The Impact of Medical Interpreter Services on the Quality of Health Care: A Systematic Review

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Twenty-one million Americans are limited in English proficiency (LEP), but little is known about the effect of medical interpreter services on health care quality. A systematic literature review was conducted on the impact of interpreter services on quality of care. Five database searches yielded 2,640 citations and a final database of 36 articles, after applying exclusion criteria. Multiple studies document that quality of care is compromised when LEP patients need but do not get interpreters. LEP patients' quality of care is inferior, and more interpreter errors occur with untrained ad hoc interpreters. Inadequate interpreter services can have serious consequences for patients with mental disorders. Trained professional interpreters and bilingual health care providers positively affect LEP patients' satisfaction, quality of care, and outcomes. Evidence suggests that optimal communication, patient satisfaction, and outcomes and the fewest interpreter errors occur when LEP patients have access to trained professional interpreters or bilingual providers.

Keywords: *translating; communication barriers; language; physician-patient relations; quality of health care; patient satisfaction*

Between 1990 and 2000, the number of people in the United States speaking a language other than English at home increased from 31.8 million to 47.0 million, and the number of Americans limited in English proficiency (LEP) rose

This article, submitted to *Medical Care Research and Review* on October 31, 2003, was revised and accepted for publication on April 9, 2004.

Medical Care Research and Review, Vol. 62 No. 3, (June 2005) 255-299
DOI: 10.1177/1077558705275416
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from 14 million to 21.4 million (U.S. Census Bureau 1990, 2000). This marked growth in the number of Americans who speak a language other than English at home or who are LEP can be attributed to the rapid increase in the foreign-born population in the United States, which grew from 9.6 million in 1970 to 28.4 million in 2000 (U.S. Census Bureau 2001). The vast majority of LEP Americans (64 percent, or 13.8 million) speak Spanish; Asian/Pacific Island languages (led by Chinese) are the next most common among LEP Americans (comprising 17 percent, or 3.6 million), followed by other Indo-European languages (16 percent, or 3.4 million) and all other languages (3 percent, or 600,000) (U.S. Census Bureau 2003). Using conservative estimates from the 1990s (U.S. Census Bureau 2003), projections indicate that by 2010, there will be at least 69 million Americans who speak a language other than English at home (a 47 percent increase) and at least 28.4 million LEP Americans (a 33 percent increase).

A substantial number of studies document how language barriers can have a major adverse impact on health and health care, including impaired health status (Kirkman-Liff and Mondragón 1991; Hu and Covell 1986); a lower likelihood of having a usual source of medical care (Kirkman-Liff and Mondragón 1991; Hu and Covell 1986; Weinick and Krauss 2000); lower rates of mammograms, pap smears, and other preventive services (Marks et al. 1987; Woloshin et al. 1997); a greater likelihood of a diagnosis of more severe psychopathology and leaving the hospital against medical advice among psychiatric patients (Marcos et al. 1973; Baxter and Bucci 1981); an increased risk of drug complications (Gandhi et al. 2000); and higher resource utilization for diagnostic testing (Hampers et al. 1999). There has been no published systematic review, however, of the effect of medical interpreter services on the quality of health care. Not enough is known, for example, about whether interpreter services affect health care processes, outcomes, patient satisfaction, patient-provider communication, costs, or medical errors. The aim of this article, thus, is to systematically review the published literature on the impact of interpreter services on the quality of health care.

NEW CONTRIBUTION

A review of the literature indicates that this is the first published systematic review (to my knowledge) examining the impact of interpreter services on

I thank Vanessa Brown for assistance with the literature search and Maureen O'Reilly and Nicole Fitzhugh for clerical assistance. This article was commissioned by the National Standards for Health Care Language Services project, with support from the Office of Minority Health. I am grateful to Guadalupe Pacheco, Ann Kenny, and the American Institutes for Research for their comments on earlier drafts of this article.

quality in health care. This topic is important because it affects the more than 21 million Americans who are LEP, and a systematic review will be useful in identifying the critical issues in this area for health care providers, institutions, and policy makers.

METHOD

The databases used for this systematic review included MEDLINE (from 1966 to Week 2 of January 2003), CANCERLIT (1975 to October 2002), CINAHL (1982 to December 2002), HealthSTAR (1975 to December 2002), and PsycINFO (1974 to Week 4 of 2003). The literature search of these databases was performed both with *interpreter* as the keyword and with the appropriate default Medical Subject Heading term for *interpreter* (*translating*). This initial search yielded 2,640 citations published in multiple languages. The abstracts of all 2,640 citations were reviewed, and articles were excluded if they (1) were opinion pieces, letters to the editor, or review articles; (2) did not directly address interpreter services; and (3) did not directly address a health care quality issue, including processes, outcomes, patient satisfaction, costs, adherence, medical errors, and patient understanding of medical information. The Institute of Medicine's (Lohr 1990) definition of quality of care was used, which holds that quality consists of "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." In particular, the focus was on the Institute of Medicine's (2001) six aims for the 21st-century health care system of safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity. The patient-centeredness definition used in this literature review emphasized two key levels of quality assessment as described by Donabedian (1988): physician-patient communication and patient satisfaction. For the purposes of this study, *interpreter services* were defined as any intervention involving an interpreter that was intended to enhance language access for an LEP patient, including the use of any type of medical interpreter (from trained professional interpreters to ad hoc interpreters, including family members, friends, and untrained medical or nonmedical staff), and telephone interpreter services. Articles addressing sign language and interpreter services for the deaf were excluded from this analysis, as the focus was interpreter services for those facing spoken language barriers. Abstract review, application of these exclusion criteria, and elimination of citations duplicated in multiple databases yielded 76 papers, all of which were in English. Both international and U.S. studies were included because the included papers indicate that there are similarities in how language barriers affect health care around the world, a diversity of populations was desired, and the intent was

to conduct a systematic review with potential international implications. These 76 articles were photocopied; further review of these photocopied articles and application of the exclusion criteria yielded a final database of 36 published articles. The design, analysis, conceptual framework, and findings of each of the final 36 articles were then reviewed to assess the scientific and theoretical merit of included studies.

RESULTS

Topics addressed by the published literature on the impact of interpreter services on quality in health care were classified using three general categories: (1) communication issues; (2) patient satisfaction with care; and (3) processes, outcomes, complications, and use of health services. At the end of the section for each category, a summary is provided that addresses the key findings of the more methodologically rigorous studies and the implications for policy and future research.

COMMUNICATION ISSUES

Communication Quality for Those Needing But Not Getting an Interpreter

Several studies examined the quality of communication when various interpreter types are used, and the findings are summarized in Table 1. A study of 467 patients in an urban emergency department (ED) (Baker et al. 1996) revealed that patients' self-reported understanding of their discharge diagnosis and self-reported understanding of their treatment plan were significantly more likely to be poor or fair among those who needed but did not get an interpreter, compared with those who used an interpreter and those who were proficient in English (62 percent vs. 43 percent vs. 34 percent, respectively, for discharge diagnosis, and 42 percent vs. 19 percent vs. 14 percent, respectively, for treatment plan). Those who needed but did not get an interpreter were most likely (90 percent) to wish that the health care provider had explained things better, followed by those who used an interpreter (63 percent) and those who were proficient in English (34 percent). Information abstracted from medical records, however, showed that patients who used interpreters were significantly more likely than those not needing interpreters to incorrectly describe their diagnosis and report that physicians did not mention their diagnosis, but those needing but not getting interpreters did not

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TABLE 1 A Summary of Published Studies on the Impact of Interpreter Services on Communication Quality in Health Care

First Author	*Sample Size*	*Principal Findings*	*Comments*
Baker (1996)	467	Patients' understanding of diagnosis and treatment significantly worse when interpreters needed but not used Greater proportions of patients using interpreters or had none but wanted one wished examiner explained things better versus those not needing interpreter Patients with interpreters more often incorrectly described diagnosis and reported doctor did not say diagnosis versus those not needing interpreter Interpreter need/use had no impact on correctly describing medications or identifying all appointments	Mixture of interpreter types used (bilingual providers, professional interpreters, ad hoc interpreters), but effect of each interpreter type on outcomes not examined LEP population limited to Spanish speakers
David	261	LEP patients with ad hoc interpreters less likely than EP patients to report medication side effects explained No difference between LEP and EP patients in reports that doctor understands how they feel, having enough time to communicate with doctor, and doctor discussed mammography and cervical cancer screening	Interpreters: untrained medical office assistants Subjects predominantly Spanish speakers 4 LEP cases without interpreter not analyzed separately

