Do Physicians with Self-Reported Non-English Fluency Practice in Linguistically Disadvantaged Communities?

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BACKGROUND: Language concordance between physicians and patients may reduce barriers to care faced by patients with limited English proficiency (LEP). It is unclear whether physicians with fluency in non-English languages practice in areas with high concentrations of people with LEP.

OBJECTIVE: To investigate whether physician non-English language fluency is associated with practicing in areas with high concentrations of people with LEP.

DESIGN: Cross-sectional cohort study.

PARTICIPANTS: A total of 61,138 practicing physicians no longer in training who participated in the California Medical Board Physician Licensure Survey from 2001–2007.

MEASURES: Self-reported language fluency in Spanish and Asian languages. Physician practice ZIP code corresponding to: (1) high concentration of people with LEP and (2) high concentration of linguistically isolated households.

METHODS: Practice location ZIP code was geocoded with geographic medical service study designations. We examined the unadjusted relationships between physician self-reported fluency in Spanish and selected Asian languages and practice location, stratified by race-ethnicity. We used staged logistic multiple variable regression models to isolate the effect of self-reported language fluency on practice location controlling for age, gender, race-ethnicity, medical specialty, and international medical graduate status.

RESULTS: Physicians with self-reported fluency in Spanish or an Asian language were more likely to practice in linguistically designated areas in these respective languages compared to those without fluency. Physician fluency in an Asian language [adjusted odds ratio (AOR)=1.77; 95% confidence intervals (CI): 1.63–1.92] was independently associated with practicing in areas with a high number of LEP Asian speakers. A similar pattern was found for Spanish language fluency (AOR=1.77; 95% CI: 1.43–1.82) and areas with high numbers of LEP Spanish-speakers. Latino and Asian race-ethnicity had the strongest effect on corresponding practice location, and this association was attenuated by language fluency.

CONCLUSIONS: Physicians who are fluent in Spanish or an Asian language are more likely to practice in geographic areas where their potential patients speak the corresponding language.

INTRODUCTION

In California 6.7 million people have limited English proficiency (LEP). Those who speak Spanish and Asian languages make up 69% and 22% of this group, respectively[1]. Patients with LEP are at an increased risk of receiving lower quality of care including worse doctor-patient communication[2–5]. Because language diversity is increasing rapidly in California and the US, there is a growing need for physicians who can provide culturally and linguistically appropriate health care services[6,7]. Linguistic concordance between physicians and their patients with LEP facilitates effective doctor-patient communication and may improve the quality of health care provided to these patients[8–11].

A recent report on California physicians' linguistic diversity found that 18% and 13% of practicing physicians reported speaking Spanish or an Asian language, repectively[12]. Little is known about whether physicians who are fluent in these languages are geographically distributed in a way that promotes access to language-concordant physicians among patients with LEP. Few studies have examined this important relationship for commonly spoken non-English languages other than Spanish[13].

We sought to examine the association between physicians' self-reported fluency in two non-English languages (Spanish and Asian languages) with practicing in an area with a high concentration of LEP or linguistically isolated households (LIH) in those corresponding languages. We hypothesized that re-

gardless of a physician's race-ethnicity, there are differences in practice location based on language fluency.

METHODS

Data Sources

We examined cross-sectional re-licensure survey data collected between 2001 and 2007 by the California Medical Board from 109,763 licensed physicians with doctor of medicine (MD) degrees[14]. The survey response rate was 83%. Eligible physicians (n=61,138) had a practice address in California and had completed training. Ten percent of survey respondents were missing language fluency data and 6% were missing race-ethnicity. Only cases with complete data were retained for this study. Additional details of this data source have been published elsewhere[12,15–17].

