

© Health Research and Educational Trust

DOI: 10.1111/j.1475-6773.2011.01338.x

SPECIAL ISSUE: BRIDGING THE GAP BETWEEN RESEARCH AND HEALTH POLICY-INSIGHTS FROM ROBERT WOOD JOHNSON FOUNDATION CLINICAL SCHOLARS PROGRAM

“Does This Doctor Speak My Language?” Improving the Characterization of Physician Non-English Language Skills

*Lisa C. Diamond, Harold S. Luft, Sukyung Chung, and
Elizabeth A. Jacobs*

Objective. To describe the initial impact of an organizational policy change on measurement of physician non-English language proficiency.

Study Setting. Multispecialty health care organization in the San Francisco Bay Area.

Study Design/Data Collection. In response to preliminary findings suggesting that the organization’s nonvalidated and undefined three-category tool for physician self-report of non-English language proficiency levels was likely inadequate, the organization asked physicians to rate their non-English language proficiency levels using an adapted Interagency Language Roundtable (ILR) scale, a validated measure with five rating levels and descriptors. We then compared the self-reported language proficiency on the original scale and the ILR for those physicians who completed both and used regression analysis to investigate physician characteristics potentially associated with a change in score on the old versus ILR scales.

Principal Findings. Six months after the ILR scale was implemented throughout the organization, 75 percent (258/342) of physicians had updated their language proficiency ratings. Among clinicians who had previously rated themselves in the “Medical/Conversational” category, there were substantial variations in scores using the ILR scale. Physicians who spoke two or more non-English languages were significantly more likely to lower their self-reported proficiency when updating from the old scale to the ILR scale.

Conclusions. The organization was willing to adopt a relatively straightforward change in how data were collected and presented to patients based on the face validity of initial findings. This organizational policy change appeared to improve how self-reported physician language proficiency was characterized.

Key Words. Physician–patient communication, language barriers, organizational policy

BACKGROUND

Effective communication between physicians and patients is critical to providing optimal health care. Communication failures can occur when both parties speak the same language; when they do not, these failures are even more common. Federal regulations require health care organizations to assure the competency of language services being offered by bilingual staff, including clinicians (Civil Rights Act of 1964; U.S. Department of Health and Human Services, Office of Minority Health 2001). In addition, the Culturally and Linguistically Appropriate Services standards in Health Care, issued by the Department of Health and Human Services' Office of Minority Health, state that "health care organizations must assure the competence of language assistance provided to limited English proficient patients/consumers by interpreters and bilingual staff." There is very little guidance, however, on what it means to "assure the competence of linguistic assistance" provided by bilingual staff and health care providers. Patients with limited English proficiency (LEP) should be cared for by a provider who speaks their language; a provider who does not know the language of a patient should call an interpreter. However, it is not clear what is the minimum language proficiency a provider should have before they independently provide care or how patients could identify physicians' proficient enough to communicate with them in their language.

Language concordance between patients and providers results in better health care quality and outcomes (Manson 1988; Baker et al. 1996; Perez-Stable, Napoles-Springer, and Miramontes 1997; Carter-Pokras et al. 2004; Fernandez et al. 2004; Green et al. 2005; Jacobs, Sadowski, and Rathouz 2007; Ngo-Metzger et al. 2007; Eamranond et al. 2009). True language concordance occurs when physicians are fluent in the languages their patients speak. Although true language concordance between LEP patients and clinicians can be beneficial, the effects of partial language concordance are unknown. The existing studies have not used validated or consistent measures of clinician non-English language proficiency. For partially fluent physicians, providing

Address correspondence to Lisa C. Diamond, M.D., M.P.H., Department of Psychiatry and Behavioral Health, Department of Medicine, Memorial Sloan-Kettering Cancer Center, Immigrant Health and Cancer Disparities Service, 641 Lexington Ave, 7th Fl, New York, NY 10022; e-mail: diamondl@mskcc.org. Harold S. Luft, Ph.D., and Sukyung Chung, Ph.D., are with Palo Alto Medical Foundation Research Institute, Palo Alto, CA. Elizabeth A. Jacobs, M.D., M.P.P., is with the Department of Medicine & Health Innovation Program, University of Wisconsin-Madison, Madison, WI.

language concordant care may be appropriate and even desirable in some settings and circumstances, but not in others (Fernandez et al. 2004; Jacobs, Sadowski, and Rathouz 2007; Schenker et al. 2007).