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TABLE 1 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Flores	13	Errors committed by ad hoc interpreters significantly more likely to have potential clinical consequences versus those by professional interpreters Interpreters averaged 31 errors per encounter and 19 errors of potential clinical consequence per encounter Omission errors most common, followed by false fluency, substitution, editorialization, and addition Providers committed most false fluency errors and were 11 times more likely to make false fluency errors when professional interpreter used (usually when interpreter on phone or out of room) Interpreter errors may be root cause of medical errors as several documented mechanisms for medical errors observed, including being told to use wrong dose, frequency, duration, or mode of administration of drugs and other therapeutic interventions, and omitting information about drug allergies and past medical history	Limited to Spanish speakers Professional interpreters had limited or no training

Seijo	51	Patients seen by bilingual physicians had significantly better overall information recall than those seen by monolingual physicians, as well as recall by information category (diagnosis, labs, etc.) In monolingual physician group, recall among those using interpreter (43 percent) was lower than those who spoke English (58 percent) or Spanish (64 percent) with physician Patients with bilingual physicians asked significantly more questions than those seen by monolingual physicians	Limited to Latinos and Spanish speakers 27 patients with monolingual English physicians included 15 EP, 9 LEP with interpreter, and 3 LEP without interpreter No statistical tests of differences by information category or interpreter use Type/training of interpreter not specified No multivariate adjustment
Kuo	149 patients; 51 residents	Patients reported greater comfort discussing sensitive/embarrassing subjects when family members/friends interpreted or they had bilingual physicians vs. professional hospital, staff, or telephone interpreters	Limited to Spanish speakers Response rate of residents only 69 percent No quantitative data or statistical tests for statements regarding comfort discussing various issues
Leman	28	In 28 LEP patients who used some form of interpreter, physicians reported visit could have been improved by use of additional interpreter services in 43 percent of cases Physicians felt additional interpreter services were required for most encounters using telephone line, employers, or bilingual staff, but for 17 percent of cases using friends as interpreters and 15 percent using relatives	Small sample size of LEP patients with interpreters Few data collected and no statistical analysis done Underpowered to compare different interpreter types

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TABLE 1 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Hornberger (1997)	301	In bivariate analysis, physicians using trained interpreters significantly more satisfied with quality of interpreter services versus those using untrained staff or those using family members/companions Multivariate analysis showed no differences in satisfaction with quality among three interpreter categories	
Hornberger (1996)	49	In this randomized trial comparing remote-simultaneous versus proximate-consecutive interpretation, physicians reported improved eye contact, but wires would occasionally interfere with physical exam in patients in remote-simultaneous group Remote-simultaneous service had 10 percent more total physician utterances and 28 percent more mother utterances Remote-simultaneous service had significantly more questions asked per visit and more physician and mother explanations Remote-simultaneous service had 13 percent lower rate of inaccurately interpreted mother utterances per visit, but no intergroup difference in accuracy of physician utterances	Limited to Spanish speakers After first visit, family alternated interpreter type in subsequent visits Proximate-consecutive interpreters full-time clinic staff with 6 months of interpreter experience, but prior training unspecified, and they used the third person when interpreting Simultaneous interpreters received 15 hours of training and used first person when interpreting Only 17 families had at least two visits and completed the end-of-study surveys

Elderkin-Thompson	21	10/21 (48 percent) of encounters contained minor interpretive errors that were not clinically significant Uncomplicated cases "half as likely" to have communication difficulties as complicated cases Successful encounter features: using simple sentence construction; working slowly; careful attention to nonverbal cues; minimal editing; physician restatement of patients' comments, with interpreter back-translation Problematic encounter features: physician failure to redefine problems in face of contradictory information, interpreter solving differing perceptions by providing contradictory clinical information thought to be expected by physician, paternalistic editing and omission by interpreter, not providing cultural explanation of idiom Despite interpreter errors, medical record review did not reveal cases of inappropriate care	Limited to Spanish speakers All encounters interpreted by nurse interpreters
Ebden	4	Ad hoc interpreters (all family members) misinterpreted or omitted 23 to 52 percent of questions asked by physicians "More than 80 words" in 143 questions and answers mistranslated, misunderstood, or not translated Children interpreting embarrassed by/ignored questions regarding menses, bowel movement, other bodily functions	Limited to Gujarati speakers

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TABLE 1 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Launer	30	Interpreter errors can exclude or distort key clinical information Interpreters often independently questioned the patient, resulting in needless repetition, irrelevant questions, and conflicts with patients and physicians	Unspecified if any orderly had interpretation training Terms ("deviations," "legitimate" vs. "illegitimate") not adequately defined
Lang	?	Distortions included omissions, additions, and truncations of patients' utterances that orderlies viewed as "irrelevant" or "too lengthy"	No mention made of number of interactions analyzed, nor number of orderlies who interpreted
Kline	61	Majority of LEP patients with interpreters said they understood their doctor and the doctor understood them, but majority of resident physicians said patients interviewed with interpreters felt less understood and communicate worse than EP patients, and both intergroup differences significant 76 percent of LEP patients with interpreters wanted to return for a second visit, but only 31 percent of resident physicians said these patients were eager to return, and only 6 percent comfortable seeing these patients beyond initial interview None of the resident physicians believed they helped LEP patients with interpreters as much as they helped EP patients, but 76 percent of LEP patients with interpreters felt their physician was helpful	Limited to Spanish speakers Statistical tests of many comparisons not displayed No multivariate adjustment of findings Types of interpreters and their training not specified

Farooq	20	No differences in LEP patients between bilingual psychiatrist and monolingual psychiatrist with interpreter in ratings for mental status exam or family history Qualitative analysis: minor distortions by interpreter, but had minimal impact on the elicitation of information	Bilingual psychiatrist evaluated performance of medical interpreter
Sabin	2	Author hypothesized use of interpreters with psychiatric patients may overemphasize psychotic features and underemphasize affective components, thus underestimating suicide risk	Limited to Spanish speakers Case reports with N = 2
Drennan (2002)	88	Lack of interpreters for LEP patients associated with distortions or overestimation of severity of impaired intellectual ability or thought disorders	Interchanges not audiotaped; based on written notes and investigator recall Limited to Xhosa speakers
Marcos	Focus groups: 14	Psychiatrists reported distortions associated with interpreter overidentifying with provider or patient	Limited to Spanish and Chinese speakers
	Encounters: 8	Psychiatrists and interpreters expressed concerns about protecting confidentiality of patients' communications Psychiatrists indicated assessment of affect and mental status had a high-probability distortion by interpreter Various types of clinically relevant errors noted in audiotaped encounters including omissions, additions, substitutions, and condensations; attributed to interpreters' competence and skills	Interpreters included a psychiatric nurse, a nurse's aide, and patients' relatives

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TABLE 1 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Marcos	Encounters: 8	Distortions occurred in the form of "normalization" of pathological symptoms by interpreters, including altering thought disorders such as circumstantiality, tangential thinking, loose associations, and blocking Relatives who interpreted tended to either minimize or emphasize psychopathology Relatives who interpreted often answered the clinician's questions without asking the patient	
Rivadeneyra	38	Patient "offers" (topics/questions) significantly more common in five of six areas for EP vs. LEP patients with interpreters EP patients made about three times as many offers to MDs as LEP patients with interpreters Physicians for EP patients had statistically significant higher patient-centeredness scores than physicians of LEP patients with interpreters	Training of nurse interpreters not described Limited to Spanish speakers Physician patient-centeredness score affected by interpreter omissions No adjustment for visit type (full physical vs. urgent care), which would affect outcomes Small, statistically significant differences in patient-centeredness scores (.5) of dubious clinical significance

Note: LEP = limited in English proficiency; EP = English proficient.

differ from either group, and there were no significant differences among the three groups in correctly describing medication directions and identifying appointments. This study, however, was limited by the great heterogeneity of interpreter types: 22 percent were bilingual physicians, 28 percent were bilingual nurses, only 12 percent were professional interpreters, 12 percent were family members or friends (one third of whom were children), 11 percent were hospital clerks, and 16 percent were "other people" in the ED.

