mode maintains or compromises patient-centered and culturally competent care.

This study takes advantage of a natural experiment resulting from the implementation of a video conferencing interpretation program in a large county health care system. Randomization of visits to interpretation mode was not possible due to system constraints (a heavily burdened county system) and ethical issues (patients could not be randomized to *ad hoc* interpretation since this might have compromised patient confidentiality and many feel that there is sufficient evidence that untrained interpreters contribute to errors and miscommunication).[2, 4, 22, 24, 30] Due to great heterogeneity in patient languages and study resource limitations, we were unable to obtain patient-reported ratings of the quality of visits. However, we were able to obtain clinician ratings of the quality of visits with patients who spoke a large number of languages (20) across three interpretation modes in four safety net primary care clinics. The aims of this study were to compare clinician ratings of the quality of interpretation and communication, their visit satisfaction, their degree of patient engagement, and their self-rated cultural competence across three methods of interpretation: in-person professional, video conferencing professional, and *ad hoc* interpretation.

Methods

Setting and sample

We studied medical visits where interpretation occurred with LEP adult primary care patients at Alameda County Medical Center (ACMC) clinics in California between April 2004 and October 2005. ACMC is a safety net provider of comprehensive health care to primarily low-income and uninsured persons; over 75% of patients are from racial/ethnic minorities. Approximately 60% of all outpatient visits are with LEP patients. Sites included a hospital-based and three community-based clinics selected because of their planned implementation of video conferencing interpretation. Prior to implementation of the video

conferencing system, clinicians relied heavily on *ad hoc* interpretation or advance scheduling of in-person professionally interpreted visits, with more interpretation by in-person professional staff for the most common languages. We varied the days of the week on which research assistants were on-site, and attempts were made to collect data from clinicians on all eligible LEP patient encounters on any given day. Estimates based on the patient's primary language as recorded on daily appointment schedules indicate that we captured approximately 75% of LEP visits on the days we had a research assistant stationed on site to prompt clinicians to fill out the survey. Inclusion criteria for encounters were: 1) the clinician was an attending physician, third year resident, nurse practitioner, or physician assistant; 2) LEP of the patient was confirmed by office staff, a clinician, or a research assistant through face-to-face interaction; and 3) use of an interpreter during the clinical encounter to facilitate oral language interpretation between the clinician and patient.

Procedures

Data were collected *via* self-administered clinician surveys. Clinicians could opt out of the entire study or specific visits. Clinicians who agreed to participate completed a one-time demographic survey and filled out a visit-specific survey immediately following each encounter with a LEP patient. They received no compensation for participating. The same professional interpreter staff provided video conferencing and in-person services. The ACMC and UCSF institutional review boards approved the study.

Measures: Interpretation mode and quality of visit—The primary explanatory variable was type of interpretation used during the visit assessed with the question, "What type of interpreter did you use?" (None, we did not need one; none, but we probably needed one; family member/friend; nurse or clerk who is not a professional interpreter; professional interpreter in person; professional interpreter on a video screen; or professional interpreter on the telephone). Mode of interpretation was classified into one of three categories: in person professional, professional *via* video conferencing, or *ad hoc* (if answered family member/friend or nurse/clerk). Professionally interpreted visits were defined as visits in which the interpreter had completed a formal medical training program required by the health care system (40-hour training course, and passing an oral/written proficiency examination in English and the language of interpretation). Comparisons between family members/friends and nurses/clerks were not possible due to small cell sizes. The two professional telephone interpreted visits were excluded, as were those in which no interpreter was used.

We examined five clinician-reported visit-specific outcomes: quality of interpretation, degree of patient engagement, quality of communication, visit satisfaction, and self-perceived understanding of the patient's cultural beliefs (surrogate for perceived cultural competence). The outcome measures consisted mostly of newly developed items based on the literature[4, 29, 31, 32] and developed by a multidisciplinary research team of adult medicine physicians and behavioral scientists, with review by clinicians at the targeted sites.