The characterization of non-English language skills is particularly important in community-based ambulatory care in which patients may choose physicians in part on how well they think a physician can communicate in his or her preferred language. It is not clear how to meet the goals of both federal regulations and improved quality when the classification of a physician's language ability is expressed in terms, such as "medical Spanish" or "basic." The U.S. Foreign Service has been considerably more advanced in developing standardized descriptions of professional linguistic proficiency (Interagency-Language-Roundtable 2009). Although some health care organizations have instituted language proficiency testing for bilingual staff (Moreno, Otero-Sabogal, and Newman 2007), few have broached the topic of testing or standardizing how clinician language proficiency is characterized (Tidwell 2009; Tang et al. 2011). In this research brief, we describe how physicians' self-report of their non-English language proficiency shifted when a large, multispecialty group practice in Northern California changed the way physician non-English language proficiency was measured and reported. The expectation was that use of a validated scale would provide more meaningful data to both patients and the health care organization.

METHODS

Setting

The Palo Alto Medical Foundation (PAMF) is a nonprofit multispecialty organization serving patients in Alameda, San Mateo, Santa Clara, and Santa Cruz counties in the San Francisco Bay Area. PAMF contracts with a large (950+) physician group to provide clinical services. All PAMF practice sites have comprehensive electronic health record systems and participate in organizational and state-wide quality improvement programs. PAMF's catchment areas are racially and ethnically diverse (26 percent Asian, 21 percent Latino, 8 percent African American, and 40 percent non-Latino white) and over 27 percent of adults in these areas reported LEP (U.S. Census Bureau 2001; California Health Interview Survey 2005). Over 90,000 patients at PAMF (10 percent of those who have completed language preference data collection) report a preferred language other than English.

Language Proficiency Measurement at PAMF

Since 1997, Sutter Health, the larger organization of which PAMF is an affiliate, has offered physician non-English language proficiency information on its website to help patients select a language concordant clinician. Patients can search for a physician based on location, department, and languages spoken. Prior to April 2010, non-English language proficiency had been categorized on the PAMF website using the terms “basic,” “medical/conversational,” or “fluent.” These descriptions had been created by Sutter Health’s marketing department and had not been validated. No definitions of these categories were provided to physicians or patients.

In 2009, PAMF began using an adapted version of the Interagency Language Roundtable (ILR) scale to characterize physician non-English language proficiency. This standardized, validated scale consists of five levels with descriptive explanations of each level: Poor, Fair, Good, Very Good, and Excellent (Table 1), and these levels and explanations were provided to PAMF physicians. The ILR scale has a long history of use by the U.S. government, private, and academic organizations. In the 1950s, after determining that most Foreign Service officers had inadequate fluency in their work-related languages, the Foreign Service Institute led the development and validation of a standard scale for language skills in speaking, listening, writing, and translating. The scale has been revised and validated by the ILR, which is comprised of representatives from academia, government, and nongovernment organizations (Interagency-Language-Roundtable 2009). Other organizations, such as the American Council on the Teaching of Foreign Languages, have adapted the ILR scale for their own proficiency guidelines.

Policy Change

In early 2009, researchers from PAMF’s Research Institute received a grant from The California Endowment to study the best methods for characterizing physician language proficiency. We asked primary care physicians who wished to use non-English language skills to communicate directly with LEP patients to apply a new scale to characterize his/her proficiency level. We sought institutional endorsement for the research project from the organization’s Quality Improvement Steering Committee (QISC) for the Palo Alto Division, which agreed to help with physician recruitment.