Communication Quality with Ad Hoc Interpreters and Bilingual Physicians

A survey of Latinos in a primary care clinic (David and Rhee 1998) found that LEP patients with ad hoc interpreters were significantly more likely than English-proficient (EP) patients to have not been told of medication side effects. Audiotaped encounters in a pediatric clinic (Flores et al. 2003) revealed that errors committed by ad hoc interpreters (family members, friends, untrained medical and nonmedical staff, and strangers) were significantly more likely to be errors of potential clinical consequence than those committed by hospital interpreters (77 percent vs. 53 percent). In a study of Latinos in a general medicine clinic (Seijo, Gomez, and Freidenberg 1995), investigators found that compared with patients seen by monolingual English-speaking physicians, patients seen by bilingual physicians had significantly better overall information recall and recall by specific category (diagnosis, labs, treatment, recommendations, or social/personal issues) and asked significantly more questions. The 27 patients in the monolingual physician group, however, included 15 who were EP, 9 who were LEP and had an interpreter, and 3 who were LEP and had no interpreter. Those who spoke Spanish with their "monolingual" physician had better information recall (64 percent) than those who spoke English (58 percent) or had an interpreter (43 percent), but no statistical tests were performed, and the type and training of the interpreter were not specified. Another study of Latino LEP patients at a general medicine clinic (Kuo and Fagan 1999) found that patients reported "greater levels of comfort" in discussing sensitive issues or embarrassing subjects when they had bilingual physicians or family members/friends interpreted, compared with professional hospital, staff, or telephone interpreters. No actual quantitative data or statistical tests were provided, however, to support this statement.

Communication and the Adequacy and Type of Interpreter Services

Two methodologically limited studies examined physicians' assessment of the quality of interpreter services as secondary outcomes. A survey of all patients presenting to a British ED in 1 week (Leman 1997) found that for the 28 LEP patients who used an interpreter, the physician reported that the clinical encounter could have been improved by the use of additional interpreter services; specifically, the physicians stated that additional interpreter services would have improved encounters most when the interpreters were bilingual health workers (83 percent of cases, $N = 6$), employers (100 percent, $N = 2$), and telephone services (100 percent, $N = 1$), and least when relatives (15 percent, $N = 13$) and friends (17 percent, $N = 6$) were used. This study, however, suffered from small sample sizes, no statistical analyses, and the lack of professional interpreters. A survey of 301 primary care physicians (Hornberger, Itakura, and Wilson 1997) revealed that those using trained interpreters rated the quality of interpretation services significantly higher than those using staff with no interpretation training or family members/other companions, but there were no significant differences in quality ratings of the three groups after adjustment in multivariate analysis.

A randomized controlled trial comparing remote-simultaneous interpretation (all participants wear headphones, and the interpreter interprets simultaneously in another room) with proximate-consecutive interpretation (traditional sequential interpretation with the interpreter in the same room) in 49 Spanish-speaking LEP families making their first well-baby visit (Hornberger et al. 1996) noted that there were 10 percent more physician utterances and 28 percent more utterances by mothers with remote-simultaneous interpretation. Significantly more questions were asked per visit, and there were more physician and mother explanations with remote-simultaneous interpretation, with a 13 percent lower rate of inaccurately interpreted mother utterances per visit, but there was no significant difference in the accuracy of interpretation of physician utterances. Methodological limitations included the following: (1) the proximate-consecutive interpreters were full-time clinic staff with 6 months of interpreter experience, but the prior training was not specified, and they used the third person in interpreting; (2) remote-simultaneous interpreters received 15 hours of training and used the first person when interpreting; and (3) only 17 families had at least two visits and completed the end-of-study surveys.

Interpreter Errors

Several studies have examined errors committed by interpreters and their potential effects on patient-provider interactions. In a study of 21 videotaped encounters of Spanish-speaking patients in a primary care clinic who had nurse interpreters (Elderkin-Thompson, Silver, and Waitzkin 2001), investigators found that 48 percent of encounters contained minor interpretive errors that were not clinically significant, but 52 percent had serious miscommunication problems that affected either the physicians' understanding of the symptoms or the "credibility" of the patients' concerns. Uncomplicated cases were half as likely to contain communication problems as complicated cases. Characteristics of successful encounters where misunderstandings did not occur included providers using simple sentence construction; providers and interpreters working slowly to understand and verify; careful attention to nonverbal cues; interpretation with minimal editing; and physician restatement of patients' comments, with back-translation by interpreters to patients. Characteristics of problematic encounters where serious miscommunication occurred included physician failure to redefine problems in the face of contradictory information, interpreters resolving differing perceptions of problems by providing contradictory clinical information that was thought to be expected by the physician, paternalistic editing and omission by interpreters, and not providing cultural explanations of an idiom. The investigators reported that despite interpreter errors, cases of "inappropriate care" were not noted in a review of medical records.

Three studies have documented the errors and distortions that can occur with ad hoc interpreters. Videotape analysis of four Gujarati-speaking patients in outpatient clinic encounters revealed the hazards of using family members to interpret (Ebden et al. 1988). Ad hoc interpreters (all family members) misinterpreted or omitted 23 to 52 percent of the questions asked by physicians. More than 80 words in the 143 questions and answers by patients and physicians were mistranslated, misunderstood, or not translated. Children who interpreted were embarrassed by, and tended to ignore, questions about menstruation, bowel movements, and other bodily functions. A study of audiotaped interactions in a Nigerian outpatient clinic where medical orderlies were used as interpreters (Launer 1978) revealed that errors by the interpreters can exclude or distort key clinical information. For example, the orderly interpreters changed "I pass stools with difficulty" to "severe pain when he's passing stools" and omitted decreased hearing and neck pain from one patient's complaints and walking difficulties and inability to straighten

the leg from another patient's complaints. Interpreters often independently questioned patients, resulting in needless repetition, irrelevant questions, and conflicts with patients and physicians. No mention was made of whether any of the seven orderlies who interpreted had received any formal interpretation training. An analysis of audiotaped interactions in two New Guinean hospitals in which medical orderlies without prior interpretation training were used as interpreters (Lang 1976) revealed communication distortions that included omissions, additions, and truncations of patients' utterances that orderlies viewed as "irrelevant" or "too lengthy." No mention was made of the number of interactions analyzed or the number of orderlies who interpreted.

Analysis of audiotapes of 13 encounters with Spanish-speaking children and their families in a pediatric primary care clinic (Flores et al. 2003) provided data on the frequency, categories, and potential clinical consequences of errors in medical interpretation and compared the quality of interpretation in professional hospital versus ad hoc interpreters. Interpreters averaged 31 errors per encounter; the most common error category was omission (52 percent), followed by false fluency (16 percent), substitution (13 percent), editorialization (10 percent), and addition (8 percent). Sixty-three percent of all errors had potential clinical consequences (defined as any error that altered or potentially altered one or more of the following: the history of present illness, the past medical history, diagnostic or therapeutic interventions, parental understanding of the child's medical condition, or plans for future medical visits [including follow-up visits and specialty referrals]), and there was a mean of 19 errors of potential clinical consequence per encounter. False fluency errors occurred more often during encounters with hospital than ad hoc interpreters (22 percent vs. 9 percent, $p = .001$). Health care providers made 76 percent of these false fluency errors, and 58 percent of these errors occurred while the interpreter was out of the room or on the phone, whereas the remaining 42 percent of errors were made by the provider without any correction by the interpreter. About three quarters (73 percent) of false fluency errors committed by hospital interpreters involved medical terminology, including not knowing the correct Spanish words for *level*, *results*, and *medicine*, and using the Puerto Rican colloquialism for mumps that could not be understood by a Central American mother.

This audiotape analysis of encounters in a pediatric primary care clinic (Flores et al. 2003) also showed that errors committed by ad hoc interpreters were significantly more likely to be errors of potential clinical consequence than those committed by hospital interpreters (77 percent vs. 53 percent, $p < .0001$). Of note, the hospital interpreters in this study had received no ongoing

training or formal performance evaluation as part of their employment (as is true in many U.S. hospitals), which the authors pointed out may account for their higher-than-expected rate of errors of potential clinical consequence. Errors of clinical consequence observed in this study included (1) omitting questions about drug allergies; (2) omitting instructions on the dose, frequency, and duration of antibiotics and rehydration fluids; (3) adding that hydrocortisone cream must be applied to the entire body, instead of solely to facial rash; (4) instructing a mother not to answer personal questions; (5) omitting that a child was already swabbed for a stool culture; and (6) instructing a mother to put amoxicillin in both ears for treatment of otitis media. The investigators suggested that interpreter errors of potential clinical consequence could be a previously unrecognized possible root cause of medical errors, given that several documented common mechanisms for medical errors were observed among the interpreter errors of clinical consequence, including being told to use the wrong dose, frequency, duration or mode of administration of drugs and other therapeutic interventions, and omitting relevant clinical information on drug allergies and the past medical history.

