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Hospital and Health System-Level Interventions to Improve Care for Limited English Proficiency Patients: A Systematic Review.

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**Abstract**

**Objective**

Although federal legislation mandates the provision of qualified interpreters for limited English proficiency (LEP) patients, language services are consistently underutilized by health care providers even when readily available. The objective of this study was to systematically review the literature and summarize evidence for interventions at the hospital or health system level that improve communication with, quality of care for, or health outcomes of LEP patients.

**Methods**

We systematically reviewed the literature according to PRISMA guidelines to answer the following question: “For patients with limited English proficiency, which interventions at the hospital or health system level will result in improved communication, quality of care or health outcomes?”

**Results**

The search yielded an initial 16,686 references, 19 of which met the inclusion criteria. Baseline rates of language service utilization were extremely low and remained at low levels postintervention in multiple studies. Most studies focused on language service utilization, patient communication, metric tracking, and access to care, whereas few studies evaluated quality of care or health outcomes of LEP patients. Multifaceted interventions that include elements of administrative emphasis, process evaluation, and education appear to improve language service use and communication.

**Conclusion**

This review revealed large gaps in the evidence to guide hospital and health system improvement strategies for LEP patient care. Given the large and persistent performance gaps in the provision of language assistance for LEP patients, hospitals, health systems, and granting agencies should invest in

## LEP Interventions Review

31 implementation and dissemination research focused on language service  
32 use.

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36 **Introduction**

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38           The U.S. population is increasingly linguistically and culturally  
39 diverse.<sup>1</sup> The U.S. Bureau of Statistics reported in 2017 that 21% of the  
40 population aged 5 years and older spoke a language other than English at  
41 home and that over 25 million people in the United States have limited  
42 English proficiency (LEP), defined as speaking English less than “very well.”  
43 Communication barriers thus represent a growing challenge to health care  
44 institutions. Health outcomes for LEP patients are often worse than for their  
45 English-speaking counterparts.<sup>2-4</sup> At the patient level, the use of qualified  
46 health care interpreters, when compared to no interpreter or ad hoc  
47 interpreter use, has been shown to improve outcomes for LEP patients.<sup>5,6</sup>  
48 Even when language assistance is readily available, however, health care  
49 providers underutilize language services.<sup>7,8</sup>

50           The Institute of Medicine states that health care should be patient-  
51 centered and equitable.<sup>9</sup> Reports from several agencies, including the  
52 Institute of Medicine, The Joint Commission, and the Agency for Healthcare  
53 Research and Quality, emphasize the contribution of language barriers to  
54 persistent health disparities.<sup>10-12</sup> Despite the existence of standards for  
55 culturally and linguistically appropriate care and the legal right of LEP  
56 patients to access interpreter services, we know that hospitals often fall  
57 short, failing to inform patients of their right to an interpreter or to offer  
58 language assistance.<sup>13-15</sup> Although legal and regulatory emphasis typically  
59 drives administrative efforts, minimal progress has been made in improving  
60 use of language services, likely because it is unclear how to best surmount  
61 current barriers and improve care for this vulnerable population. Although  
62 ample promising pilot studies exist, many are limited in scope and duration  
63 and take place in a tightly controlled clinical environment.<sup>5,6,16</sup>  
64 Administrators with interest in improving outcomes for LEP patients would be  
65 best informed by those projects that describe sustainable, large-scale work  
66 that focuses on effectiveness in a real-world clinical setting. An

## LEP Interventions Review

67 understanding of the current evidence for interventions to improve LEP  
68 patient care at the hospital or health system level is necessary to guide  
69 administrative decision-making.

70

### 71 *Objective*

72 The objective of this study was to systematically review the literature to  
73 describe evidence for interventions on the hospital or health system level to  
74 improve communication with, quality of care for, or health outcomes of LEP  
75 patients.