The physician survey was initially sent to primary care physicians in July 2009. The response rate to the survey was initially 27 percent (92/342). After

Table 1: Adapted ILR Scale for Physicians (Interagency-Language-Roundtable [ILR] 2009)

Excellent	Speaks proficiently, equivalent to that of an educated speaker, and is skilled at incorporating appropriate medical terminology and concepts into communication. Has complete fluency in the language such that speech in all levels is fully accepted by educated native speakers in all its features, including breadth of vocabulary and idioms, colloquialisms, and pertinent cultural references
Very Good	Able to use the language fluently and accurately on all levels related to work needs in a health care setting. Can understand and participate in any conversation within the range of his/her experience with a high degree of fluency and precision of vocabulary. Unaffected by rate of speech. Language ability only rarely hinders him/her in performing any task requiring language; yet the individual would seldom be perceived as a native
Good	Able to speak the language with sufficient accuracy and vocabulary to have effective formal and informal conversations on most familiar topics. Although cultural references, proverbs, and the implications of nuances and idiom may not be fully understood, the individual can easily repair the conversation. May have some difficulty communicating necessary health concepts
Fair	Meets basic conversational needs. Able to understand and respond to simple questions. Can handle casual conversation about work, school, and family. Has difficulty with vocabulary and grammar. The individual can get the gist of most everyday conversations but has difficulty communicating about health care concepts
Poor	Satisfies elementary needs and minimum courtesy requirements. Able to understand and respond to 2–3 word entry level questions. May require slow speech and repetition to understand. Unable to understand or communicate most health care concepts

we presented our preliminary data to the larger PAMF-wide QISC in December 2009, the committee decided to change the way PAMF presented physician non-English language proficiency information on its website by using the adapted ILR scale. Permission was obtained from the Sutter Health Chief Medical Officer, who approved changing the physician language proficiency scale on PAMF's website in March 2010. ILR scale data collection for physicians was started in April 2010 when the Director of Web Services sent an email to PAMF physicians requesting that they update their language data for the website.

Data and Analysis

For each clinician who listed a non-English language on the PAMF website using the old scale, we extracted both the old and the ILR scale results and selected physician characteristics. Standard frequency analyses were performed to characterize baseline physician characteristics, including the

non-English language(s) spoken, proficiency level on both the old scale and the ILR scale, years since medical school graduation, department, and PAMF site. Bivariate analyses using chi-square were conducted to assess differences between physicians who updated their language proficiency level to the ILR scale and those who did not. Spearman's rank correlation coefficients were calculated to evaluate the relationship between the old scale and the adapted ILR scale.

Finally, we performed a regression with the subgroup of physicians who reported both old scale and ILR scale ratings to identify physician characteristics associated with the direction of the change in their score. The dependent variable was a five-category variable indicating the difference between a recategorized ILR scale (1: "Excellent" or "Very Good"; 2: "Good"; and 3: "Fair" or "Poor") and the old scale (1: "Fluent"; 2: "Medical/Conversational"; and 3: "Basic"), where -2 indicated a substantial increase in fluency using the ILR scale, 0 indicated no change, and $+2$ indicated much lower fluency using the ILR scale, as compared with old scale. The physician characteristics we included as potential predictors of change were non-English language spoken, gender, years of practice, specialty, and whether the physician reported speaking more than one non-English language. We initially used an ordered probit model, but the results were virtually the same using linear regression, which is reported here.

RESULTS

As of October 31, 2010, 258/342 (75 percent) of the PAMF physicians who had a non-English language proficiency rating on the website using the old scale had updated their information to the ILR scale. Table 2 shows baseline physician characteristics. Almost half (47 percent) of PAMF physicians reporting non-English language proficiency spoke Spanish. Other languages were Chinese (Mandarin, Cantonese, Shanghaiese, Taiwanese, and Toishanese, totaling 18 percent), South Asian languages (Hindi, Bengali, Gujarati, Kannada, Marathi, Punjabi, Tamil, Telugu, and Urdu, totaling 10 percent), other Asian languages (Thai, Tagalog, Indonesian, Japanese, Korean, Vietnamese, Arabic, and Farsi, totaling 10 percent), and non-Spanish European languages (Dutch, Finnish, French, German, Greek, Italian, Portuguese, Romanian, Russian, and Serbo-Croatian, totaling 16 percent). Physicians who had language proficiency ratings on the old scale but did not update to the ILR scale (nonupdaters) were less likely to rate their language proficiency as "fluent"