Communication, Interpreter Services, and Mental Health Care

Five studies examined how interpreter services can affect communication and the quality of psychiatric encounters. A survey of Latino patients in a psychiatric clinic and their monolingual English psychiatrists (all of whom were residents) (Kline et al. 1980) found that LEP Latinos who had interpreters were significantly more likely than EP Latinos to report that their psychiatrist helped them (76 percent vs. 40 percent, respectively) and that they achieved self-understanding (90 percent vs. 53 percent). In contrast, a substantial majority of psychiatrists believed that LEP patients interviewed with interpreters felt less understood (81 percent), were helped less (100 percent), appreciated the session less (81 percent), were less eager to return for subsequent visits (69 percent), and felt that they communicated worse (81 percent), compared with EP patients. The psychiatrists also unanimously agreed that interviews in English were more comfortable to them and more helpful to patients, and 94 percent were more satisfied with English interviews. The types and training of interpreters in this study, however, were not specified. Farooq, Fear, and Oyebode (1997) compared differences in assessments of 20 psychiatric patients by a bilingual psychiatrist and a monolingual psychiatrist with a trained professional interpreter. In the 10 LEP patients, there were no significant differences between psychiatrists in the ratings for any of the items on the

mental status exam or family history assessment. Similarly, for the control group of 10 EP psychiatric patients, no significant differences were found between the two psychiatrists in mental status exam or family history ratings. In the qualitative analysis, minor distortions by the interpreter were observed, but these were viewed as having minimal impact on the elicitation of information.

In an examination of two suicides by Spanish-speaking LEP patients evaluated and treated by monolingual English psychiatrists using an interpreter (trained in school counseling but apparently not in medical interpretation) (Sabin 1975), the author hypothesized that use of interpreters with psychiatric patients may overemphasize psychotic features and underemphasize affective components, thus underestimating suicide risk. A qualitative study of patients in a South African psychiatric hospital (Drennan and Swartz 2002) found that lack of interpreters for LEP patients was associated with distortions or overestimation of the severity of impaired intellectual ability or thought disorders. The study observations, however, were not audiotaped but were based on written notes and investigator recall. In another study that evaluated both audiotapes of psychiatric evaluations of LEP patients and focus groups of psychiatrists and ad hoc interpreters (including a nurse, a nurse's aide, and patients' relatives) (Marcos 1979), psychiatrists reported that assessments of affect and mental status had a higher probability of being distorted when interpreters were used, distortions also were associated with interpreters overidentifying with providers or patients, and that ambivalent patient attitudes were difficult to evaluate through interpreters. Both psychiatrists and interpreters expressed concerns about protection of the confidentiality of patients' communications when interpreters were used. Various types of clinically relevant errors were noted in audiotaped encounters including omissions, additions, substitutions, and condensations, and these problems were attributed to interpreters' competence and skills. Distortions occurred in the form of "normalization" of pathological symptoms by interpreters, including altering thought disorders such as circumstantiality, tangential thinking, loose associations, and blocking. For example, an interpreter "normalized" a patient's statements about God and completely omitted the comments that "they cannot get me" and "protection" was afforded by wearing "new pants." Relatives who interpreted tended to either minimize or emphasize psychopathology and often answered the clinician's questions without asking the patient. For example, the son of a patient was asked to inquire about his father's possible suicidal ideation; without asking his father, he insisted on a negative answer.

Other Communication Issues

In a study analyzing videotapes of the first primary care clinic visit of 19 Spanish-speaking LEP patients who had nurse interpreters and 19 Latino and non-Latino EP patients (Rivadeneyra et al. 2000), the authors concluded that LEP patients with interpreters made fewer comments, and the ones they made were more likely to be ignored. Patient "offers" (any topic or question introduced during the encounter that was not a direct answer to a physician's question) were found to be significantly more common in five of six categories (symptoms, expectations, thoughts, feelings, and nonspecific cues) for EP compared with LEP patients who had interpreters. Overall, EP patients averaged about three times more offers than LEP patients with interpreters (mean of 20 vs. 7, respectively), and the physicians of EP patients had statistically significantly higher patient-centeredness scores than physicians of LEP patients with interpreters (mean scores 1.1 vs. .6, respectively, on a scale ranging from 0 to 3). There were several methodological problems with this study, including the following: (1) it was not specified whether the nurse interpreters had any interpreter training; (2) the performance of interpreters affected the patient centeredness scores of physicians (physicians received lower scores if interpreters made omissions); (3) there was no adjustment for the clinical visit type (full physical vs. urgent care visit vs. brief follow-up), which would affect the primary outcomes; and (4) the small but statistically significant difference in the patient-centeredness scores (.5) is of dubious clinical and quantitative significance.

Summary

The most methodologically rigorous studies on interpreter services and communication reveal the following: (1) those who need but do not get interpreters have a poor self-reported understanding of their diagnosis and treatment plan and frequently wish their health care provider had explained things better; (2) ad hoc interpreters misinterpret or omit up to half of all physicians' questions, are more likely to commit errors with potential clinical consequences, have a higher risk of not mentioning medication side effects, and ignore embarrassing issues when children are ad hoc interpreters; and (3) interpreter services can affect communication and the quality of psychiatric encounters, including positive effects of bilingual providers, and an adverse impact of ad hoc and no interpreters. These findings indicate that ad hoc interpreters and having no interpreter can impair communication quality in health

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TABLE 2 A Summary of Published Studies on the Impact of Interpreter Services on Patient Satisfaction with Health Care

First Author	*Sample Size*	*Principal Findings*	*Comments*
Lee (LJ)	536	EP patients, LEP patients with bilingual providers, and LEP patients using AT&T Language Line did not differ in overall satisfaction with care or on any of seven individual aspects of satisfaction with care LEP patients who had family or untrained staff interpreters significantly less satisfied overall than EP patients and LEP patients with bilingual providers ("language concordant") Patients with family interpreters significantly less likely than language-concordant patients to be satisfied with provider listening, discussion of sensitive issues, and provider manner Patients with untrained staff interpreters significantly less likely than language-concordant patients to be satisfied with provider listening, provider answers, provider explanations, support, provider skills, and provider manner	Limited to Spanish speakers Professional medical interpreters not available at clinic
Pérez-Stable	236	No significant differences in patient satisfaction between patients with language-concordant physicians (LEP patients with bilingual physicians and EP patients with monolingual physicians) and those with language-discordant physicians (LEP patients with monolingual English physicians)	44 to 49 percent refusal rate for survey Limited to Spanish speakers Data not provided on whether any patients with language-discordant physicians used interpreters

Kuo	149 patients; 51 residents	Highest satisfaction for both patients and residents associated with professional hospital interpreters Patients significantly more likely than residents to be satisfied with family members/friends as interpreters and with bilingual physicians Residents significantly more satisfied than patients with telephone interpreters	Limited to Spanish speakers Response rate of residents only 69 percent Satisfaction considered to be either "somewhat" or "very" satisfactory responses No multivariate adjustment
Baker (1998)	457	Patients who did not need an interpreter had highest satisfaction; patients who used interpreter had significantly lower satisfaction, and those who needed but did not use interpreters had lowest satisfaction	85 percent of those not needing interpreter spoke Spanish with provider Mixture of interpreter types, but effect of each interpreter type on outcomes not examined
David	261	LEP patients with ad hoc interpreters significantly less likely to be satisfied with care, compared with EP patients	Interpreters were medical office assistants without training Subjects predominantly Spanish speakers 4 of 68 cases LEP and had not used an interpreter, but these 4 cases not analyzed separately
Kline	61	Almost twice as many LEP patients with interpreters said they were helped by their doctor versus EP Latinos LEP patients with interpreters more likely to feel they were helped with self-understanding	Limited to Spanish speakers Statistical tests of many comparisons not displayed No multivariate adjustment of findings

(continued)

TABLE 2 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Brooks	277	89 percent of patients who used interpreter services found them useful 11 percent who did not find interpreters useful cited unacceptable interpreter attitudes, such as being "rude" or "aggressive"	Limited to patients who spoke Urdu or Punjabi
Hornberger (1996)	49	Parents prefer remote-simultaneous vs. proximate-consecutive interpretation	Limited to Spanish speakers Family alternated interpreter type at each subsequent visit Proximate-consecutive interpreters full-time clinic staff with 6 months of experience, but prior training not specified, and they used the third person when interpreting Simultaneous interpreters received 15 hours of training and used the first person when interpreting Only 17 families had more than one visit and completed end-of-study survey

Note: LEP = limited in English proficiency; EP = English proficient.

care, suggesting that bilingual providers and trained medical interpreters may be the best option for optimal communication with LEP patients, a topic that would merit additional research, particularly in randomized trials.

PATIENT SATISFACTION

Eight studies have examined various aspects of interpreter services and how they affect patient satisfaction with care, and the findings are summarized in Table 2.