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77 **Methods**

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79 This review was conducted between January and October 2018 in  
80 accordance with PRISMA guidelines.<sup>17</sup> We sought to answer the PICO  
81 question,<sup>18</sup> “For patients with limited English proficiency in any healthcare  
82 setting (P), does any intervention at the hospital or health system level (I),  
83 including but not limited to education of providers, policy change,  
84 technologic interventions, or organizational change, compared to another  
85 type of intervention or none (C) improve communication with, quality of care  
86 for, or health outcomes (O) of LEP patients?” (See Figure 1.) We specified the  
87 PICO question, definition of terms, outcomes, and plan of analysis *a priori*.  
88 This review was registered with PROSPERO prior to the initiation of the  
89 search (Record CRD42018093015,  
90 [http://www.crd.york.ac.uk/PROSPERO/display\\_record.php?](http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42018093015)  
91 [ID=CRD42018093015](http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42018093015) ) .

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93 *Definition of Key Terms*

94 A *patient* was defined as a person seeking any type of health care. We  
95 accepted any definition of limited English proficiency (LEP) used by the  
96 authors (i.e., self reported, provider reported, or on objective assessment).  
97 Realizing that language barriers in health care are an important topic not  
98 only in the United States but also in many other countries with large  
99 immigrant populations, we included studies that refer to patients who do not  
100 speak the majority language of the country even if the majority language  
101 was not English. We focused on spoken languages, as the laws and  
102 regulations surrounding provision of sign language assistance for patients  
103 with hearing loss differ. We defined a hospital-wide intervention to mean an  
104 intervention that was clearly applied to three or more inpatient clinical  
105 services. We chose three or more clinical services to eliminate small pilot  
106 studies that were limited in scope and thus would have less applicability to  
107 the primary research question, which is at the hospital or health system

108 level. In addition, we defined *health system* as any network of more than two  
109 institutions providing health care. Outcomes included any type of  
110 measurement of any result of the described intervention related to patient  
111 care or patients.

112

### 113 *Search Strategy*

114 We used the following databases for this search: PubMed, which  
115 includes MEDLINE (1946 to present), Embase (1947 to present), CINAHL, and  
116 CABI: CAB Abstracts and Global Health. All publication dates until April 30,  
117 2018 and all languages were eligible for this study. Search strategies were  
118 developed by a health sciences librarian (N.M.). The librarian translated the  
119 search strategies using each database platform's command language and  
120 appropriate search fields. MeSH terms, Emtree terms, CINAHL headings, and  
121 keywords were used for the search concepts of limited English proficiency,  
122 translation services, and patient health outcomes. The three concepts were  
123 combined with a Boolean "AND." (See Appendix 1 for detailed search  
124 strategies) Initial searches were run in April 2018. Final searches were  
125 completed on May 29, 2018.

126 Conference proceedings and grey literature were considered; however,  
127 this topic is extremely interdisciplinary and specific conferences and journals  
128 were not identified. References of the included studies were also searched  
129 for additional manuscripts meeting our criteria. We included studies of any  
130 design provided they described an intervention and measured an outcome  
131 related to the care of LEP patients according to our inclusion criteria. Using  
132 Endnote X8, references were imported and deduplication was performed  
133 using the protocol described by Bramer et al.<sup>19</sup>

134

### 135 *Article Appraisal*

136 We included all studies that described interventions designed to  
137 improve any aspect of health or health care for LEP patients or patients that  
138 did not speak the majority language. If the article measured and described

139 an outcome that did not relate to patients or patient care, it was excluded. If  
140 the study reported an outcome after implementing an intervention but did  
141 not provide a baseline for comparison, it was excluded. Studies that did not  
142 include an intervention, had no evaluation of an intervention, or included a  
143 setting of less than three clinical services, departments, or clinics were  
144 excluded from the study. We excluded systematic reviews, epidemiologic  
145 descriptions of language access needs, unpublished theses, and posters or  
146 abstracts that were not published as full manuscripts. Unique references  
147 were subsequently screened by title and abstract according to inclusion and  
148 exclusion criteria above by two authors (K.K. and B.T.). We randomly  
149 selected 10% of the titles and abstracts on which to evaluate inter-rater  
150 reliability. Inter-rater reliability was assessed using probability adjusted and  
151 bias adjusted kappa (PABAK).<sup>20</sup> For those studies deemed potentially  
152 relevant, full-text references were retrieved and reviewed. Full-text  
153 screening was performed by two authors, and disagreements were resolved  
154 through consensus. The final group of included articles was read by both  
155 authors, and the data was extracted using a standardized extraction form.  
156 Extracted information included title, author, journal, publication year, type of  
157 study, patient population, health care setting, intervention description,  
158 outcome measure, results, intervention category, outcome category, and  
159 geographic region. The data were then analyzed and presented using a  
160 narrative approach.

