

Identifying Families With Limited English Proficiency Using a Capture-Recapture Approach

abstract

BACKGROUND AND OBJECTIVE: Health providers need reliable estimates of the number of families with limited English proficiency (LEP) to assess language need and language service provision. Hospitals often lack reliable language screening tools and fail to provide interpretation for LEP families. The objective of this study was to develop a simple audit tool to more accurately identify LEP patients and families.

METHODS: We conducted a cross-sectional analysis of a retrospective cohort of patients admitted to a large pediatric hospital between July 1 and December 31, 2009. We used a “capture-recapture” approach to develop a simple audit tool to measure language screening, determine the rate of language interpretation, and estimate the number of LEP families. The captures were based on 2 independent sources: (1) language need identified at registration and (2) request for interpretation during hospital admission. Assuming a closed population, we estimated the number of LEP families missed by both captures.

RESULTS: During the study period, 6887 patients were admitted for care. There were 948 LEP families identified at registration and 847 families received interpretation at least once during hospital admission. We determined that the “ascertainment corrected” number of LEP families was 1031 (95% confidence interval: 1022–1040). The number of patients who had been “missed” by both methods was 15 (95% confidence interval: 7–24). Only 76% of LEP patients were identified in both data sources.

CONCLUSIONS: A simple language audit tool can be used to determine language need, rates of interpretation, and unmet demand for language services, even when both sources of data are incomplete.

More than 25 million people in the United States are limited English proficient (LEP), and demographic trends suggest that the number of LEP patients accessing the health care system will increase.¹ The delivery of high-quality, safe, and effective medical care to LEP children and families is dependent on clear communication between patients and health care providers.^{2–5} Compared with English-proficient (EP) patients, LEP patients are less likely to understand their diagnosis, follow treatment recommendations, and return for future appointments and are more likely to experience medical errors and adverse events.^{6–12} Medical errors resulting from poor communication can be costly and are likely preventable.¹³

The use of professional interpreter service has been shown to increase patient comprehension, equalize health care utilization, improve clinical outcomes, and increase satisfaction with communication and clinical services for LEP

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KEY WORDS

health care disparities, hospitalized child, communication barriers, quality improvement, screening tool, health literacy, Latino, language services, research methods

ABBREVIATIONS

EP: English proficient
LEP: limited English proficient

www.hospitalpediatrics.org
doi:10.1542/hpeds.2013-0040

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HOSPITAL PEDIATRICS (ISSN Numbers: Print, 2154 - 1663; Online, 2154 - 1671).

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FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: Project support was provided by the Robert Wood Johnson Foundation (grant 65127, Ebel, principal investigator) and the Seattle Children's Hospital Center for Diversity and Health Equity, Seattle, Washington.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

patients.^{14–16} Federal law, The Joint Commission, and best practice dictates that health care organizations offer and provide language assistance services at no cost to each LEP patient at all points of contact.^{17–19} As of 2012, the Joint Commission required that hospital medical records document the communication needs of each patient, including preferred language for discussing health care.¹⁸

To assess language needs and measure rates of language service provision, hospitals must have a reliable estimate of how many patients are LEP. Although there has been progress in developing tools that identify language needs,²⁰ hospitals often fail to screen every patient and his or her family for language need, lack reliable screening tools, or fail to document language needs in the medical record.^{21,22} A national survey of pediatric providers found that care was routinely provided without professional interpretation.²³ In these instances, it is challenging to measure “invisible” occurrences of unmet language needs.

We hypothesized that LEP families may have unidentified language needs that were not noted or met. The goal of this study was to develop and test a methodologic approach to determine need for and provision of interpretation for LEP families. We used a “capture-recapture” approach to identify families whose need for language services was not noted at registration. We also identified LEP families who did not receive language services during their hospital stay. Our objective was to develop a tool to help hospitals and health care providers audit unmet language needs among patients and families who would otherwise have gone undetected. Transparent monitoring of LEP screening and provision

of language interpretation to LEP families may inform quality improvement efforts to provide equitable care.

METHODS

Study Design

We conducted a retrospective cohort study of all EP and LEP patients admitted to a large pediatric hospital.

Setting

Seattle Children’s Hospital is the only quaternary care pediatric referral center for a 4-state region in the Pacific Northwest. There are 300 000 annual patient visits and >14 000 annual hospital admissions. The hospital serves a diverse patient base: 35% of patients are non-white, 46% qualify for Medicaid, and 16% self-identify as limited English proficient. Each year there are ~15 000 professional interpretation encounters provided to children and their families.

Participants

All patients hospitalized during a 6-month period between July 1, 2009, and December 31, 2009 were included in the study.