Comparison of Patient Satisfaction across Different Types of Interpreters

Only one study has compared patient satisfaction among LEP patients across a broad spectrum of interpreter services, including bilingual health care providers. A survey by Lee et al. (2002) of 536 EP and LEP patients at a walk-in clinic revealed that overall visit satisfaction did not differ among LEP patients with bilingual providers, EP patients, and LEP patients who used telephone interpreters, but LEP patients who had family members or medical and nonmedical support staff interpret were significantly less likely to be satisfied with their visit than language-concordant patients (LEP patients with bilingual providers and EP patients with monolingual English providers), at 54 percent versus 49 percent versus 77 percent satisfied, respectively. Compared with language-concordant patients, those who had support staff interpreters were significantly less satisfied with six of seven health care provider characteristics (listening, answers, explanations, support, skills, and manner), and those with family member interpreters were significantly less satisfied with three provider characteristics (listening, discussion of sensitive issues, and manner). In another study that examined satisfaction with bilingual health care providers, Pérez-Stable, Napoles-Springer, and Miramontes (1997) surveyed 236 Latino and white patients with hypertension and diabetes in an outpatient clinic (including 44 who were followed by bilingual clinicians) and found no significant differences in patient satisfaction between patients with language-concordant physicians (LEP patients with bilingual physicians and EP patients with monolingual physicians) and those with language-discordant physicians (LEP patients with monolingual English physicians). Data were not provided, however, on whether any of the patients with language-discordant physicians used interpreters.

Patient Satisfaction with Telephone Interpreters

Two studies have examined patient satisfaction with telephone interpreters. In a survey of 149 Spanish-speaking LEP patients and 51 resident physicians in a primary care clinic, Kuo and Fagan (1999) found that residents (75 percent) were significantly more likely than patients (47 percent) to be satisfied with telephone interpreters. The aforementioned Lee et al. (2002) study indicated that overall visit satisfaction and satisfaction with seven provider characteristics did not differ significantly among LEP patients with telephone interpreters, EP patients, and LEP patients with bilingual providers, but satisfaction with the visit and provider characteristics was significantly higher for these three interpretation types than for LEP patients with either family member or support staff interpreters.

Patient Satisfaction for Those Who Need But Do Not Get Interpreters

A cross-sectional survey by Baker, Hayes, and Fortier (1998) of 457 Latino patients seen in an urban ED showed that LEP patients who needed but did not get an interpreter had the lowest satisfaction with interpersonal aspects of care for any group of patients. Those who needed but did not get an interpreter had significantly lower scores than EP patients for all five satisfaction items (provider friendliness, spending enough time, respectfulness, showing concern, and made patient comfortable) and significantly lower scores than EP patients who had interpreters on three items (provider spending enough time, showing concern, and made patient comfortable). In multivariate analysis, saying that an interpreter was needed but not used was strongly associated with overall satisfaction scores.

Patient Satisfaction with Ad Hoc Interpreters

Two studies indicate that satisfaction with ad hoc interpreters is significantly lower. The previously cited study by Lee et al. (2002), which surveyed 536 patients in a primary care clinic, revealed that LEP patients with ad hoc interpreters were significantly less likely to be satisfied with their overall visit than language-concordant patients (LEP patients with bilingual providers and EP patients with EP providers) and significantly less satisfied on up to six of seven health care provider characteristics (listening, answers, explanations, support, skills, and manner). A second study in a different primary care clinic (David and Rhee 1998) showed that Latino LEP patients with ad hoc interpreters were significantly less satisfied with their care than Latino EP patients (80 percent vs. 95 percent satisfied, respectively). In the previously cited study of a

primary care clinic by Kuo and Fagan (1999), the investigators found that both patients and resident physicians were least satisfied with nonprofessional hospital employee interpreters (40 percent and 44 percent satisfied, respectively), but patients were significantly more likely than their physicians to be satisfied with interpreters who were family members or friends (85 percent vs. 62 percent satisfied, respectively). Both patients and physicians in this study, however, were most satisfied with professional hospital interpreters (98 percent and 92 percent satisfied, respectively), and at significantly higher levels than for other interpreter types.

Comparison of Patient Satisfaction between Those Needing and Those Not Needing Interpreters

Two studies had contradictory findings on the comparative satisfaction of LEP patients with interpreters. The previously cited Baker, Hayes, and Fortier (1998) study of Latino patients in an ED indicated that LEP patients who used an interpreter had significantly lower overall satisfaction scores and satisfaction with four of five health care provider interpersonal aspects of care (friendliness, respectfulness, showing concern, and made patient comfortable) than patients who did not use an interpreter and did not think an interpreter should have been called. This study, however, had several methodological problems, including the following: 85 percent of those who did not use an interpreter and did not think one should have been called spoke Spanish with their health care provider, and there was substantial heterogeneity of interpreter types among those patients who used interpreters, including nurses, physicians, family members, friends, hospital employees, and hospital interpreters (only 12 percent of all interpreters), but there was no analysis by interpreter type. In a survey of Latino patients in a psychiatric clinic (Kline et al. 1980), researchers found that almost twice as many LEP patients with interpreters said that they were helped by their doctor versus EP patients (76 percent vs. 40 percent, respectively), and LEP patients with interpreters were significantly more likely to feel that they were helped with self-understanding (90 percent vs. 53 percent, respectively). There was, however, no adjustment of these findings for relevant covariates (such as age, diagnosis, gender, health status, and anticipated satisfaction with visit) using multivariate analysis.

Specific Aspects of Patient Satisfaction with Interpreters

Two additional studies looked at specific aspects of satisfaction with care among patients using interpreter services. A British study of hospitalized LEP patients (Brooks et al. 2000) revealed that 11 percent of patients did not find

interpreter services useful, specifically because of the unacceptable attitudes of certain interpreters, such as being "rude" or "aggressive." In the earlier described randomized controlled trial comparing remote-simultaneous interpretation with proximate-consecutive interpretation in Spanish-speaking LEP families making their first well-baby visit (Hornberger et al. 1996), investigators found that parents reported a significant preference for the remote-simultaneous interpretation service (mean preference score of 4.2 on a 5-point scale). There were several limitations of this study, however, that included no specification of whether the clinic staff that served as proximate-consecutive interpreters had any training, use of the third person by proximate consecutive interpreters but the first person by remote-simultaneous interpreters, and a small sample size (17) of participants who had at least two visits and completed surveys at the end of the study.

Summary

The most methodologically rigorous studies on patient satisfaction document that (1) bilingual providers and telephone interpreters result in the highest levels of satisfaction that are equivalent to that in EP patients, whereas ad hoc interpreters result in significantly lower satisfaction; and (2) patients who need but do not get interpreters have the lowest satisfaction. These findings indicate that the highest satisfaction for LEP patients occurs with bilingual providers and trained professional interpreters, and that it would be useful for future studies to compare whether there are differences in the effects of bilingual providers, trained hospital interpreters, and telephone interpretation on patient satisfaction.

HEALTH PROCESSES, OUTCOMES, COMPLICATIONS, AND USE OF HEALTH SERVICES (SEE TABLE 3)

Preventive Screening

Several studies document the positive impact that interpreter services can have on preventive screening. A pre- and poststudy of an intervention that included language support services (link workers who served as interpreters and mailed multilingual information) in three clinics in Wales (Bell et al. 1999) found that after implementation of the intervention, there was a statistically significant 16 percent increase (from 35 percent to 51 percent) in the proportion of women who attended the clinics to be screened for breast cancer. A study of 261 patients in a primary care clinic (David and Rhee 1998) revealed that significantly more LEP patients who used ad hoc interpreters reported

having mammograms done in the prior 2 years compared with EP patients (78 percent vs. 60 percent, respectively). A study of 4,380 patients in a large HMO by Jacobs et al. (2001) focusing on health care delivery to LEP patients found that after institution of professional interpreter services, the number of rectal exams increased significantly, and disparities between LEP and EP patients in fecal occult blood testing and flu vaccinations were eliminated (i.e., there were no longer significant differences between the two groups for these two preventive services). This study, however, did not find a significant increase after institution of interpreter services in the number of mammograms, breast exams, Pap smears, fecal occult blood testing, or flu vaccinations.