Quality of interpretation and degree of patient engagement were assessed with multi-item scales. We created new items from the perspective of the clinician that had face validity in terms of the functions of the interpreter in facilitating information exchange. The 4-item Quality of Interpretation Scale asked clinicians to rate, to the best of their knowledge, how well the interpreter listened to what the clinician had to say, explained what the clinician said to the patient, and helped the clinician understand what the patient said, as well as the overall quality of the interpretation for that visit (responses were: 1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent). The scale score was calculated as the mean of non-missing items.

To assess patient engagement, we created new items from the perspective of the clinician that had face validity in terms of their importance to patient self-care behaviors. The 4-item Patient Engagement Scale asked how well the patient understood the information provided; the patient understood the clinician's recommendations; the clinician was able to elicit the patient's concerns; and the clinician was able to engage the patient as a partner in managing their health (responses were: 1 = not at all, 2 = poorly, 3 = fairly well, 4 = well, 5 = very well). The scale score was calculated as the mean of non-missing items.

Using multi-trait scaling methods, we conducted psychometric analyses of the two scales.[33] Multi-trait scaling analysis assesses the convergent validity (item-scale correlations are ≥ 0.30 adjusting for overlap) and discriminant validity (whether each item is correlated at least two standard errors higher with its hypothesized scale than with other scales) of multi-item scales. Both scales demonstrated good construct validity in this sample (i.e., within each scale, the correlations between each item and the scale score corrected for overlap ranged from 0.76 to 0.93; all items were more highly correlated with their own hypothesized scale score than with the other scale score). Cronbach alpha was 0.97 for the Quality of Interpretation Scale and 0.93 for the Patient Engagement Scale. Thus, scores for these scales were computed as the average of non-missing items.

To calculate odds ratios estimating the probability of higher-quality interpretation and greater patient engagement being associated with interpretation mode, scale scores were rounded to the nearest integer, and dichotomized as follows. For the Quality of Interpretation Scale, scores ≥ 3 were categorized as high quality interpretation (good/very good/excellent) and scores < 3 were labeled as low quality interpretation (poor/fair). For the Patient Engagement Scale, scores ≥ 3 were categorized as high engagement (fairly well/well/very well) and scores < 3 were labeled as low engagement (not at all/poorly).

Quality of communication, visit satisfaction, and understanding of patient's cultural beliefs were assessed with single items. For quality of communication we asked, "In general, how would you rate the quality of the communication you had with the patient today?" (poor, fair, good, very good, excellent). Responses were dichotomized as high quality communication (good/very good/excellent) *vs.* low quality (poor/fair). Satisfaction with the visit was assessed by asking, "In general, how satisfying was the visit with this patient today?" (not at all satisfying, a little satisfying, somewhat satisfying, very satisfying, extremely satisfying). Responses to the satisfaction item were dichotomized as more clinician visit satisfaction (somewhat/very/extremely satisfied) *vs.* less clinician visit satisfaction (not at all/a little satisfied). Clinician understanding of the patient's cultural beliefs was assessed asking, "How well do you understand the health-related cultural beliefs of the patient?" (not at all, poorly, fairly well, well, very well). Responses were dichotomized as better understanding (fairly well/well/very well) *vs.* worse understanding (not at all/poorly). The global ratings of the quality of communication and cultural competence were based on longer patient-reported measures developed by the authors that have undergone extensive conceptual and psychometric analyses in diverse ethnic groups (focus groups, cognitive interviews and confirmatory factor analysis). [31, 34] The clinician satisfaction item was adapted from patient-reported global ratings of health care satisfaction. [35]

Measures: Clinician-reported patient characteristics—Clinicians reported on the patient's primary language, English-speaking ability, gender, age, global health rating, and level of emotional distress during the visit. To assess patient's primary language, clinicians were asked: "What is this patient's primary language?" Responses were collapsed as: Chinese (Cantonese or Mandarin); Spanish; Southeast Asian language (Tagalog, Vietnamese, Mien, or Cambodian); and other (Farsi, Russian, Hindi, Bosnian, or other). The