Outcome Measures

Two outcome measures were constructed by assigning physicians to a Medical Service Study Area (MSSA) based on geocoding[18] practice ZIP code and linking MSSAs to Census variables on language use. Based on earlier work[15], MSSAs were classified based on whether they were in the top quintile (dichotomous: yes/no) of all MSSAs in the 2000 Census estimates for (1) the percentage of residents who were LEP and spoke either Spanish or a selected Asian language, and (2) the percentage of households that were LIH in Spanish or an

Asian language. We refer to these geographic areas in the top quintiles as being linguistically disadvantaged.

Independent Variables

We examined two survey items querying physicians about language fluency and race-ethnicity. Race-ethnicity was created from a survey question with 28 response options. Respondents could indicate languages spoken other than English with 34 options. A dichotomous Spanish and Asian fluency category was created for those who self-reported the corresponding language. The Asian language variable was created by collapsing responses from physicians fluent in the following: Cantonese, Mandarin, "other" Chinese dialects, Hmong, Cambodian, Vietnamese, Thai, Lao, Mien, Samoan, Tagalog, Ilocano, Japanese, and Korean. Our categorization of languages was dictated by the availability of the 2000 US Census. Physicians who reported fluency in languages other than Spanish or an Asian language were categorized in an "all other languages" category (dichotomous: yes/no).

Physician specialty was categorized as primary care (family medicine, general internal medicine, and general pediatrics) or non-primary care. Other independent variables included age (<35, 35–44, 55–64, and ≥65 years), gender, and international medical graduate (IMG) status [categorized as US medical graduate (USMG) or IMG].

Statistical Analysis

All statistical analyses were performed using Stata 10.1 statistical software (College Station, TX). Descriptive statistics were computed comparing physician characteristics by lan-

Table 1. Physician Characteristics by Selected Language Fluency

Physician characteristic	Physician language fluency				
	Speaks Spanish (n=10,956)	P-value[*]	Speaks Asian language[†] (n=7,695)	P-value[‡]	Does not speak Spanish or Asian Language[§] (n=43,314)
Race-ethnicity (%)					
White	57	<0.001	6	<0.001	79
Black	3		<1		3
Latino	22		<1		1
Asian/Pacific Islander	15		87		2
Other	4		6		15
Age (years) (%)					
<35	5	<0.001	5	<0.001	3
35–44	27		30		23
45–54	30		26		29
55–64	27		25		28
≥65	10		15		17
Female (%)	30	<0.001	32	<0.001	26
US medical graduate (%)	73	<0.001	50	<0.001	81
Specialty (%)					
Primary care	43	<0.001	44	<0.001	30
Non-primary care	57		56		70

(1) The USMG category includes physicians who graduated from Canadian medical schools; (2) physicians who selected their race-ethnicity as Chinese, Japanese, Korean, Cambodian, Indonesian, Laotian/Hmong, Thai, Vietnamese, Fijian, Filipino, Guamanian, Hawaiian, Samoan, Tongan, or other Pacific Islander were categorized as Asian/Pacific Islander; and (3) primary care specialties include general internal medicine, family medicine, general pediatrics
[*]*Comparison between Spanish-speaking physicians and the "does not speak Spanish or Asian Language" reference group as assessed by χ^2 test*
[†]*Mandarin, Cantonese, other Chinese, Japanese, Korean, Cambodian, Hmong, Mien, Thai, Laotian, Vietnamese, Tagalog, Ilocano, "other" Asian language*
[‡]*Comparison between Asian language physician group and the "does not speak Spanish or Asian Language" reference group as assessed by χ^2 test*
[§]*English, Indo-European languages, and all other languages*

guage fluency; the percentage of physicians with self-reported fluency in one of the selected languages within racial-ethnic groups; and language fluency based on practice location. These analyses were repeated for each racial-ethnic group. We compared categorical variables between groups with χ^2 tests.