Visit Duration

Controversy exists among the studies that have examined the impact of interpreter services on visit duration. Certain studies suggest that visits in which interpreters are used are of longer duration than visits for EP patients. In their prospective cohort of 4,146 children presenting to the ED, Hampers and McNulty (2002) found that LEP patients with professional interpreters had significantly longer visits than EP patients (with an adjusted mean difference of 16 minutes). In their prospective study of 285 patients in general medicine and family medicine clinics, Kravitz et al. (2000) found that LEP patients who used professional interpreters or bilingual physicians had significantly longer visits than EP patients, with an adjusted mean of 12.2 additional minutes per visit for Spanish speakers and 7.1 additional minutes per visit for Russian speakers. A study by Drennan (1996) examining staff surveys at a South African psychiatric hospital each time an interpreter was used or needed but not obtained indicated that the one hospital interpreter used (whose training was unspecified) had an average length of interview of "over 30 minutes," compared with a professional nurse and a staff nurse interpreter, whose average interviews were 18 and 14 minutes, respectively. This study, however, did not perform any statistical tests of significance. In a study comparing patient self-administered bilingual questionnaires with interpreters in women presenting to the ED with obstetric and gynecological complaints, Nasr et al. (1993) found that the average completion time for obtaining a medical history was significantly longer in LEP patients with interpreters (mean of 14.6 minutes) compared with LEP patients who completed the questionnaire. The interpreters included hospital interpreters, family members, or friends, with no analysis by interpreter type.

Several other studies indicate no difference between LEP patients using particular interpreter services and EP patients in the duration of their medical

(text continues on p. 288)

TABLE 3 A Summary of Published Studies on the Impact of Interpreter Services on Health Processes, Outcomes, Complications, and Use of Health Services

First Author	*Sample Size*	*Principal Findings*	*Comments*
Bell	369	Intervention, including language support and translated literature, associated with increase (16 percent) in proportion of women attending clinics to be screened for breast cancer	Not stated whether "link workers" acting as interpreters had any formal interpreter training
David	261	LEP patients with ad hoc interpreters significantly more likely than EP patients to have had mammogram in past 2 years	Interpreters = medical office assistants with no formal training Participants predominantly Spanish speakers 4 of 68 cases LEP and had not used an interpreter, but these 4 cases not analyzed separately
Jacobs	4,380	After instituting trained interpreter services, LEP patients made more office visits and received and filled more prescriptions, but they did not differ in number of phone calls or urgent care visits or calls versus EP patients Rectal exams increased for LEP patients after institution of trained interpreter services, but no other differences for five other preventive services Disparities for fecal occult blood testing, rectal exams, and flu vaccinations eliminated after trained interpreter services instituted	Limited to Spanish and Portuguese speakers

Hampers (2002)	4,146	LEP patients with no/ad hoc interpreter had higher incidence and cost for testing and were most likely to be admitted and receive IV hydration, but they showed no difference in visit duration LEP patients with professional interpreters did not differ from EP patients in test costs or IV hydration, had a lower likelihood of testing, but a higher odds of hospital admission and a longer visit duration	Patients with ad hoc interpreters and those without interpreters lumped together Mostly Spanish speakers
Kravitz	285	Spanish and Russian speakers with interpreters (trained interpreters or bilingual physicians) had longer visits than EP patients, averaging 12.2 and 7.1 additional minutes, respectively No differences in visit duration between trained interpreters and bilingual physicians	Study underpowered to detect difference for Spanish-speaking group Limited to Spanish and Russian speakers Interpreter services included trained and ad hoc interpreters and bilingual clinicians
Drennan (1996)	299 surveys on 148 patients	No interpreter services associated with delays in 40 percent of cases; 14 interviews not taking place at all; and delays in treatment initiation, management, and patient discharge Mean interview length longer for interpreters versus bilingual nursing staff Untrained, ad hoc interpreters associated with interviews that had to be repeated, missing information, and diagnostic uncertainty	Actual quantitative data missing for multiple outcomes

(continued)

TABLE 3 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Nasr	110	In this comparison of self-administered bilingual questionnaire versus interpreter, mean medical history completion time longer in LEP patients with interpreters (14.6 minutes) versus questionnaire (5.7 minutes), but no difference in documentation compliance Hospital interpreters averaged significantly longer on medical history completion time versus family members and friends	Limited to Spanish speakers Interpreters: hospital interpreters, family members, or friends No quality measures of interpretation, errors, patient/physician satisfaction Nothing in questionnaire or documentation criteria regarding prior hospitalizations, comorbidity, regular MD
Hornberger (1996)	49	No difference in visit duration between remote-simultaneous and proximate-consecutive groups Physicians prefer remote-simultaneous system and feel it provides more comfort, better meets patient needs, and allows for a better diagnosis and better patient advice Interpreters believed remote-simultaneous system permits better understanding of patient by physician, but they prefer to work as proximate-consecutive interpreters	Limited to Spanish speakers After first visit, family alternated interpreter type at subsequent visits Proximate-consecutive interpreters were full-time clinic staff with 6 months of interpreter experience, but prior training not specified, and they used the third person when interpreting Simultaneous interpreters received 15 hours of training and used the first person when interpreting Only 17 families had at least two visits and completed end-of-study survey

Tocher (1999)	166	No differences between EP and LEP patients in visit time or five components of wait/visit time, whether physician resident or attending Substantial majority of physicians said they spent and needed either a little more or much more time in visits with LEP versus EP patients No significant differences in perceived amount physicians accomplished in visits with LEP versus EP patients	LEP patients spoke 22 different languages All interpreters professional, trained, and certified
Cashman	376	LEP patients who had hospital interpreters had mean visit duration 20 minutes shorter than those with their own ad hoc interpreters (168 minutes vs. 188 minutes, respectively)	Limitations: no statistical analysis of primary outcome, and use of a convenience sample
Dodd		No significant differences between Arabic-speaking physicians and English-speaking physicians using medical interpreters in diagnostic rate of either mental or physical disorders	Small sample sizes (N = 10 in each physician group) No data on proportion of Arabic- and English-speaking patients seen by each physician group
Tocher (1998)	622	LEP patients with professional interpreters significantly more likely than EP patients to receive care meeting American Diabetes Association guidelines of two or more glycohemoglobin tests per year and two or more clinic visits per year LEP patients three times more likely to have one or more dietary consultations No significant differences between two groups in lab tests, eye exams, other outcome variables, complication rates, use of health services, or total charges	LEP group included 24 languages All LEP patients had trained, professional, certified interpreters

(continued)

TABLE 3 (continued)

First Author	*Sample Size*	*Principal Findings*	*Comments*
Pérez-Stable	236	Physician-patient language concordance associated with better functioning on 4 overall scales and 10 subscales, but not patient satisfaction	44 to 49 percent refusal rate for survey Limited to Spanish speakers
Thompson	25	Most nurses stated that their neurological assessments of LEP patients using bedside interpreter program as accurate and complete as assessments for EP patients	No objective measure of neurological assessment accuracy in LEP versus EP patients
Lee (ED)	732	Presence of interpreter (of any kind) not associated with odds of hospital admission in LEP patients	Mixture of interpreter types included family members/friends, EMTs, hospital staff, a physician, and "undescribed" (33 percent) Impact of different interpreter types not examined
Manson	96	LEP patients with monolingual English-speaking physicians with at least eight office visits more likely to miss one or more office appointments than those with bilingual providers No difference between two groups in medication adherence, ED visits, or hospitalizations	Not clear whether patients of language-discordant physicians received interpreter services

Sarver	714	LEP patients with interpreters and LEP patients needing but not getting interpreters two times more likely to be discharged without appointment versus language-concordant group No association between knowledge of follow-up appointments or appointment compliance and language/interpreter group	Limited to Spanish speakers No analysis by type of interpreter (which included 12 percent, hospital interpreters; remainder: family members, hospital staff) LEP patients given discharge instructions by nurse fluent in Spanish EP patients with monolingual English physicians and LEP patients with bilingual physicians lumped together in "language-concordant" group

Note: LEP = limited in English proficiency; EP = English proficient; ED = emergency department.

visits. In the previously described Hampers and McNulty (2002) pediatric ED study, there was no significant difference in adjusted visit duration between EP patients, LEP patients with bilingual providers, and LEP patients who used untrained ad hoc interpreters or had no interpreter. The randomized trial described earlier that examined the efficacy of remote-simultaneous interpretation (Hornberger et al. 1996) revealed no difference in the visit duration between this type of interpretation and proximate-consecutive interpretation. The Kravitz et al. (2000) study mentioned above found no difference in the visit duration of patients using trained medical interpreters compared with those who had bilingual providers. A prospective time-motion study in a primary care clinic (Tocher and Larson 1999) showed that, regardless of whether the physician was a resident or attending, there was no significant difference between EP patients and LEP patients who had trained medical interpreters in the total visit time or five components of the visit time (the wait time for the first physician contact, the time the physician spent on the visit, the time in contact with the physician, the wait time for the first nurse contact, and the time the nurse spent on the visit). There also was no significant difference in the perceived amount physicians accomplished in visits with EP patients versus LEP patients with trained medical interpreters. In contrast to the findings on actual visit duration, most physicians (86 percent) said they spent either a little more or much more time during visits with LEP versus EP patients, and a substantial majority said that they needed either a little more or much more time in visits with LEP versus EP patients.