patient's English-speaking ability was assessed by asking, "How well does the patient you've just seen speak English?" (Not at all, poorly, fairly well, well, very well). The clinician provided the patient's date of birth and gender from the medical record. The clinician's rating of the patient's health was obtained with the following question, "In general, would you say this patient's health is…?" (poor, fair, good, very good, excellent), and dichotomized as good/very good/excellent *vs.* poor/fair. We asked clinicians to estimate to what extent a patient was emotionally distressed[36] by asking, "Was the patient emotionally distressed (patient seemed upset, depressed or anxious) during the visit today?" (not at all distressed, a little distressed, somewhat distressed, very distressed, extremely distressed). Patient distress was dichotomized as not at all distressed *vs.* a little/somewhat/very/extremely distressed (since clinicians rated patients as not at all distressed in 65% of the visits). Clinicians also were asked about the number of times the clinician had previously seen the patient (first time, 2–5 times, 6–10 times, and over 10 times), the purpose of the visit (new problem or follow-up), demographic characteristics, previous training on working with interpreters (none, one lecture or workshop, several lectures, a course), and experience working with professional interpreters (none, a little, a fair amount, a lot).

Statistical analyses

Data analysis was performed using SAS software, Version 9.1.[37] The unit of analysis was the medical visit. Chi-squared and t-tests were used to examine differences in clinician and patient characteristics by interpretation mode. We used SAS PROC SURVEYFREQ to obtain chi-squared tests of differences by mode of interpretation, adjusting for clustering of visits within clinicians, on clinician ratings of quality of communication and interpretation, degree of patient engagement, visit satisfaction, and understanding of the patient's cultural beliefs.

Using SAS PROC GENMOD, multivariate generalized estimating equations (GEE) logistic regression models assessed the independent effects of interpretation mode on outcomes, controlling for covariates associated with the outcome at $p<.15$ in bivariate analyses. Multivariate GEE models accounted for intra-clinician correlations of visit ratings. Odds ratios were estimated corresponding to the probability of clinicians reporting higher quality interpretation, higher quality communication, greater clinician visit satisfaction, and a better understanding of the patient's health-related cultural beliefs.

Results

Descriptive analyses

Of 32 clinicians approached, 3 declined to participate because they indicated they were too busy. We obtained a total of 283 post-visit surveys from the remaining 29 clinicians on 278 unique patients (five patients had two visits each). Of the 29 who agreed to participate, three did not complete a clinician demographic survey. On average, clinicians completed 9.7 visit-specific surveys (range=1–56; SD=12.83). Clinicians' mean age was 51 years; half were women; half were White; and most were internal medicine physicians (Table 1). There were no significant differences on clinician characteristics by interpretation mode (results not shown). In almost all visits (98%), clinicians indicated speaking the patient's primary language poorly or not at all. Half had no prior training on how to work with interpreters, although most used interpreters regularly in their practice.

Forty percent (n=114) of LEP visits used in-person professional, 38% (n=107) used video conferencing, and 22% (n=62) used *ad hoc* interpretation (Table 2) for 20 different languages. Except for language ($p< .0001$) and number of times patient was seen previously ($p<.04$), there were no significant differences in patients' demographic characteristics or

health status by interpretation mode. In-person and *ad hoc* interpretation were used more often with Southeast Asian patients. Of *ad hoc* interpreted visits, 44 used a family member or friend, and 18 used a nurse or clerk. Patients' mean age was 56 years. About 25% were first encounters with the patient. *Ad hoc* interpretation was used more often for first encounters than video conferencing and in-person modes. Clinicians rated the patient's health as good or better in over half the visits.

The mean score for the Quality of Interpretation Scale was 3.42 (SD=0.87) and 3.41 (SD=0.65) for the Patient Engagement Scale. Overall, clinicians rated the quality of interpretation as being good, very good, or excellent in almost 90% of visits (Table 3). The quality of communication was more likely to be rated as being of good/very good/excellent quality for video conferencing visits compared with in-person and *ad hoc* visits (89% of visits *vs*. 77% and 66%; $p < .01$). Overall, visit satisfaction tended to be high for all modes of interpretation. Clinicians were more satisfied with video conferencing than in-person or *ad hoc* visits (95% of visits vs. 86% and 88%; $p < .01$). There were no significant differences by mode of interpretation in the quality of interpretation, the extent of patient engagement, or perceived cultural competence. In nearly 50% of visits, clinicians reported understanding patients' cultural beliefs poorly or not at all.