By using a staged approach to our regression analyses, we isolated the effect of language fluency on the study's outcome measures. We conducted six models (three for each language: Spanish and Asian) for our two practice location outcomes (high LEP and high LIH) and controlled for age, gender, and race-ethnicity in the base models. In the second set of models, we added medical specialty and IMG status[19,20]. The final models included a language fluency variable. Because the pattern of results for the high LEP and high LIH regressions were highly similar, we only report the high LEP results. We used studies in the literature to select covariates and model

Table 2. Spanish Language Fluency and Race-Ethnicity by Physician Practice Location Characteristics

Physician race-ethnicity and Spanish fluency	Characteristics of primary practice location[*]	
	High % of Spanish-speaking LIH[†]	High % of Latinos with LEP[‡]
Latino		
Fluent in Spanish (n=2,419)	38%	39%
Not fluent in Spanish (n=323)	20%	21%
P	<0.001	<0.001
Non-Latino white		
Fluent in Spanish (n=5,253)	23%	24%
Not fluent in Spanish (n=27,211)	15%	15%
P	<0.001	<0.001
Asian/Pacific Islander		
Fluent in Spanish (n=1,299)	38%	37%
Not fluent in Spanish (n=9,186)	25%	24%
P	<0.001	<0.001
Black		
Fluent in Spanish (n=323)	44%	41%
Not fluent in Spanish (n=1,377)	31%	31%
P	<0.001	<0.001
Other race-ethnicities		
Fluent in Spanish (n=724)	36%	36%
Not fluent in Spanish (n=4,533)	25%	24%
P	<0.001	<0.001
Missing race-ethnicities		
Fluent in Spanish (n=983)	28%	28%
Not fluent in Spanish (n=7,507)	18%	18%
P	<0.001	<0.001

Statistical significance assessed by χ^2 test; race-ethnicity categories allow for physicians to report more than one race-ethnicity
[*]*MSSA at the ≥80th percentile for selected language use characteristics of population based on 2000 Census data*
[†]*LIH = linguistically isolated household is one in which no person aged 14 years or older speaks a language other than English and speaks English at least "very well." Specifically, a household in which all members 14 years old and over speak a non-English language and also speak English less than "very well" is linguistically isolated. Source: US Census*
[‡]*LEP = Limited English proficiency, speak English "less than very well"*

Table 3. Physician Asian Language Fluency and Race-Ethnicity by Physician Practice Location Characteristics

Physician race-ethnicity and language fluency	Characteristics of primary practice location[*]	
	High % of Asian-speaking LIH[†]	High % of Asians with LEP[‡]
Asian/Pacific Islander		
Fluent in Asian language[§] (n=7,218)	36%	35%
Not fluent in Asian language (n=4,024)	24%	23%
P	<0.001	<0.001
Non-Latino white		
Fluent in Asian language (n=236)	23%	21%
Not fluent in Asian language (n=33,366)	17%	16%
P	0.03	0.06
Other race-ethnicity[‖]		
Fluent in Asian language (n=719)	43%	32%
Not fluent in Asian language (n=13,805)	20%	19%
P	<0.001	<0.001

Statistical significance assessed by χ^2 test; race-ethnicity categories allow for physicians to report more than one race-ethnicity
[*]*MSSA at the ≥80th percentile for selected language use characteristics based on 2000 Census data*
[†]*LIH = linguistically isolated household is one in which no person age 14 years or older speaks English at least "very well." Source: US Census*
[‡]*LEP = Limited English proficiency, speak English "less than very well"*
[§]*Asian languages include Mandarin, Cantonese, other Chinese, Japanese, Korean, Cambodian, Hmong, Mien, Thai, Laotian, Vietnamese, Tagalog, Ilocano, other Asian language*
[‖]*Due to small sample size, this category includes black, Latino, and other physicians including those with missing race-ethnicity*

physician factors associated with practice location[13,19,21–25]. For all analyses in this study, a p-value of <0.05 was used to determine statistical significance.