One study compared visit duration in an urgent care clinic for LEP patients who had hospital interpreters versus those who supplied their own ad hoc interpreters (Cashman 1992). LEP patients who had hospital interpreters had a mean visit duration that was 20 minutes shorter than those who supplied their own ad hoc interpreters (168 minutes vs. 188 minutes, respectively). Limitations of this study included no statistical analysis of the primary outcome and use of a convenience sample.

Medical Care Delays and Diagnostic Uncertainty

Only one published study has examined the impact of lack of adequate interpreter services on medical care delays and diagnostic uncertainty. The aforementioned study in a South African psychiatric hospital by Drennan (1996) found that a lack of interpreter services was associated with delays in 40 percent of cases; 14 interviews not taking place at all; and delays in treatment initiation, management, and patient discharge. Untrained, ad hoc interpreters were associated with interviews that had to be repeated, missing information,

and diagnostic uncertainty on fundamental issues such as whether a patient was psychotic.

Diagnostic Rates

Only one published study examined whether interpreter use affects the frequency of medical diagnoses. In a study of Saudi Arabian physicians caring for a primarily Arabic-speaking population, Dodd (1984) found no significant differences between Arabic-speaking physicians and English-speaking physicians using medical interpreters in the diagnostic rate of either mental or physical disorders. Study limitations, however, included small sample sizes ($N = 10$ in each physician group) and no data on the proportion of Arabic- and English-speaking patients seen by each physician group.

Physician and Interpreter Preferences for Types of Interpretation

Only one published study examined physician and interpreter preference for specific types of interpreter services. The randomized trial of the efficacy of remote-simultaneous interpretation (Hornberger et al. 1996) revealed that the four participating physicians preferred the remote-simultaneous system over proximate-consecutive interpreters and felt that it provided more comfort, better met patient needs, and allowed for a better diagnosis and better patient advice. Interpreters in this study stated that they believe the remote-simultaneous system permits better understanding of patients by physicians, but they prefer to work as proximate-consecutive interpreters; the interpreters, however, did not report a strong preference for either approach as far as which was more efficient or led to better patient understanding.

Use of Health Services

The study by Jacobs et al. (2001) described earlier was the only one to focus on the impact of interpreter services on general outpatient services use. The investigators found that after institution of trained interpreter services in a large HMO, LEP patients had a significantly greater increase in office visits than EP patients (adjusted mean difference of 1.1 visits per person per year). There was also a significantly greater increase in the number of prescriptions written (adjusted mean difference = 1.4) and filled (adjusted mean difference = 1.3) for LEP compared with EP patients, but there were no differences between the two groups in the number of overall phone contacts, urgent care phone calls, or urgent care visits.

Health Outcomes and Processes

Several studies have investigated the effect of interpreter services on health outcomes and processes. The Hampers and McNulty (2002) pediatric ED study described above found that LEP patients with professional interpreters did not differ from EP patients in test costs or use of intravenous hydration and had a significant lower adjusted likelihood of testing (odds ratio [OR] = .7; 95 percent confidence interval [CI], .56-.97), but a significantly higher adjusted odds of hospital admission (OR = 1.7; 95 percent CI, 1.1-2.8). Compared with EP patients, LEP patients in this study who had either no interpreter or nonmedical, ad hoc interpreters had a significantly higher incidence of having medical tests done (OR = 1.5; 95 percent CI, 1.04-2.2), higher test costs (mean difference = $5.73), and a significantly greater likelihood of hospitalization (OR = 2.6; 95 percent CI, 1.4-4.5) and receiving intravenous hydration (OR = 2.2; 95 percent CI, 1.2-4.3). A retrospective cohort study of 622 patients with Type 2 diabetes mellitus (Tocher and Larson 1998) revealed that LEP patients with trained professional interpreters were significantly more likely than EP patients to receive care meeting American Diabetes Association guidelines of two or more glycohemoglobin tests per year (OR = 1.9; 95 percent CI, 1.2-3) and two or more clinic visits per year (OR = 2.6; 95 percent CI, 1.2-5.4). LEP patients with interpreters also were found to be about 3 times more likely than EP patients to have one or more dietary consultations (OR = 2.8; 95 percent CI, 1.3-6.1). No significant differences were found between the two groups in 18 other processes and outcomes that included lab tests, eye exams, complication rates, use of health services, and total charges. Pérez-Stable, Napoles-Springer, and Miramontes's (1997) study (described earlier) of patients with hypertension and diabetes in an outpatient clinic found that patients with language-concordant physicians had significantly higher adjusted scores than patients with language-discordant physicians on several health status measures, including physical functioning, psychological well-being, health perceptions, and pain. No differences between these two groups were found for adjusted scores on general medicine or specialty practice visits. In a study of a neurosurgical ward in an Australian hospital, Thompson (2001) examined nurses' perspectives on the impact of a program that arranged for an interpreter to be at the LEP patient's bedside for the first 24 hours postoperatively, as well as an on-call interpreter or telephone interpretation service after the first 24 hours. Most nurses stated that their neurological assessments of LEP patients using this interpreter program were as accurate and complete as assessments for EP patients.

Two other studies with methodological problems examined health outcomes. A prospective convenience sample of ED patients (Lee et al. 1998)

found that the odds of hospitalization did not differ between EP patients and LEP patients who had interpreters, but there was substantial heterogeneity in the types of interpreters used and no analysis by interpreter type. In a retrospective chart review of patients with asthma in an outpatient clinic, Manson (1988) found that medication adherence, ED visits, and hospitalization rates did not differ between LEP patients with monolingual English-speaking physicians and those with bilingual physicians. This study, however, did not specify whether interpreters were used for any of the LEP patients with monolingual English physicians.

Two studies examined the relationship between interpreter services and missed appointments. A prospective cohort study of 714 patients in the ED (Sarver and Baker 2000) found that LEP patients who used interpreters and LEP patients who needed but did not get interpreters were about two times more likely to be discharged without an appointment than language-concordant patients. There were no significant differences among the three groups, however, in knowledge of follow-up appointments or appointment adherence. Limitations of this study included the following: (1) there was no breakdown or analysis by type of interpreter (which included 12 percent hospital interpreters, and the remainder, family members and medical staff); (2) all LEP patients were given discharge instructions by a nurse fluent in Spanish, which may have distorted outcomes for patients who needed but did not get interpreters; and (3) EP patients with monolingual English physicians and LEP patients with bilingual physicians were lumped together in a "language-concordant" group. The Manson (1988) study of asthmatic patients described earlier found that LEP patients with monolingual English-speaking physicians who made at least eight office visits were significantly more likely (OR = 3.1; 95 percent CI, 1.3-7.3) to miss one or more office appointments than those with bilingual providers. There were no differences between the two groups, however, when all patients (regardless of whether they made at least eight office visits) were analyzed, and it was not specified whether any of the patients with monolingual English physicians received interpreter services.

Summary

The most methodologically rigorous studies on health processes, outcomes, complications, and use of services indicate the following: (1) interpreter services positively affect preventive screening rates; (2) controversy persists about whether the duration of visits is longer when interpreters are used; (3) institution of trained interpreter services results in more office visits and prescriptions being written and filled; (4) LEP patients who either get no interpreter or an ad hoc interpreter have more medical tests, higher test costs,

more frequent intravenous hydration, and a higher risk of hospitalization; and (5) among diabetics, LEP patients who get trained interpreters are more likely than EP patients to get higher quality care on selected measures. These findings indicate that trained interpreters generally result in better health processes, outcomes, and use of services, but additional research in this area is warranted, and greater insight is needed on the effect of interpreter services on visit duration.

DISCUSSION

Several recurrent methodological issues were noted among the published studies on interpreter services and quality. There was a conspicuous paucity of randomized controlled trials, with only 1 of the 36 studies employing this research design, which is generally accepted as the most rigorous approach to evaluating interventions. There was variability in the quality of some of the studies, with problems that included small sample sizes, no power calculations, lack of appropriate comparison groups, absence of statistical tests of significance, failure to adjust for relevant covariates using multivariate analysis, and low survey response rates. Additional frequently encountered methodological problems were lack of specification of the training and type of interpreters used and failure to separately evaluate and analyze the different types of interpreter services. For example, several studies simply stated that certain patients had interpreters, but these interpreters could include a mixture of the spectrum of interpreter types, including bilingual providers, trained professional interpreters, untrained medical and nonmedical staff, family members, friends, and strangers. Thus, outcome comparisons between LEP patients who had such an admixture of interpreters and EP patients or LEP patients without interpreters are of dubious utility and validity. There also were no formal cost analyses in any of the 36 studies.