Table 2: Baseline Physician Characteristics

<i>Physician Characteristic</i>	<i>n (%) or Mean (SD)</i>
Old scale	342 (100)
Fluent	125 (36.4)
Medical/conversational	86 (25.1)
Basic	131 (38.4)
ILR scale	258 (75.4)
Excellent	50 (19.4)
Very good	53 (20.5)
Good	84 (32.6)
Fair	71 (27.5)
Poor	0
Professional degree	
M.D.	185 (71.7)
D.O.	6 (2.3)
Other (D.P.M., O.D., etc.)	67 (25.5)
Years since medical school graduation	13.9 (7.6)

compared with physicians who changed their ratings ($\chi^2 = 8.3, p = .02$). There were no differences between updaters and nonupdaters with regard to language spoken, years since medical school graduation, department, or PAMF site. The remainder of the analysis focuses on the updaters.

Table 3 compares self-ratings from the old scale and the ILR scale. As in the preliminary findings, the moderate correlation (Spearman’s rank correlation coefficient = 0.48, $p < .001$) is largely because of anchoring at the high end of the scales among those who rated themselves as “fluent” on the old scale who then rated themselves as “Excellent” or “Very Good” on the ILR

Table 3: Comparison of Old Language Proficiency Scale and ILR Scale ($n = 258$)

<i>Old Scale</i>	<i>Adapted ILR Scale</i>					<i>Total</i>
	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	
Fluent	38	29	25	6	0	98
Medical/conversational	8	13	26	29	0	76
Basic	4	11	33	36	0	84
Total	50	53	84	71	0	258

Notes. Spearman’s rank correlation coefficient = 0.48 ($p < .001$). ILR, Interagency Language Roundtable.

scale. None of the physicians who updated their language proficiency ratings indicated “poor” proficiency on the ILR scale. However, 31 physicians who had rated their non-English language proficiency as “Fluent” on the old scale downgraded their language proficiency to either “Good” or “Fair” on the ILR scale. The majority of physicians who had rated their proficiency as “Basic” on the old scale considered themselves “Good” (39 percent) or “Fair” (43 percent) on the ILR scale. There was substantial variation, however, among clinicians who had rated themselves in the “Medical/Conversational” category. Eleven percent considered themselves “Excellent” on the ILR scale, 17 percent “Very Good,” 34 percent “Good,” and 38 percent “Fair.”

PAMF physicians who self-reported Spanish as one of their non-English languages were more likely than those speaking other languages to lower their self-reported proficiency levels (Table 4). Of the 53 PAMF physicians who initially characterized their Spanish language ability as “Medical/Conversational,” only 19 percent (10/53) scored themselves as “Excellent” or “Very Good” on the ILR scale. Among the physicians indicating “Medical/Conversational” skills in another language, 48 percent (11/23) scored themselves in the “Excellent/Very Good” category. In contrast to the 18 percent of those indicating they were “Fluent” in Spanish on the old scale, 63 percent of those reporting other languages scored themselves as “Fluent.” This suggests that many of physicians who report Spanish language capabilities may not have acquired them at home, whereas many reporting other languages may have been native speakers. This would be consistent with other data showing that Spanish is the most common non-English language spoken in the United States by patients and physicians (Shin and Bruno 2003) and that most physicians who provide language concordant care for Spanish-speaking patients are nonnative speakers (Yoon, Grumbach, and Bindman 2004).

Table 4: Comparison of Old Language Proficiency Scale and ILR Scale among Spanish-Speaking Physicians ($n = 122$)

<i>Old Scale</i>	<i>Adapted ILR Scale</i>					<i>Total</i>
	<i>Excellent</i>	<i>Very Good</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>	
Fluent	7	8	5	2	0	22
Medical/conversational	2	8	20	23	0	53
Basic	0	4	23	20	0	47
Total	9	20	48	45	0	122

Notes. Spearman’s rank correlation coefficient = 0.43 ($p < .001$). ILR, Interagency Language Roundtable.