Variables of Interest

Demographic Data

Patient age, race, and ethnicity were self-reported by the child’s parent or guardian at registration. Parents were free to select multiple choices when describing the child’s race. Additionally, parents were free to select any of 4 choices for ethnicity: Hispanic, Non-Hispanic, Patient Refused, and Other.

Screening for LEP at registration

Two questions were used to populate the language field in the registration

system and determine English proficiency. During the registration process, families were asked, “What is the primary language spoken at home?” and “Will anyone in the family need an interpreter?” LEP families were identified as those who responded to the first and second questions with a language other than English and “Yes,” respectively.

Determination of LEP

LEP patients or families were identified using 2 cross-cutting methods: (1) patients and families who were documented in the hospital registration system as speaking a language other than English and (2) a patient or family with documented professional interpretation (in-person or telephonic) during the hospital stay.

Determination of Professional Interpretation

This study examined oral communication (interpretation) rather than written communication (translation). At the time of this study, hospital policy required professional interpretation for medical communication with LEP families, irrespective of provider language ability. The provision of professional interpretation was measured using 1 of 2 methods: (1) in-person interpretation was determined by reviewing the electronic medical record system for any in-person interpretation orders during admission and (2) telephonic interpretations were measured by linking medical record numbers from telephonic interpretation records to inpatient medical records. All inpatient requests for in-person interpretation required an electronic order linked to the individual patient medical record. Each electronic order included

fields for time, date, and medical record number. Alternatively, double handset phones located in each patient room were available, each with a preset link to a telephonic interpretation service. Each telephonic interpretation provided by a contracted interpretation agency also collected the time, date, and patient medical record number of the patient receiving interpretations.

The provision of interpretation was evaluated during 3 phases of hospitalization: admission, discharge, and any additional interpretation during the hospital stay. The time and date of each interpreted event was recorded. Our primary outcome was provision of interpretation at any point during inpatient stay. Secondary analyses examined provision of interpretation on admission or at discharge. To capture admission history gathered in the emergency department, interpretation at admission was defined as any interpretation event 6 hours before or 24 hours after time of admission. Interpretation at discharge was defined as any interpretation event occurring 24 hours preceding or 12 hours after recorded discharge time.

Data Analysis

Popular in ecologic studies and animal management, the capture-recapture methods provide ways to estimate the sizes of specific study populations without conducting a complete census.²⁴ The capture-recapture technique has been applied to human populations under the name “multiple-record system.” The special cases of 2-sample system are often referred to as “dual system” or “dual-record system.”^{25,26} Capture-recapture methodology is an effective tool to ascertain incomplete information using 2

distinct sources of data.²⁷ A 2-by-2 contingency table can be used to estimate the cells that were unobserved. The statistical model and assumptions have been discussed in detail in the literature; we refer the interested reader to a tutorial by Chao et al for technical details.²⁸

We used capture-recapture techniques to develop an audit tool that evaluated language service provision from 2 independent data sources collected over the same time period and linked via the medical record number: (1) patients identified as LEP at registration and (2) patients identified as LEP by request for interpretation at least once during the hospital stay (Fig 1). We applied log-linear modeling to data in 2-by-2 contingency table to estimate the cells that were unobserved. This methodology allowed us to calculate the rate at which LEP families were identified at registration, the rate of interpretation provided

to LEP families, and estimate the unknown number of families missed by both screening tools.

For this analysis, we made the assumption that a patient identified as LEP at registration has a language need; however, a family may still have required interpretation even if the family was not identified as LEP at registration. In addition, we assumed that a patient for whom an interpreter has been ordered is LEP. Finally, we assumed that no families switched status during the study period, for example, changed from LEP to EP.

Figure 2 represents the audit tool used to assess LEP status (a + c), provision of interpretation (a + b), and unmet language need (x). We determined missed language screening opportunities (x) (families not identified as LEP and no interpreter ordered) by using the formula given by the maximum likelihood estimator.²⁷ Estimating