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164

165 **Results**

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167           The search yielded an initial 16,686 references. After deduplication,  
168 13,743 unique references remained. Title and abstract review was then  
169 completed by two authors. Inter-rater reliability was assessed on a randomly  
170 selected sample of 1,001 title and abstract pairs. The two authors were  
171 99.1% concordant in their ratings (PABAK =  $0.98 \pm 0.006$ ). After title and  
172 abstract review, we reviewed the full text of 49 references. Of these, 19 met  
173 inclusion criteria (Figure 2).

174           The 19 articles included in the review represent a broad range of  
175 interventions (Tables 1 and 2). Among the 19 references, 4 sets of papers  
176 were identified that reported different outcomes of the same interventions.  
177 The first set included 2 papers evaluating data from an HMO in  
178 Massachusetts, one reported a health care delivery outcome, and one  
179 reported a utilization outcome.<sup>21,22</sup> Further, 3 manuscripts assessed the same  
180 policy's impact on care for LEP patients, however the first assessed access to  
181 care,<sup>23</sup> the second assessed how implementation methods might confound  
182 results,<sup>24</sup> and the third assessed quality of care.<sup>25</sup> Two manuscripts reported  
183 the impact of a single intervention for hospitalized inpatients on informed  
184 consent<sup>26</sup> and discharge preparedness.<sup>27</sup> Finally, one study reported a single  
185 hospital's experience implementing language-related interventions<sup>28</sup> as part  
186 of a multicenter project.<sup>29</sup> Thus, although we included 19 references, they  
187 represent data from 14 unique studies published between 2001 and 2018.  
188 Three of the 10 studies took place outside the United States<sup>30-32</sup>, one was a  
189 national level study in the United States,<sup>29</sup> and the others were from multiple  
190 geographic regions throughout the United States. Below we summarize the  
191 evidence for the interventions organized by outcome category:  
192 communication (interpreter knowledge, language service utilization, patient-  
193 provider communication), quality of care (satisfaction, access to care,  
194 healthcare utilization, metric availability, quality measures), and health  
195 outcomes.

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197

198 **Communication**

199 *Interpreter Knowledge*

200           Two interventions aimed to improve interpreter knowledge as a  
201 mechanism of improving communication. Donelan et al. constructed  
202 specialized training sessions for interpreters from Boston-area hospitals and  
203 improved interpreter knowledge of cancer and clinical trials.<sup>33</sup> McCabe et al.  
204 compared the impact of in-person versus video-based training for health  
205 care providers that frequently acted as Navajo interpreters. Both groups  
206 perceived improvement in their knowledge and comfort level in  
207 interpretation, but the in-person attendees reported greater improvement  
208 compared with those trained by video.<sup>34</sup>

209           Two manuscripts implemented language assessment for dual-role  
210 staff (i.e., staff members who have another assigned role but spent part of  
211 their work hours interpreting). de Jaimes et al. reported on the  
212 implementation of a language assessment in a system of federally qualified  
213 health centers in Central California. They found that only 60% passed with  
214 intermediate or higher fluency.<sup>35</sup> They also implemented a phone screen for  
215 new applicants whose roles required them to be bilingual and found that  
216 93% of new applicants had at least intermediate fluency and that knowing  
217 the language fluency level allowed them to place new staff into roles  
218 appropriate for their language skills. Moreno et al. implemented a language  
219 assessment for dual role staff in a large health care organization in California  
220 and found that one in five of the dual-role staff members in their  
221 organization had insufficient language skills to interpret.<sup>36</sup>