Gaps in the published literature indicate areas in particular need of further investigation. Randomized controlled trials need to be performed comparing the effectiveness and costs of the various types of interpreter services, such as how bilingual providers compare with trained professional interpreters and telephone interpreters. Because LEP patients still frequently either receive no interpreter (Baker et al. 1996) or untrained ad hoc interpreters (Hornberger, Itakura, and Wilson 1997), additional studies are needed to address what effect this has on outcomes, communication, and patient satisfaction, particularly in comparison to use of bilingual providers, professional interpreters, and telephone interpreters. One published study suggests that LEP patients who used telephone interpreters are as satisfied as EP patients and LEP patients with bilingual providers (Lee et al. 2002), in contrast to another study

that found that physicians are significantly more satisfied with telephone interpreters than LEP patients (Kuo and Fagan 1999). Given these contradictory findings and the fact that these are the only two studies to examine issues related to telephone interpreters, additional study of telephone interpreter services is warranted.

Most studies (55 percent) focused only on Spanish-speaking LEP patients, which probably reflects that most of this research was conducted in the United States, where Spanish speakers comprise 60 percent of those who speak a non-English language at home and 64 percent of those who are LEP (U.S. Census Bureau 2003). Nevertheless, it would be beneficial to examine interpreter services issues in more non-Spanish-speaking populations and multilingual populations to evaluate whether smaller language groups face similar or greater challenges than U.S. Spanish speakers. Indeed, no studies were found that addressed whether cultural beliefs, attitudes, and practices may interact with the effect of interpreter services on quality of care. For example, some LEP populations may only accept an interpreter of the same gender as the patient and thus forego a trained professional interpreter of the opposite gender in favor of an untrained family member of the same gender, with potential serious implications for the quality of communication. Thus, additional studies are needed of the potential mediating role of cultural issues in examining interpreter services and their impact on quality, particularly with regard to whether findings for Spanish-speaking populations apply to or differ from findings for LEP populations speaking African, Asian, or other Indo-European languages.

Policy makers frequently demand cost data before implementing interventions and programs, but there is a noticeable absence of studies on the costs of various interpreter services. Because clinicians commit most false fluency errors (Flores et al. 2003), but most U.S. hospitals do not train clinicians on how to properly work with interpreters (Ginsberg et al. 1995), more research is needed on effective clinician training programs for working with interpreters. This is especially important, given that studies document that physicians' negative perceptions of the helpfulness, communication quality, and duration of patient encounters using interpreter services starkly contrast with patients' perceptions and objective data (Kline et al. 1980; Tocher and Larson 1999). Similarly, because the quality of care for LEP patients is often inferior when untrained, ad hoc interpreters are used, but most U.S. hospitals do not formally train their interpreters (Ginsberg et al. 1995), much more study is needed of what is the optimal content and duration of medical interpreter training.

Findings indicating that interpreter errors may be a root cause of medical errors (Flores et al. 2003) suggest that there is a critical need for more detailed

study of the association between medical errors and absence of, or inadequate, interpreter services, as well as the role of trained professional interpreters and bilingual providers in potentially reducing medical errors for LEP patients. Data from several studies documenting the profound effects that inadequate interpreter services can have on LEP patients' mental health care indicate that more work needs to be done on the impact of interpreters on the quality of mental health services. Controversies described earlier regarding patient satisfaction and visit duration with various interpreter types suggest that these topics also are in need of further investigation. Although 10 states currently provide third party payer reimbursement for interpreter services (National Health Law Program and the Access Project 2004), no formal evaluations have been published on the impact of these state services on health outcomes.

This systematic review indicates that a considerable amount is already known about selected aspects of the impact of interpreter services on the quality of health care. It is clear, for example, that the quality of care is substantially compromised when an LEP patient needs but does not get an interpreter. Studies document that LEP patients who need but do not get interpreters have a worse understanding of their diagnosis and treatment (Baker et al. 1996); more often wish that their provider had explained things better (Baker et al. 1996); have more tests done at a higher overall cost (Hampers and McNulty 2002); are more likely to receive intravenous hydration and to be hospitalized (Hampers and McNulty 2002); are at greater risk of being discharged from the emergency department without a follow-up appointment (Sarver and Baker 2000); often experience delays in treatment initiation, management, and discharge from the hospital (Drennan and Swartz 2002); and are least satisfied with their care (Baker, Hayes, and Fortier 1998). The evidence also indicates that the quality of care for LEP patients is often inferior when untrained, ad hoc interpreters (including family members, friends, medical and nonmedical staff, and strangers) are used. Adverse effects on quality associated with the use of ad hoc interpreters include a lower likelihood of having medication side effects explained (David and Rhee 1998); a high risk of interpretation errors, omissions, distortions, redundancy, and irrelevant questions (Ebden et al. 1988; Launer 1978); a greater likelihood of committing interpreter errors with potential clinical consequences (Flores et al. 2003); decreased satisfaction with care (David and Rhee 1998; Kuo and Fagan 1999; Lee et al. 2002); and distortions in psychiatric encounters associated with overidentification, normalization of pathologies, interpretation errors, and inaccurate assessment of affect and thought processes (Marcos 1979). Studies indicate that there is an especially high risk of adverse consequences when the ad hoc interpreters are children, including not interpreting perceived embarrassing but important

clinical questions (Ebden et al. 1988) and frequent interpreter errors of potential clinical consequence (Flores et al. 2003).

The limited available evidence suggests that inadequate interpreter services can affect the quality of care for patients with mental health problems. Lack of trained, professional interpreters can result in overemphasis of psychotic features (Sabin 1975); underemphasis of affective disorders (Sabin 1975); the potential to underestimate suicide risk (Sabin 1975); distortions and overestimation of the severity of intellectual impairment, thought disorders, and mental status (Drennan and Swartz 2002; Marcos 1979); overidentification with the patient or physician (Marcos 1979); "normalization" of pathological symptoms (Marcos 1979); and commission of clinically relevant errors through omissions, additions, substitutions, and condensations (Marcos 1979).

In contrast, multiple studies document the positive impact that both trained, professional interpreters and bilingual providers have on LEP patients' quality of care. LEP patients who have trained, professional interpreters make more outpatient visits (Bell et al. 1999), receive and fill more prescriptions (Bell et al. 1999), do not differ from EP patients in test costs or receipt of intravenous hydration (Hampers and McNulty 2002), are less likely than EP patients to have laboratory tests done (Hampers and McNulty 2002), have outcomes among those with diabetes that are superior or equivalent to EP patients (Tocher and Larson 1998), and have high satisfaction with care (Kuo and Fagan 1999; Lee et al. 2002). LEP patients who have bilingual providers ask more questions (Seijo, Gomez, and Freidenberg 1995); have better overall information recall (Seijo, Gomez, and Freidenberg 1995); are more comfortable discussing sensitive or embarrassing issues (Kuo and Fagan 1999); have less pain and better physical functioning, psychological well-being, and health perceptions among those with hypertension or diabetes (Pèrez-Stable, Napoles-Springer, and Miramontes 1997); and have high patient satisfaction (Lee et al. 2002).

The available evidence also suggests that interpreter services in general have a positive effect on LEP patients obtaining preventive screening. Studies document both a significantly higher likelihood of attending clinics for breast cancer screening (Bell et al. 1999) and obtaining mammograms (David and Rhee 1998) among LEP patients who have used some form of interpreter services. Disparities between LEP patients and EP patients in occult blood testing, rectal exams, and flu vaccinations can be eliminated after the institution of a trained, professional interpreter service (Jacobs et al. 2001).

The findings of this systematic review have relevance for the recent increased attention on cultural competency and racial/ethnic disparities in health care. The study findings that inadequate interpreter services affect quality of care

for LEP patients supports published recommendations, including the U.S. Department of Health and Human Services Culturally and Linguistically Appropriate Services (CLAS) Standards, that cultural competency training for health care providers must include knowledge and skills regarding the effective choice and use of interpreters, and awareness of the impact of language barriers on LEP patients' health care (Flores 2000; Office of Minority Health 2001). The study findings also are relevant to racial/ethnic disparities in health care, as demonstrated by the fact that language barriers and the importance of medical interpreters and bilingual providers were highlighted in recent disparities reports by the Institute of Medicine (Smedley, Stith, and Nelson 2003) and the Agency for Healthcare Research and Quality (2003).

In conclusion, a systematic review of the literature indicates that additional studies employing rigorous methods are needed on the most effective and least costly ways to provide interpreter services to LEP patients. But available evidence suggests that optimal communication, the highest patient satisfaction, the best outcomes, and the fewest errors of potential clinical consequence occur when LEP patients have access to trained professional interpreters or bilingual health care providers.

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