In multivariate analysis, only one physician characteristic explained the tendency to under- or over estimate proficiency on the old scale compared with the ILR scale. Physicians who reported speaking two or more non-English languages were more likely to report a lower ILR scale score compared with the old scale by 0.3 category ($p < .05$; Table 5).

DISCUSSION

Overall, we found a moderate correlation between a commonly used categorization of fluency and the adapted ILR scale. However, even those reporting themselves as being “Fluent” reclassified themselves as being only “good” or “fair” a third of the time when given descriptions of those categories. Those initially using the “Medical/Conversational” category reclassified themselves as “good” or “fair” almost three quarters of the time. Physicians reporting themselves as multilingual were significantly more likely to lower their self-ratings when using the ILR scale.

Categories do not indicate how physicians actually use their skills, but the old categories do not provide clear information to help LEP patients choose a physician who can proficiently communicate in their language. The PAMF leadership recognized this. Less than 6 months after the beginning of the project, a relatively simple preliminary survey was sufficient to convince PAMF’s quality leadership to support a change in how its physicians characterized their language capabilities. Four months later, physicians were asked to re-rate themselves and within 6 months of that time nearly three quarters had done so. This rapid change was probably because of the fact that our

Table 5: Physician Characteristics Associated with Under or Overevaluating Their Language Proficiency on the ILR Scale Compared with the Old Scale

<i>Physician Characteristic</i>	<i>Beta Coefficient (SE)</i>
Spanish speaker	-0.0213 (0.138)
Asian language speaker	-0.128 (0.156)
Multilingual	0.281* (0.113)
Female	0.111 (0.112)
Years in practice	-0.00550 (0.00812)
Primary care versus specialist	0.0686 (0.116)

Note. * $p < .05$.

preliminary results offered a plausible, convincing, and easy-to-implement way to improve quality.

The few other studies that have looked at health care providers' self-report of language proficiency have shown that some methods of self-rating language proficiency appear to work and others do not. Medical students accurately assessed their own level of Spanish language proficiency when compared with performance on a standardized oral fluency test (Reuland et al. 2009). Unpublished data from Kaiser Permanente show that 86 percent of physicians who self-reported non-English language fluency passed a validated language proficiency test (Tidwell 2009). Another study, which included physicians and nurses functioning as interpreters for LEP patients, showed that almost one in five had non-English language proficiency levels that were inadequate (Moreno, Otero-Sabogal, and Newman 2007).

This is not just an academic question. Better measures of physician language proficiency are important for quality of care. Studies have shown that language concordance between patients and providers results in improved health care quality and outcomes. Patients whose physicians speak their language have better patient satisfaction with care (Green et al. 2005; Ngo-Metzger et al. 2007), medication adherence (Manson 1988), patient understanding of diagnoses and treatment (Baker et al. 1996), patient functioning for LEP patients with diabetes (Perez-Stable, Napoles-Springer, and Miramontes 1997), patient centeredness (Fernandez et al. 2004), and more health education (Ngo-Metzger et al. 2007; Eamranond et al. 2009). Having a language concordant provider leads to fewer emergency department visits, lower likelihood of missing medications, and lower cost (Manson 1988; Carter-Pokras et al. 2004; Jacobs, Sadowski, and Rathouz 2007). Physicians' self-reported Spanish fluency is strongly associated with their Spanish-speaking patients' reports of optimal patient-centered communication (Fernandez et al. 2004). Our study will ideally be followed up with an investigation of the association between physicians' self-rated language proficiency on the ILR scale and quality of care and outcomes. We would expect that patient satisfaction with care, patient perception of physician non-English language proficiency, and communication-sensitive quality and outcome measures would be associated with physicians' higher self-rated fluency. Comprehension of hospital discharge instructions and subsequent reductions in rehospitalization would be an example of a communication-sensitive measure. As much of health care and outcomes depend on good communication, there should be plenty of opportunity to measure the impact of better physician fluency data on quality and outcomes in our population.