222

223 *Language Service Utilization*

224           Dowbor et al. reported a decrease in ad hoc interpreter use and an  
225 increase in phone interpreter use after the implementation of a phone-based  
226 remote interpreter system for a primary health center network in Toronto.<sup>30</sup>

227 Lion et al. described a multifaceted QI intervention at a children’s hospital  
228 that included education, institution-wide messaging, EMR alerts, an upgrade  
229 of phones to dual handset, and one- touch dialing for interpreters. They  
230 found that telephonic interpretation increased by 53%, overall interpretation  
231 increased by 54%, and patient-reported interpreter use improved in addition  
232 to decreased ad hoc interpreter use and interpreter-related delays in care.<sup>37</sup>  
233 After Massachusetts state legislation mandated access to and use of  
234 professional medical interpreters for LEP patients, Ginde et al. reported rates  
235 of use of interpreters at four Boston area Emergency Departments,  
236 comparing rates in 2002 to rates in 2010. They found that despite the  
237 legislation, in 2010 only 18% of LEP patients interviewed had a professional  
238 medical interpreter used during their ED visit compared with 15% in 2002.<sup>38</sup>  
239 Novak-Zezula et al. described the “Migrant-Friendly Hospitals Project,” a  
240 consortium of hospitals in Europe that implemented measures to develop  
241 and/or improve existing interpreter services that varied with the baseline  
242 resources of the hospital.<sup>32</sup> They saw an increase in the uptake of  
243 professional interpreter use from 35% to 55.2% of clinical staff and a 10%  
244 decrease in the use of ad hoc interpreters.

245

#### 246 *Patient-Provider Communication*

247 Lee et al. described the impact of dual handset phone installation  
248 on three surgical floors on rates of adequate consent for LEP patients  
249 undergoing surgical procedures. Postintervention, patients were more likely  
250 to meet the definition of adequate informed consent (54% vs 29%,  $p =$   
251 0.001). LEP patients, however, still had lower adjusted odds (0.38) of  
252 informed consent when compared to English speakers.<sup>26</sup> In an analysis of  
253 the impact of the same intervention on preparedness for inpatient discharge,  
254 unadjusted scores on the “Care Transitions Measure” (a validated scale for  
255 discharge preparedness) did not differ before and after implementation of  
256 the dual handset phones.<sup>27</sup>

257

258 **Quality of Care**

259 *Satisfaction*

260 Both providers and patients of the Toronto Local Health Integration  
261 Network reported high levels of satisfaction after implementation of a phone-  
262 based remote interpreter system.<sup>30</sup> Marshall et al. reported on the revamping  
263 of the diversity services department of the Children’s Hospital of Los Angeles  
264 and the creation of a professional ladder for interpreters. They saw an  
265 increase in patient satisfaction, a decrease in complaints related to language  
266 services, and improved interpreter career satisfaction.<sup>39</sup>

267

268 *Access to Care for LEP Patients*

269 McClellan et al. studied the impact of a “threshold language access  
270 policy” on penetration of mental health services for Russian, Vietnamese,  
271 and Spanish speakers in 34 counties in California. The threshold language  
272 access policy was implemented by the California Department of Mental  
273 Health and mandates that for all languages above a certain population  
274 threshold, county mental health services must provide: (1) a 24-hour toll-free  
275 phone line with linguistic capability; (2) translated written materials; (3)  
276 bilingual clinicians or other nonclinical staff, interpreters, or telephonic  
277 interpretation capacity; and (4) information to consumers about the  
278 availability of linguistic services. They found that implementation of the  
279 policy lead to significant increase in penetration rates, defined as the  
280 percentage of the beneficiaries receiving services relative to all beneficiaries  
281 eligible to receive services, for Russian and Vietnamese speakers.<sup>23</sup> Snowden  
282 then evaluated the same data to assess why Spanish speakers did not have  
283 a significant improvement in penetration rates. This analysis found that the  
284 improvements depended on implementation by the community-based  
285 organizations and that, when implemented, the policy did increase  
286 penetration for Spanish speakers as well.<sup>24</sup>