Multivariate analyses

Adjusting for clinician and patient characteristics, there were no differences in the quality of interpretation between in-person and video conferencing encounters (OR = 1.79; 95% CI 0.74, 4.33; Table 4). Compared with *ad hoc* interpretation, clinicians were more likely to rate the quality of interpretation of in-person (OR = 5.55; 95% CI 1.50, 20.51), video conferencing (OR = 3.10; 95% CI 1.16, 8.31), and combined professional modes as being of good/very good/excellent quality.

Adjusting for clinician and patient characteristics, there were no differences in clinician ratings of the quality of communication or visit satisfaction by interpretation mode. Parameter estimates for the multivariate model assessing the relationship between mode of interpretation and extent of patient engagement were unstable due to small cell sizes and these results were not included. Patient engagement was rated as high in 95% of the visits. Clinicians were more likely to understand the patient's cultural beliefs fairly well or better using in-person interpretation compared with video conferencing (OR = 2.32; 95% CI 1.11, 4.86).

Discussion

Despite a largely unfunded mandate for federal fund recipients to provide language services,[38] few studies have compared the acceptability and effectiveness of different modes of interpretation.[25] Our study helps address this gap by comparing quality ratings of in-person, video conferencing and *ad hoc* interpretation from the clinician's perspective. We found that clinicians perceived the quality of in-person and video conferencing interpretation to be similar, and that both were felt to be superior to *ad hoc* interpretation. Mode of interpretation did not have an independent effect on clinicians' perceptions of the quality of communication or their satisfaction with the visit. These results suggest that when language-concordant clinicians or in-person professional interpreters are not available, video conferencing increases access to professional interpreters without compromising the quality of the interpretation and communication, and clinician satisfaction with the visit. These findings also support the use of professional over *ad hoc* interpreters whenever possible. Shared, centralized videoconferencing technology could help health care systems expand language access while containing costs, especially in the case of less common languages.

Studies comparing satisfaction with and the quality of interpretation across modes of medical interpretation are few, and those that do exist are limited for several reasons. First, most studies compare two types of interpretation or one type with usual or no interpretation. For example, compared with *ad hoc* interpretation, use of professional interpreters was associated with greater patient satisfaction with clinicians and quality of care,[23] and fewer interpretation errors.[24, 39] In another study, patients randomized to remote simultaneous medical interpretation reported greater respect by physicians and satisfaction with interpreters when compared with usual interpretation through telephone language lines and *ad hoc* interpretation combined. [28] Simultaneous interpretation, however, requires a higher degree of training and skill compared to consecutive interpretation, and thus, may be less feasible and more costly in practice. This study was also limited in that remote simultaneous interpretation was compared to a group that included both professional interpreters via telephone and *ad hoc* in-person interpretation combined.

Although clinicians often must depend on *ad hoc* interpretation, evidence has accumulated that interpretation mediated by a professional results in better physician-patient communication, greater clinician and patient satisfaction, and fewer errors of interpretation with adverse clinical consequences.[21, 24, 26, 40–42] Our findings are consistent with these studies and suggest that these results extend to video conferencing interpretation. Thus video conferencing may increase access to professional interpreters and limit use of *ad hoc* interpretation to a method of last resort.

In-person professional interpretation appeared to offer an advantage over video conferencing with respect to clinicians' understanding of patients' cultural beliefs. Clinicians were almost 2.5 times more likely to indicate a better understanding of the patient's culture with a professional interpreter in the room as compared to video conferencing interpretation. Certain types of visits, such as those involving a serious illness or end-of-life care may be at especially high risk of miscommunication when the clinician's and patient's culture differ. In these cases, using the interpreter as a cultural broker to bridge differences between the patient's and clinician's explanatory models of illness and cultural and spiritual beliefs, may be critical to providing the best quality care. [43] For example, in one study, an interpreter working with an East Indian patient conveyed to the physician the need for sensitivity to a cultural belief that talking about death hastens its occurrence. [43]