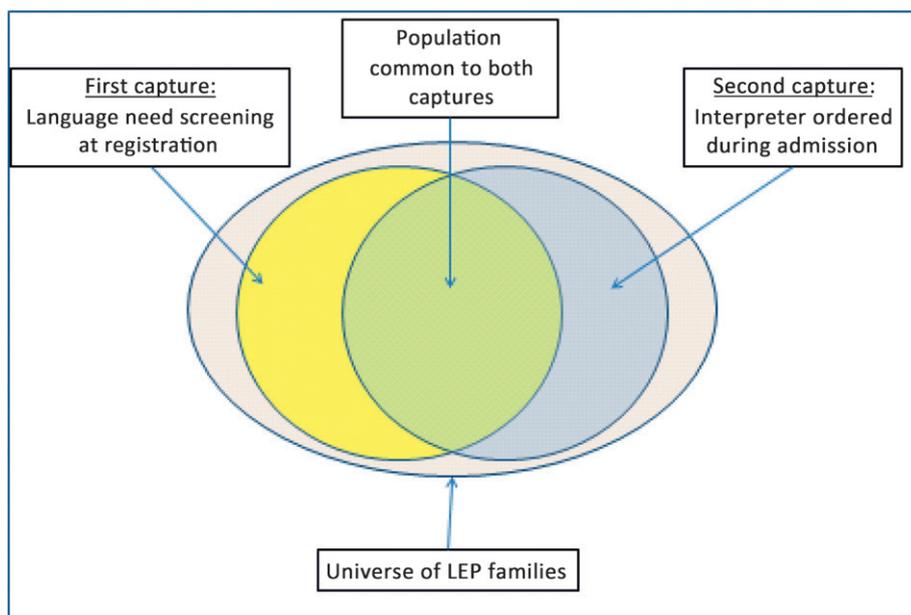


FIGURE 1 Venn diagram of capture-recapture strategy.

		Identified as LEP at registration		
		Yes	No	
Identified as LEP by request for interpretation	Yes	a (observed)	b (observed)	a + b (observed)
	No	c (observed)	x = (bc / a) (estimated) ²⁷	c + x
		a + c (observed)	b + x	Total = a + b + c + x number of estimated LEP patients

FIGURE 2 Identification of LEP using 2 data sources.

the proportion of patients identified at registration as not requiring interpretation who nonetheless required interpretation was done by using the formula $[(b + x) / \text{total}]$. We further determined missed provision of interpretation by estimating the proportion of LEP patients for whom there was no interpreter ordered $[(c + x) / \text{total}]$.

RESULTS

There were 6887 children admitted and discharged during the study period (Table 1). Approximately 17% of hospitalized children were identified as LEP at registration. LEP and EP children had similar age and gender distribution (Table 1). LEP families were much

more likely to be insured by Medicaid than were EP families (85% vs 35%, Table 1). A greater proportion of LEP patients were between the ages of 0 and 1 compared with EP patients, 34% compared with 25%. Nearly two-thirds of LEP families identified themselves as being of Hispanic ethnicity (63%) and predominately spoke Spanish. The remaining patients spoke a wide variety of languages, including Vietnamese, Somali, and Russian (Table 2).

During the study period, we identified 1016 children who were LEP. We determined that the “ascertainment corrected” number of LEP families was 1031 (95% confidence interval: 1022–1040; Table 3). The number of patients who had been “missed” by both methods was 15 (95% confidence interval:

TABLE 1 Description of Study Participants

	EP (n = 5871)	LEP (n = 1016)
Age (y)		
0–1	25%	34%
2–5	20%	20%
6–12	26%	25%
13–15	13%	11%
16–18	12%	9%
19–21	4%	1%
>21	0%	0%
Gender		
Female	46%	45%
Male	54%	55%
Ethnicity		
Hispanic	8%	63%
Non-Hispanic	83%	33%
Patient refused	6%	2%
Other	3%	2%
Insurance type		
Commercial	59%	13%
Medicaid plans	35%	85%
Other	6%	2%

TABLE 2 Preferred Language for Health Communication Among LEP Families

Preferred Language for Health Communication	n (N = 1016)	%
Spanish	631	62
Vietnamese	51	5
Somali	43	4
Russian	40	4
Korean	23	2
Cambodian	21	2
Japanese	18	2
Sign/American Sign Language	13	1
Amharic	13	1
Cantonese	12	1
Arabic	10	1
Other	141	14

7–24). Only 76% of LEP patients were identified in both data sources.

The audit tool allowed for the estimation of 2 important quality measures for language service provision: (1) the proportion of LEP families identified at registration and (2) the proportion of LEP families who received professional interpretation. In our data set, 92% of LEP families were identified as LEP at registration. This high proportion reflected hospital policy requiring mandatory language need screening for every patient at registration. A total of 83% of LEP-identified families received interpretation at least once during the hospital stay (Table 3).

Although good communication is needed throughout a hospital stay, we felt that admission and discharge were points of particular importance to provide interpretation to LEP families. Therefore, we used the audit tool to examine interpretation on admission and interpretation at discharge separately. During admission, 96% of LEP families were originally screened and registered as LEP. Of these families, 74% received professional interpretation during admission, and 71% received professional interpretation within 24 hours of discharge.

DISCUSSION

Addressing the oral communication needs of patients and their families is a critical component of delivering high-quality health care and is also a regulatory requirement for hospitals.^{17–19} Nevertheless, in most health care settings, poor identification and use of language services remains more the rule than the exception,²⁹ lending additional emphasis to the importance of measuring families who have unmet language needs and addressing them.