287

288 *Health Care Utilization by LEP*

289                Jacobs et al. reported that LEP members of an HMO who had access  
290 to an interpreter showed greater increases per person per year in  
291 recommended preventive services, number of office visits, and prescriptions  
292 written and filled when compare to the English-speaking group.<sup>21,22</sup>

293

294 *Metric Tracking*

295                Hudelson et al. implemented the collection of language needs at  
296 registration for the patients of eight clinical services in the university  
297 hospitals of Geneva, Switzerland.<sup>31</sup> They found that routine collection of  
298 patient language at first contact was both feasible and acceptable and  
299 provided the hospital a baseline assessment of language needs. Regenstein  
300 et al reported the findings of the quality improvement initiative “Speaking  
301 Together,” which included four public and six nonprofit hospitals throughout  
302 the United States. In each hospital, they created a multidisciplinary team  
303 focused on language services and reported data on five metrics to the  
304 collaborative. The five metrics included patients screened for language  
305 preference, patients receiving language services from qualified interpreters,  
306 patient wait-time for language services, interpreter productivity, and  
307 interpreter wait time to begin providing language services. They found that,  
308 at the end of the initiative, each hospital demonstrated improvement by  
309 more than five percentage points in at least one of the five metrics.<sup>29</sup>

310                Standiford et al. presented the experience of University of Michigan  
311 Health System as part of the Speaking Together Collaborative. They  
312 implemented a multifaceted intervention including constructing a  
313 multidisciplinary team to integrate language services in clinical care, a  
314 workflow prompt to remind staff to obtain language data, and a daily  
315 inpatient and outpatient report of language needs of the patients. This report  
316 allowed interpreters to proactively round on LEP patients to assure they were  
317 receiving language services. Over two years, they increased the percent of  
318 patients whose language field was completed in the record from 59% to 96%  
319 and the use of qualified interpreter from 19 to 83% of encounters.<sup>28</sup>

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*Quality Measures*

At the end of the two-year language intervention described by Standiford et al., quality measures for diabetic patients with LEP were compared to those for English speaking diabetics. They found no significant differences in receipt of A1c and LDLC tests, LDLC less than 100 mg/dL, or in the proportion of patients on a statin medication used to lower cholesterol levels. LEP patients were more likely to have an A1c less than or equal to 9%, to receive a diabetic eye examination, and to have a BP less than 135/80 mm Hg, but they were less likely to have a diabetic foot examination or to set a self-management goal.<sup>28</sup> This comparison was not made prior to the language intervention, thus we cannot assess the impact of the intervention on these quality measures. McClellan et al. evaluated the impact of the threshold language policy in California on quality of care for psychiatric outpatient visits, defined as the receipt of appropriate medication follow up visits.<sup>25</sup> They found no evidence that rates of follow-up visits differed for those county mental health plans that implemented the language access programming compared to those that did not.

*Health Outcomes*

None of the studies evaluated the impact of their interventions on long-term health outcomes of LEP patients.

346

347 **Discussion**

348

349 Language barriers in health care are an issue of global concern. As  
350 migration increases worldwide, health systems must engage increasingly  
351 linguistically diverse populations. Institutions included in this review are  
352 located throughout every region of the United States, Canada, and Europe.  
353 Although the persistent underuse of interpreters has been previously  
354 reported, the extent of underuse throughout the literature is concerning.  
355 Lion et al. reported that LEP inpatients received only 0.58 interpretations per  
356 patient-day after the intervention, meaning that many LEP inpatients did not  
357 receive a single interpreted encounter in a 24-hour period.<sup>37</sup> Lee et al.  
358 described an increase in professional interpreter use from 29.8 to 39.7% of  
359 LEP inpatient encounters,<sup>26</sup> and Ginde et al. reported only 18% of LEP  
360 patients in emergency departments received interpretation.<sup>38</sup> Since these  
361 data are from institutions that are actively working to improve language  
362 access, we might infer that the rates of interpreter use in other institutions  
363 are even lower. The persistent low rates of interpreter use imply that other  
364 factors are at play that have yet to be addressed. Diamond et al. used  
365 qualitative methods to explore this issue and concluded both that underuse  
366 of professional interpreters is normalized in the medical culture and that  
367 clinicians consider calling an interpreter a trade-off with their own efficiency.  
368 This work provides valuable insight, and future research should focus on  
369 changing the decision architecture of clinicians regarding when to call an  
370 interpreter.<sup>7</sup>