This study is not without limitations. We adapted the existing, validated ILR scales for speaking and listening to reflect patient–physician communication. This adaptation has not yet been validated, although we are currently conducting research to validate its use in the health care setting by comparing it with a gold standard validated oral proficiency test. Also, the adapted ILR scale is based on self-assessment. To date, there is no validated self-assessment tool designed to measure physician non-English language proficiency. Further research is needed to determine whether self-report is adequate or whether proficiency testing is needed.

Although our data suggest the need for a more detailed and accurate portrayal of physician fluency in languages other than English, ideally there should be research documenting how the ILR-focused self-assessments matched those of objective testing through validated oral proficiency tests. We found few characteristics that could explain which physicians were more likely to change their self-ratings when updating to the ILR scale. Only those physicians who spoke two or more non-English languages were more likely to lower their self-ratings. Our study was not sufficiently powered to detect other potential factors that might be associated with the difference in ratings using the two scales. Further studies are needed to investigate factors associated with under- and over estimating non-English language proficiency levels by physicians to help guide organizations that are considering policy changes for physician language testing. Many PAMF physicians lowered their previous ratings when applying the ILR scale, thus making the physician group appear less fluent on the whole, but their actual skills obviously did not change because of this reclassification. The more accurate characterization of physician non-English language proficiency likely facilitated better experiences for patients seeking language concordant physicians and more advance warning on when interpreter services might be needed. Future studies may test whether the more accurate classification actually leads to better matching of patients with truly bilingual physicians. Studies providing these data are likely necessary before Federal regulations are modified to be more specific. The current regulations offer no guidance on the classification of physician language proficiency (Diamond and Reuland 2009), resulting in less than ideal approaches, such as that being used by PAMF prior to the policy change to using the ILR scale.

Changing the way physicians self-reported their non-English language proficiency at PAMF appeared to improve accuracy. As language concordance between patients and physicians is known to improve quality of care, there is critical need for more policy-relevant research on how best to measure

physicians' non-English language proficiency. Changes in self-categorization will allow us to assess whether there is better matching of patients and physicians in terms of non-English language needs and abilities. They also point to how policies can be designed to improve quality while minimizing the burdens of change.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: This study was funded by The California Endowment, grant 20082043. Dr. Diamond was also supported during the study period by the Palo Alto Medical Foundation Research Institute.

Disclosures: None.

Disclaimers: None.

REFERENCES

- Baker, D. W., R. M. Parker, M. V. Williams, W. C. Coates, and K. Pitkin. 1996. "Use and Effectiveness of Interpreters in an Emergency Department." *JAMA* 275 (10): 783–8.
- California Health Interview Survey. 2005. "California Health Interview Survey – Ask CHIS" [accessed on May 17, 2010]. Available at <http://www.chis.ucla.edu/main/default.asp> – author's calculation through Ask CHIS.
- Carter-Pokras, O., M. J. O'Neill, V. Cheanvechai, M. Menis, T. Fan, and A. Solera. 2004. "Providing Linguistically Appropriate Services to Persons with Limited English Proficiency: A Needs and Resources Investigation." *American Journal of Managed Care* 10. Spec No: SP29-36.
- Civil Rights Act of 1964, Pub. L. No. 88–352, § 601, 78 Stat. 252 (1964).
- Diamond, L. C., and D. S. Reuland. 2009. "Describing Physician Language Fluency: Deconstructing Medical Spanish." *JAMA* 301 (4): 426–8.
- Eamranond, P. P., R. B. Davis, R. S. Phillips, and C. C. Wee. 2009. "Patient-Physician Language Concordance and Lifestyle Counseling among Spanish-Speaking Patients." *Journal of Immigrant and Minority Health* 11 (6): 494–498.
- Fernandez, A., D. Schillinger, K. Grumbach, A. Rosenthal, A. L. Stewart, F. Wang, and E. J. Perez-Stable. 2004. "Physician Language Ability and Cultural Competence: An Exploratory Study of Communication with Spanish-Speaking Patients." *Journal of General Internal Medicine* 19 (2): 167–74.
- Green, A. R., Q. Ngo-Metzger, A. T. Legedza, M. P. Massagli, R. S. Phillips, and L. I. Iezzoni. 2005. "Interpreter Services, Language Concordance, and Health Care Quality: Experiences of Asian Americans with Limited English Proficiency." *Journal of General Internal Medicine* 20 (11): 1050–6.