TABLE 3 Language Screening and Provision of Interpretation at Least Once During Hospital Stay

		Identified as LEP at registration		Total
		Yes (+)	No (-)	
Identified as LEP by request for interpretation	Yes	779 (76%)	68 (7%)	847 (83%)
	No	169 (16%)	15 ^a (1%)	184 (17%)
	% Total	948 (92%)	83 (8%)	1031 ^a (100%)

^a The “ascertainment corrected” number of LEP families was 1031 (95% confidence interval: 1022–1040). The number of patients who had been “missed” by both methods was 15 (95% confidence interval: 7–24).

We sought to develop a simple audit tool using capture-recapture methodology to examine 2 critical components of language service provision: (1) screening for language need at registration and (2) interpretation provided to LEP families. This tool links 2 data sources that are widely available in most hospitals: registration data on LEP status and interpreter service provision.

Our analysis found that the hospital policy of requiring mandatory language screening of all patients at registration captured the majority of LEP families. This success reflects a commitment to scripted registration screening, continuing education for registration staff, and continuous quality improvement to monitor performance. Simple screening questions asked during the registration process can effectively capture language proficiency and ensure timely provision of language interpretation at future encounters with registered LEP patients.^{20,30}

Our hospital has also invested in programs to improve the frequency and quality of communication with LEP families. Systems improvements included hospital performance targets for twice-daily interpreted care, use of telephonic interpretation for immediate point-of-care interpretation,

language proficiency assessment for bilingual providers,³¹ and an innovative patient navigation program for LEP children and families with chronic medical conditions.³²

The audit tool does not allow one to know why interpretation may not always be provided for LEP children and families, but a number of factors related to family preference, composition, and capability may be at play. For pediatric care, the “language need” variable reflected the determination that at least 1 family member needed interpretation. For example, in some LEP families, an interpreter may have been needed only when 1 parent was present. For the future, we plan to modify language-screening questions to identify language needs for the child separately from those of family members.

Another challenge is that English proficiency is not always easy to identify. An LEP parent may have sufficient English proficiency to complete the registration process but may not possess the language proficiency necessary to understand complex medical terminology. The inability to understand complex medical terms was sometimes discovered during extended interactions with medical providers, at which time interpretation was initiated. Some families may have

spoken English relatively well but still preferred interpretation for discussion of health care.³³

Families may have been reluctant to request interpretation, even when health care providers felt it would be beneficial. For example, LEP families may not request interpretation due to concerns that there could be additional financial cost, worry that interpretation might delay care, overestimation of language ability, or privacy concerns.³⁴

Although some bilingual family members may have preferred to serve as the family interpreter, this practice was actively discouraged because the use of ad hoc interpreters may lead to ineffective communication or decrease the standard of care.^{12,35,36} Providers were taught to emphasize that the interpretation was requested for the provider. Providers were coached to encourage the bilingual family member to listen carefully to interpreted sentences and to interject or clarify as needed.

A potential limitation is that a family may have received care from a bilingual provider, although this was relatively uncommon. We separately assessed pediatric resident physicians in our hospital and found that only 6% were highly proficient in Spanish using a standardized testing instrument.^{31,37} We were not able to measure ad hoc interpretation provided by medical providers, but it is likely that pediatric residents and other providers who spoke some Spanish may have “gotten by” using clinical Spanish, despite a hospital policy requiring professional interpretation.

Although our language audit revealed important data on language need and the provision of interpretation at

our institution, several key limitations were noted. Our audit assumed that the proportion of patients who were not registered as LEP was similar between those who did and did not receive professional interpretation. For in-person interpretation, we relied on interpreter orders placed in the electronic ordering system rather than documentation of the interpretation in the medical record. Additional interpretations may have occurred through the use of interpreters assigned to inpatient units. Finally, we did not independently test the language proficiency of families or care providers, relying only on self-reported language need. Reliance on self-reported language need may have occasionally misidentified families and care providers who require interpretation.

Our findings emphasize that more fully integrating hospital language service databases with electronic medical records may improve equitable care. Increasing the transparency and free flow of information between registration and clinical and language need databases will increase the likelihood that each member of the health care team recognizes the language need and takes the proper steps to provide language interpretation and ensure understanding. Use of this simple audit tool in the health care setting may provide a straightforward benchmark for improving interpretation and communication with LEP families.

CONCLUSIONS

This study described an approach to identifying LEP patients using two separate hospital data systems: patient registration and interpretation service provision. A simple language audit using capture-recapture methods can be an effective tool to measure unmet demands for language services as well

as a tool to measure the success of efforts to provide professional interpretation to LEP families.

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Hospital Pediatrics 2014;4;16
DOI: 10.1542/hpeds.2013-0040

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