371 The body of evidence on how to improve health care for LEP patients is  
372 limited. In total, only 14 projects met the predefined criteria for review, the  
373 majority of which were descriptive studies of QI interventions. Despite the  
374 lack of robust evidence, some concrete recommendations can be made from  
375 our synthesis of this literature. For hospital administrators that seek to  
376 improve care for LEP patients, the first step is to ensure that baseline data is

377 uniformly collected and available. If the institution is not yet tracking  
378 language and interpreter preferences, the Joint Commission recommends  
379 asking and documenting for all patients, “ In what language do you prefer to  
380 receive your healthcare?”<sup>40</sup> Next, interpreter use by the providers must be  
381 recorded in the electronic record in an easily extractable and consistent  
382 place. The availability of these two data points is critical to determine both  
383 the baseline and unmet need for language assistance.

384 Next, a testing and certification process for dual-role staff should be  
385 implemented. Testing alone identified those whose language skills were  
386 insufficient to meet patient needs and alerts the organization to reassess the  
387 roles of those employees.<sup>35,36</sup> Implementing a testing and education program  
388 also facilitates compliance with current legislation. The Affordable Care Act  
389 section 1557 states that interpretation must be done by a qualified person.<sup>41</sup>  
390 “Qualified” in this context means that the person should have demonstrated  
391 proficiency in English and the target language and have training in the ethics  
392 of interpretation. No national standard exists for the level of language  
393 proficiency necessary to meet this definition for dual-role staff. Policy makers  
394 should define standards for the language skills of dual-role staff to assure the  
395 safe use non-English language skills in the clinical setting. Further, each  
396 institution should also have a system to certify bilingual clinicians.

397 For more mature institutions that have these basic processes in place,  
398 multifaceted interventions that target barriers to use of language services at  
399 multiple levels are effective. Standiford et al. describe a multifaceted  
400 intervention including mechanisms for screening for preferred language,  
401 integrating language services into clinical care, capturing and documenting  
402 language service use, and improving access to language service providers.  
403 They were able to demonstrate an enormous uptake of language service  
404 utilization from 19% to 83%.<sup>28</sup> The two large consortiums, Speaking Together  
405 and the Migrant-Friendly Hospitals Project, also used this approach.<sup>29,32</sup> In the  
406 Migrant-Friendly program, a consortium of nine hospitals aimed to ensure  
407 the provision of professional interpreters, that patients were informed about



408 their availability, and that educational materials were available in nonlocal  
409 languages.<sup>32</sup> The success of this program is remarkable because the group of  
410 institutions were very heterogeneous and thus the interventions had to be  
411 tailored to the institution. They found, however, that hospital cooperation  
412 with the benchmarking approach was both feasible and effective despite the  
413 heterogeneity. They recommended that before embarking on clinical  
414 interventions, linguistically appropriate communication must be integrated  
415 into the institution's general policies on diversity, that services and  
416 processes must be sustained by becoming mainstream, and that adequate  
417 political and managerial funding must be ensured.<sup>32</sup> Both the two large  
418 consortiums, Speaking Together in the United States and the Migrant-  
419 Friendly Hospitals Project in Europe, succeeded in producing an uptake of  
420 language services across a heterogeneous group of hospitals using  
421 multifaceted, multilevel interventions. Further dissemination of their findings  
422 will enable repetition of their success in other institutions.