RESULTS

Physicians included 10,956 self-reported Spanish-speakers, 7,695 self-reported Asian language speakers, and 43,314 who self-reported speaking English only or any combination of all languages other than Spanish and Asian (Table 1). Twenty-two percent of Spanish-speaking physicians were Latino, and 57% were non-Latino white. Seventy-three percent of those who self-reported fluency in Spanish were USMGs. More than 85% of all physicians who self-reported speaking an Asian language were Asian. Half of those with fluency in an Asian language were IMGs. Physicians in primary care were more likely than those in other specialties to speak Spanish or Asian languages.

Unadjusted Results

Regardless of race-ethnicity, language fluency is associated with a higher likelihood of practicing in LEP and LIH communities for both Spanish and Asian language-speaking physicians (Tables 2 and 3). Non-Latino white physicians were least

likely to practice in these geographic areas, even when accounting for corresponding language fluency. Although few non-Asian physicians spoke Asian languages, those who spoke Asian languages were more likely to practice in areas with high proportions of LEP and LIH Asians.

Adjusted Results

Table 4 reports the adjusted odds ratio (AOR) for physician characteristics predicting practice location in an area with a high number of Spanish or Asian language-speaking individuals with LEP. In Model 1, being a minority physician was significantly associated with practicing in both Spanish and Asian linguistically disadvantaged areas. After controlling for IMG status and primary care specialty in Model 2, the magnitude of this association decreased for Latinos, Asians, and those who were "Other" race-ethnicities. After we included a variable for self-reported Spanish fluency in Model 3, we observed a decrease in the magnitude of the AOR only for Latino physicians. Self-reporting Spanish fluency was significantly associated (AOR= 1.77; 95% CI: 1.67, 1.87) with practicing in an MSSA with a high number of Spanish-speakers with LEP.   In Model 4, being a physician of an Asian race-ethnicity (AOR=2.24; 95% CI: 2.13, 2.35) was independently associated with practicing in areas with a high number of Asian language speakers with LEP compared to non-Latino whites. When we controlled for IMG status and primary care specialty (Model 5), the positive relationship between Asian race-ethnicity and practicing in an area with significant numbers of Asian language speakers with LEP changed slightly. Controlling for self-reported fluency in selected Asian languages, Model 6, resulted in a notable decrease in this relationship. Self-reporting fluency in an Asian

language was independently associated (AOR=1.77; 95% CI: 1.63, 1.92) with practicing in an MSSA with a high number of persons who speak an Asian language and are LEP.

DISCUSSION

This study sought to determine if physicians with fluency in Spanish or an Asian language practice in linguistically disadvantaged communities. We find that regardless of race-ethnicity, self-reported fluency in Spanish or selected Asian languages is independently associated with a higher likelihood of having a primary practice location in areas with relatively large numbers of people with LEP who speak these corresponding languages. Spanish and Asian language fluency attenuated the effect of race-ethnicity on practice location when a physician's language fluency complemented race-ethnicity. Our results are in agreement with those from Yoon et al. and extend that study to incorporate findings on Asian languages[13].

Our results show that non-Latino White Spanish-speakers were least likely to co-locate in these linguistically disadvantaged areas compared to all other physician race-ethnic groups with Spanish fluency. Since non-Latino white physicians are the majority of physicians who self-reported speaking Spanish, our findings suggest that they may be less likely to use their bilingual skills in clinical practice. Language fluency may indicate an affinity for a particular culture. For Latino physicians, Spanish fluency is independently associated with practicing in areas with a high number of Spanish-speakers with LEP, and is intrinsically linked to ethnicity and culture and less likely a learned experience. This same pattern was observed for Asian physicians fluent in an Asian language.