Having an interpreter in the exam room may facilitate an exchange of cultural information that is more challenging under video conferencing conditions. Previous studies have suggested that professional interpreters function as cultural brokers,[43, 44] a function that appears to be consistent with clinicians' expectations.[40] Further studies are needed to determine whether the extent of cultural brokering varies with type of interpretation, and possible explanations. However, about half of the clinicians had never been trained in the use of interpreters and perceived their understanding of patients' health-related cultural beliefs as poor or non-existent. These findings are consistent with other studies indicating that clinicians need more training to care effectively for an increasingly diverse patient population.[32, 45, 46]

The strengths of our study are that we were able to include a large number of visits (relative to other studies), a variety of languages, three interpretation modes, and the clinician's perspective. An additional strength is that the in-person and video conferencing interpretation were delivered by the same professional interpreter staff, which makes it more likely that the observed differences were due to mode effects, not individual interpreter effects.

The inability to randomize patients to mode of interpretation and a focus on a single county health care system limit the generalizability of the study and the causal inferences that can be drawn. Selection of interpretation type was driven largely by system factors such as availability, time constraints, and convenience of a specific interpretation mode for a particular visit. Because these system-related factors were not measured, it is difficult to assess the extent of bias these factors may have introduced. Furthermore, we were unable to assess the extent to which clinicians' selection of their preferred interpretation method might have biased the ratings of the quality of interpretation. However, it should be noted that all interpretation modes tended to be rated highly and system changes were implemented to make video conferencing interpretation as accessible as other interpretation modes. Additionally, we were unable to assess interpretation *via* telephone language lines because they were either infrequently used or unavailable in these settings.

We were unable to obtain patients' perspectives on interpretation due to the diversity of languages spoken and our resource constraints; thus, we had to rely on physician-reported data. However, a study that used parallel physician and patient instruments to assess visit-specific quality of communication found that item agreement was >80% (± 1 on a 1–5 scale), and that patient ratings actually tended to be higher than physician ratings.[47] Relying on clinicians who may not be fluent in the patient's language to rate the quality of interpretation and patients' understanding of explanations may be problematic. This problem may be further compounded by differences in cultural norms. In certain cultures, patients may be inclined to assent with a nod even though they may not understand, or may prefer an "expert-learner" dynamic to collaborative care. Nonetheless, clinicians make daily judgments in clinical practice about patients' level of understanding based on patients' responses and nonverbal cues. Even though what constitutes high quality communication and visit satisfaction to a clinician may not coincide with what patients rank as high quality communication, clinicians' perspectives are important and should be combined with other data sources in determining the value of interpreter services.

We were also unable to capture cost data in our study and could find no published data on the costs of video conferencing interpretation. A 2002 Office of Management and Budget (OMB) report estimated the cost of telephone interpretation at $132 per hour [48] compared to a cost of $234 per patient for in–person interpretation in a public hospital inpatient setting.[13] Another study estimated the average cost of professional interpreter services in a health maintenance organization as $79 per interpreted visit, although these costs do not differentiate between in-person and telephone modes.[15] Data on the costs of interpretation by mode are sparse, indicating the need for more studies that factor in potential net savings achieved through better communication, adherence, and use of recommended preventive and treatment services.

Although legislative intent to address language discrimination is evident in Title VI of the Civil Rights Act of 1964, the looming question is who will pay for language services. Health care systems and insurance plans must address the growing need for professional interpretation services to enhance quality of care and decrease disparities. However, significant gaps in the availability of professional interpreter services exist due to inconsistent government mandates and public and private reimbursement policies.[22] While Medicaid and the State Children's Health Insurance Plan (SCHIP) allow for reimbursement of interpreter services, state reimbursement policies vary; in 2007, only the District of Columbia and 12 states were directly paying for the cost of language services.[49] It is up to individual commercial and Medicaid Managed Care Plans to negotiate reimbursement rates for interpreter services, but a notable gap is the lack of reimbursement provided by Medicare. The lack of comprehensive reimbursement practices for interpreter services

operates as a *de facto* disincentive for clinicians to see LEP patients or for LEP patients to seek care when they need it. [50]

Failure to address language barriers restricts access to quality care, increases the risk of medical errors, and impedes the elimination of health disparities.[48] Our study supports wider use of video conferencing to increase access to professional interpretation, especially where institutional resources or demand make it impracticable to hire on-site interpreters for a specific language. Future studies should further examine patient and clinician preferences for language services and the health outcomes and costs of providing such services. These studies are critical to elucidating best practices for providing quality health care to an increasingly diverse patient population.