423 Policy change yielded mixed results. In the study by Ginde et al, a  
424 state mandate regarding interpreter use had little impact on the proportion  
425 of emergency department patients that were offered interpreters and rates  
426 of use remained extremely low.<sup>38</sup> Work by McClellan et al. on the impact of a  
427 threshold language access policy in California demonstrated improved  
428 access to mental health care for LEP patients,<sup>23</sup> but only when the policy was  
429 implemented by the county.<sup>24</sup> Further, they found no impact on quality of  
430 care.<sup>25</sup> Granted, these four studies took place in the United States, where  
431 federal legislation already mandates language access. These results,  
432 summed with successful hospital-level initiatives, give the impression that  
433 the barrier lies more in implementation on the institutional level and that  
434 additional policies, especially if unenforced, may be less effective.

435 Another important consideration in this discussion is cost. Lack of  
436 reimbursement for interpreter services is a clear barrier to improving the  
437 uptake of language services on the institution and health system level.  
438 Although cost-related outcomes did not meet our inclusion criteria, some

439 cost-related data was available in the included manuscripts. Jacobs et al.  
440 analyzed cost of the addition of in-person interpreters for Spanish and  
441 Portuguese for a large health maintenance organization in the Northeast.  
442 The cost (reported in 2004) for the interpreter service was \$270 per LEP  
443 member per year and \$79 per documented in person interpretation.<sup>22</sup> In a  
444 2012 assessment of a shared network of remote interpreter services, Jacobs  
445 et al. found that interpreted encounters lasted on average 10 minutes and  
446 that the cost on average was \$24.86 per call and emphasized that these  
447 costs must be weighed against the potential costs of medical errors or fines  
448 for noncompliance with federal law.<sup>42</sup>

449 Both performance and outcome gaps remain in the care of LEP  
450 patients. This review summarizes what is known about interventions that  
451 improve care on the hospital and health system level. Use of formal  
452 implementation and dissemination plans for future initiatives would provide  
453 more information about what aspects of the interventions are associated  
454 with the greatest benefit and allow other institutions to learn and  
455 collaborate. Further study is needed of the entire LEP patient experience,  
456 especially for inpatients who must communicate with many different types of  
457 clinical and nonclinical staff throughout the day and night. Few interventions  
458 were identified to improve quality of care and long-term health outcomes of  
459 LEP patients. Assessment of the long-term impact of the interventions should  
460 be an additional goal for future research. Lack of an academic home for  
461 communication in medicine may contribute to the paucity of evidence and  
462 the lack of efficient dissemination of effective interventions. To ensure that  
463 advances are sustained, language services and research on communication  
464 in healthcare should have an academic home, which may fit within the newly  
465 formed schools of Health Systems Science and Health Systems Science  
466 curricula now being incorporated into medical education.<sup>43</sup>

467

## 468 **Limitations**

469

470 As in all systematic reviews, ours has limitations. We did not formally search  
471 the gray literature. We also excluded studies published only in abstract form  
472 and excluded studies that fit all inclusion criteria but did not fit our definition  
473 of hospital or health system-wide. We decided a priori to include only those  
474 studies at the hospital or health system level which we defined as three or  
475 more clinical services within an institution. While this was a purposeful  
476 choice to eliminate very small pilot studies, there is a chance we excluded  
477 pilot studies that may have some applicability at the institution level. We did  
478 not complete a structured assessment of quality of the included works. The  
479 manuscripts were extremely heterogeneous and none were randomized  
480 controlled trials. The majority were descriptions of quality improvement  
481 projects manuscripts for which it would not make sense to apply quality  
482 measures that were built to assess risk of bias in clinical trials.

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484

## 485 **Conclusions**

486

487 This review revealed large gaps in the existing evidence to guide health care  
488 administrators in efforts to improve care and outcomes for LEP patients.  
489 Multifaceted, hospital-based interventions may increase interpreter use and  
490 communication. Hospitals working as part of a consortium dedicated to  
491 culturally and linguistically appropriate care may benefit from each other's  
492 experience. Research in implementation and dissemination focused on  
493 increased utilization of language services has the potential to address the  
494 widely-recognized performance and outcome gaps related to LEP patient  
495 care. Further research to ensure high-quality, equitable health care for our  
496 increasingly diverse society is necessary.

497

498 **References**

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