Table 4. Adjusted Odds Ratio (AOR) of Practicing in MSSA with a High Number (>80th percentile) of Spanish or Asian Language-Speaking Individuals with Limited English Proficiency (LEP) by Selected Physician Characteristics

Physician characteristic	High Spanish LEP* areas			High Asian language LEP areas		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Race-ethnicity						
White	Ref	Ref	Ref	Ref	Ref	Ref
Latino	2.96 (2.73, 3.22)	2.60 (2.38, 2.84)	1.76 (1.60, 1.93)	1.10 (1.00, 1.22)	1.09 (0.98, 1.21)	1.10 (0.99, 1.22)
Black	2.38 (2.15, 2.65)	2.44(2.18, 2.72)	2.41 (2.16, 2.70)	1.38 (1.23, 1.55)	1.43(1.27, 1.62)	1.43(1.26, 1.61)
Asian/Pacific Islander	1.70 (1.61, 1.79)	1.46 (1.38, 1.54)	1.52 (1.43, 1.60)	2.24 (2.13, 2.35)	2.17 (2.06, 2.30)	1.51 (1.40, 1.63)
Other	1.74 (1.62, 1.86)	1.32 (1.23, 1.43)	1.38 (1.28, 1.49)	1.44 (1.34, 1.55)	1.39 (1.28, 1.50)	1.35 (1.25, 1.46)
Medical school of graduation						
US medical graduate†	—	0.60 (0.57, 0.63)	0.61 (0.58, 0.64)	—	0.92 (0.87, 0.97)	0.98 (0.92, 1.03)
Medical specialty						
Primary care‡	—	1.16 (1.11, 1.21)	1.12 (1.07, 1.17)	—	1.06 (1.01, 1.10)	1.05 (1.00, 1.10)
Language fluency						
Spanish fluency	—	—	1.77 (1.67, 1.87)	—	—	—
Asian language fluency§	—	—	—	—	—	1.77 (1.63, 1.92)

(1) All models also adjusted for physician age and gender; (2) ref = referent category; (3) CI = confidence intervals; (4) AOR = adjusted odds ratio, (5) Medical Service Study Area (MSSA) at the ≥80th percentile for selected language use characteristics of population based on 2000 Census data; and (6) the regression analyses were also performed using two other approaches: (a) categorizing physicians by race-ethnicity and then stratifying by language fluency, and (b) separating physicians with fluency in Asian languages into two categories (Pacific Islander and other Asian language speakers). The main findings did not differ from those found on the reported approach
*LEP = Limited English proficiency, speak English "less than very well"
†The USMG category includes physicians who graduated from Canadian medical schools
‡Primary care specialties include general internal medicine, family medicine, general pediatrics
§Asian language = Mandarin, Cantonese, other Chinese, Japanese, Korean, Cambodian, Hmong, Mien, Thai, Laotian, Vietnamese, Tagalog, Ilocano, or other Asian language

These trends suggest that language fluency may be linked to additional factors that promote practice in linguistically disadvantaged areas. Language fluency could be a learned experience for non-native speakers who chose to work in LEP communities or adjust to changing demographics. For IMGs, other incentives may influence why they locate in certain communities, based on J-1 visa waivers, professional networks, or practice recruitment[19,26]. IMGs who are more likely to locate in LEP areas, report fluency in the dominating language of those areas. Future studies should investigate why physicians practice in linguistically defined areas and how they make these career choices[27].

Strengths of our study include the large sample size and detailed data on language fluency and race-ethnicity included. To our knowledge, no other state collects linguistic data at this level of detail. Our study has limitations. Our results are cross-sectional, may not be generalizable to other states, and we do not have objective measures of the patients cared for by each physician. Patients may seek physicians with desired language fluency and travel outside their immediate community to utilize health care services[28], and geographic proximity may not fully reflect actualized access to a language concordant physician. We have no systematic objective measurement of physician language fluency; however, studies indicate that self-report is an adequate measurement of fluency[29,30].

Our findings emphasize the need for physician workforce policy and data collection that are better aligned with federal regulations focused on culturally and linguistically appropriate health care services[31,32]. In summary, this study demonstrates that physician self-reported language fluency is independently associated with practicing in a linguistically disadvantaged area.

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