- Interagency-Language-Roundtable. 2009. "Interagency Language Roundtable" [accessed on December 9, 2009]. Available at <http://www.govtllr.org>.
- Jacobs, E., L. Sadowski, and P. Rathouz. 2007. "The Impact of an Enhanced Interpreter Service Intervention on Hospital Costs and Patient Satisfaction." *Journal of General Internal Medicine* 22 (suppl 2): 306–11.
- Manson, A.. 1988. "Language Concordance as a Determinant of Patient Compliance and Emergency Room Use in Patients with Asthma." *Medical Care* 26 (12): 1119–28.
- Moreno, M., R. Otero-Sabogal, and J. Newman. 2007. "Assessing Dual-Role Staff-Interpreter Linguistic Competency in an Integrated Healthcare System." *Journal of General Internal Medicine* 22 (suppl 2): 331–5.
- Ngo-Metzger, Q., D. Sorkin, R. Phillips, S. Greenfield, M. Massagli, B. Glarridge, and S. Kaplan. 2007. "Providing High-Quality Care for Limited English Proficient Patients: The Importance of Language Concordance and Interpreter Use." *Journal of General Internal Medicine* 22 (suppl 2): 324–30.
- Perez-Stable, E. J., A. Napoles-Springer, and J. M. Miramontes. 1997. "The Effects of Ethnicity and Language on Medical Outcomes of Patients with Hypertension or Diabetes." *Medical Care* 35 (12): 1212–9.
- Reuland, D., P. Frasier, M. Olson, L. Slatt, M. Aleman, and A. Fernandez. 2009. "Accuracy of Self-Assessed Spanish Fluency in Medical Students." *Teaching and Learning in Medicine* 21 (4): 305–9.
- Schenker, Y., F. Wang, S. J. Selig, R. Ng, and A. Fernandez. 2007. "The Impact of Language Barriers on Documentation of Informed Consent at a Hospital with On-Site Interpreter Services." *Journal of General Internal Medicine* 22 (S2): 294–9.
- Shin, H. B., and R. Bruno. 2003. "Language Use and English-Speaking Ability: 2000" [accessed on October 23, 2010]. Available at <http://www.census.gov/prod/2003pubs/c2kbr-29.pdf>.
- Tang, G., O. Lanza, F. M. Rodriguez, and A. Chang. 2011. "The Kaiser Permanente Clinician Cultural and Linguistic Assessment Initiative: Research and Development in Patient-Provider Language Concordance." *American Journal of Public Health* 101: 205–8.
- Tidwell, L.. 2009. *Kaiser Permanente-Southern California Physicians Language Concordance Program: Meeting the Needs of LEP Patients*. Oakland, CA: Health Care Interpreter Network: From Ad-Hoc to Best Practices in Healthcare Interpreting.
- U.S. Census Bureau. 2001. "Profiles of General Demographic Characteristics, 2000 Census of Population and Housing" [accessed on May 20, 2011]. Available at <http://www.census.gov/prod/cen2000/dp1/2khus.pdf> – author's calculation based on the data.
- U.S. Department of Health and Human Services, Office of Minority Health. 2001. "National Standards for Culturally and Linguistically Appropriate Services in Health Care" [accessed on October 23, 2010]. Available at <http://www.omhrc.gov/assets/pdf/checked/executive.pdf>.
- Yoon, J., K. Grumbach, and A. Bindman. 2004. "Access to Spanish-Speaking Physicians in California: Supply, Insurance, or Both." *Journal of the American Board of Family Practice* 17 (3): 165–72.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.