Acknowledgments

This research was supported by funds from The California Endowment grant number 20061003, *Redes En Acción*: The National Latino Cancer Network grant number U01-CA86117 from the National Cancer Institute, and grant number P30-AG15272, from the Resource Centers for Minority Aging Research program of the National Institute on Aging, the National Institute of Nursing Research, and the National Center on Minority Health and Health Disparities, National Institutes of Health. We are grateful to Alameda County Medical Center staff, and especially Dr. Judith Wofsy, for their assistance on this project and commitment to improving patient care, and to Cecilia Populus-Eudave for administrative support.

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Biographies

Anna Nápoles is a social epidemiologist whose research interests address socio-cultural resources, cancer disparities, physician-patient interactions, and self-care among low-income minority populations.

Jasmine Santoyo-Olsson is a research analyst at UCSF and has worked on several studies pertaining to reducing health and health care disparities.

Leah Karliner is a general internist and clinical investigator whose research focuses on language barriers and improving the quality of care for limited English proficient patients.

Helen O'Brien worked as a Research Analyst at UCSF where she contributed to research focused on understanding disparities in health care among minority communities; she is

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Eliseo J. Pérez-Stable is a primary care general internist whose research has focused on health and health care disparities by race and ethnicity in the areas of tobacco use and cessation, cancer prevention, patient-physician communication and aging.

Table 1

Clinician Participants in Post-Visit Surveys of Language Interpreted Medical Visits, Alameda County Medical Center, 2004–2005

Characteristic	Total[1] N=26 (%)
Age in years	
Mean (SD)	50.6 (10.1)
(Range)	(30 – 68)
Gender	
Men	13 (50)
Women	13 (50)
Ethnicity	
White	13 (50)
Non-White	13 (50)
Clinician Category and Specialty	
Family medicine physician	4 (15)
Internal medicine physician	19 (73)
Nurse practitioner/physician assistant	3 (12)
Training on how to work with interpreters	
None	13 (50)
Any training	13 (50)
Experience working with professional interpreters	
None/A fair amount	8 (30)
A lot	18 (70)

[1]Demographic data are missing on 3 physicians who completed post-visit surveys.

Table 2

Clinician-reported Patient Characteristics of 283 Language Interpreted Medical Visits by Interpretation Mode, Alameda County Medical Center, 2004–2005

	Interpretation Mode[1]				
	In-Person N=114 (%)	**Video conferencing N=107 (%)**	***Ad hoc* N=62 (%)**	**p-value**	**Total (%)**
Patient's language					
Cantonese/Mandarin	4 (4)	34 (32)	11 (18)	<.0001	49 (17)
Spanish	20 (18)	33 (31)	6 (10)		59 (21)
Southeast Asian language	66 (58)	23 (22)	25 (41)		114 (40)
Other language	24 (21)	17 (16)	19 (31)		60 (21)
Patient's Gender					
Men	42 (37)	41 (38)	21 (34)	0.85	104 (37)
Women	72 (63)	66 (62)	41 (66)		179 (63)
Patient's age in years					
Mean (SD)	55.4 (14.9)	55.9(14.4)	58.6 (16.0)	0.39	56.3 (14.9)
Reason for visit					
New	32 (29)	34 (33)	21 (35)	0.64	87 (32)
Follow-up	80 (71)	69 (67)	39 (65)		188 (68)
Times patient was seen					
First time	25 (24)	17 (17)	21 (36)	0.04	63 (24)
2–5 times	35 (34)	41 (41)	21 (36)		97 (37)
6–10 times	17 (17)	25 (25)	5 (9)		47 (18)
Over 10 times	26 (25)	18 (18)	11 (19)		55 (21)
Patient's health					
Poor/fair	47 (42)	29 (29)	26 (43)	0.09	102 (38)
Good/very good/excellent	64 (58)	71 (71)	35 (57)		170 (63)
Patient's emotional distress					
Not at all	76 (67)	62 (62)	41 (67)	0.68	179 (65)
A little/somewhat/very/extremely	37 (33)	38 (38)	20 (33)		95 (35)
Patient's English					
Not at all/poorly	102 (90)	93 (87)	53 (87)	0.69	248 (88)
Fairly well/well/very well	11 (10)	14 (13)	8 (13)		33 (12)

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[1] Both in-person and video conferencing interpretation were provided by trained medical interpreters; *ad-hoc* consisted of family, friends, nurses, and clinic staff not trained as medical interpreters.

Table 3

Clinician-reported Quality of 283 Language Interpreted Medical Visits by Interpretation Mode, Alameda County Medical Center, 2004–2005

	Interpretation Mode[1]				
	In-Person N=114 (%)	**Video conferencing N=107 (%)**	***Ad hoc* N=62 (%)**	**p-value[2]**	**Total (%)**
Quality of interpretation					
Good/very good/excellent	101 (89)	99 (93)	50 (81)	0.13	250 (88)
Poor/fair	13 (11)	8 (7)	12 (19)		33 (12)
Degree of patient engagement					
Fairly well/well/very well	108 (95)	104 (97)	58 (94)	0.50	270 (95)
Not at all/poorly	6 (5)	3 (3)	4 (6)		13 (5)
Quality of communication					
Good/very good/excellent	88 (77)	93 (89)	41 (66)	< 0.01	222 (79)
Poor/fair	26 (23)	12 (11)	21 (34)		59 (21)
Satisfaction with visit					
Somewhat/very/extremely satisfied	98 (86)	102 (95)	53 (88)	< 0.01	253 (90)
Not at all/a little satisfied	16 (14)	5 (5)	7 (12)		28 (10)
How well understood patient's cultural beliefs					
Fairly well/well/very well	66 (59)	48 (45)	37 (60)	0.36	151 (54)
Not at all/poorly	46 (41)	59 (55)	25 (40)		130 (46)

[1] Both in-person and video conferencing interpretation were provided by trained medical interpreters; *ad-hoc* consisted of family, friends, nurses, and clinic staff not trained as medical interpreters.

[2] Adjusted for clinician clustering.

Table 4

Odds of Reporting Higher Quality of Interpreted Medical Visits, Alameda County Medical Center, 2004–2005

	Interpretation Mode[1]			
Clinician-reported Quality of Visit	**In-Person vs. Video conferencing** Odds Ratio[2] (95% CI)	**In-Person vs. *Ad hoc*** Odds Ratio[2] (95% CI)	**Video conferencing vs. *Ad hoc*** Odds Ratio[2] (95% CI)	**Professional (in-person + video conferencing) vs. *Ad hoc*** Odds Ratio[2] (95% CI)
Higher quality (good/very good/ excellent) interpretation	1.79 (0.74, 4.33)	5.55 * (1.50, 20.51)	3.10 ** (1.16, 8.31)	4.15 * (1.43, 12.09)
Higher quality (good/very good/ excellent) communication	2.25 (0.97, 5.25)	2.59 (0.73, 9.22)	1.15 (0.29, 4.57)	1.72 (0.49, 6.06)
More clinician visit satisfaction (somewhat/very/extremely satisfied)	0.39 (0.15, 1.07)	0.37 (0.08,1.66)	0.95 (0.26, 3.43)	0.60 (0.16, 2.19)
Better understanding (fairly well/well/very well) of the patient's cultural beliefs	2.32 ** (1.11, 4.86)	1.16 (0.45, 3.03)	0.50 (0.22, 1.16)	0.76 (0.33, 1.74)

[1] Both in-person and video conferencing interpretation were provided by trained medical interpreters; *ad-hoc* consisted of family, friends, nurses, and clinic staff not trained as medical interpreters.

[2] All odds ratios were adjusted for clinic site, patient's language, patient's gender, patient's health status, patient's emotional distress, number of times clinician has seen patient, clinician's age, clinician's gender, and clinician clustering.

* *p*-value <.01;

** *p*-value <.05