



# Strategies Used by Healthcare Systems to Communicate with Hospitalized Patients and Families with Limited English Proficiency During the COVID-19 Pandemic: A Narrative Review

Catherine Yang<sup>1</sup> · Larry Prokop<sup>2</sup> · Amelia Barwise<sup>3,4</sup>

Accepted: 17 January 2023 / Published online: 23 February 2023

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2023

## Abstract

The COVID-19 pandemic disproportionately affected racial and ethnic minorities in the United States, including many with limited English proficiency (LEP). These patients face various communication barriers, including a shortage of available interpreters and the need for masks that exacerbated communication barriers. It is not known how hospitals responded to these unique challenges to providing language services for the large number of patients with LEP during COVID-19. This narrative review assessed literature and lay media to identify strategies utilized by hospitals to communicate with patients with LEP hospitalized during the COVID-19 pandemic. A search of APA PsychInfo, EBM Reviews, Embase, Ovid MEDLINE, Epub Ahead of Print, and Ebsco Megafire initially yielded 61 articles, 6 of which were ultimately included after reviewing abstracts and full texts. The identified interventions, which sought to increase accessibility of language-concordant care, increase accessibility of professional interpretation, and improve family communication and understanding, were described positively, though only one was tested for effectiveness.

**Keywords** Limited English proficiency · Patient care · Intensive care · Language barriers · COVID-19

## Introduction

As of 2013, approximately 61.6 million individuals in the United States speak a language other than English at home. Of these individuals, about 41%, totaling 25 million people, are considered to have Limited English Proficiency (LEP), defined as anyone over the age of 5 who reports speaking English less than “well” or “very well” [1]. In the US, the population of individuals with LEP is estimated to be 8% of the total US population and continues to grow, having

increased by 80% between 1990 and 2013 [1], with growth fastest in smaller metropolitan areas [2].

Language barriers profoundly affect the experiences that patients with LEP have with the healthcare system, impacting their relationships with care teams, ability to access care, understanding of their of illness, and ability to make informed decisions [3]. In the hospital, language barriers encountered by patients with LEP put them at risk for sub-optimal communication especially in the ICU [4] [5]. Consequently, patients with LEP face significant disparities. Hospitalized patients with LEP are at a higher risk of adverse medical events [6], have less fully documented informed consent [7], longer hospital and ICU stays [8, 9], higher readmission rates [9–11], and increased ICU mortality rates [12]. At end of life, patients with LEP are more likely to receive mechanical ventilation and are less likely to receive a comfort measures order set [8].

Access to interpretation services in healthcare settings is legally required by the United States government [13]. Use of language services results in fewer clinically important interpretation errors, better quality of care, higher patient satisfaction, and shorter hospitalizations [14–16]. Previous literature describes patients with LEP receiving language

---

✉ Catherine Yang  
Yang.catherine@mayo.edu

<sup>1</sup> Mayo Clinic Alix School of Medicine, 200 First St SW, Rochester, MN 55905, USA

<sup>2</sup> Department of Library Services, Mayo Clinic, Rochester, MN, USA

<sup>3</sup> Bioethics Research Program, Mayo Clinic, Rochester, MN, USA

<sup>4</sup> Division of Pulmonary and Critical Care Medicine, Mayo Clinic, Rochester, MN, USA

services via in-person, phone-based, and video-based professional interpreters, as well as language-concordant clinicians [17–20]. Compared to the use of professional interpreters, care by a language-concordant clinician results in better outcomes for patients with LEP [18]. Amongst the interpretation modalities commonly used, in-person interpretation is preferred for important discussions with patients and families as in-person interpreters are not only able to provide verbatim interpretation, but also alert clinicians to health literacy challenges and function as cultural brokers [3] [21].

Unfortunately, when professional interpreters are not readily available, physicians often still resort to using ad hoc interpretation [22, 23], relying on their own limited language skills, other clinicians [24], family members [23, 25], smart phone translation apps [26], and even Google Translate [27]. These methods have been associated with poorer communication, clinical errors, family distress, and worse patient outcomes [9, 15, 25].

The COVID-19 pandemic has disproportionately affected racial and ethnic minorities in the US, many of whom have LEP [28, 29]. Since the start of the pandemic, hospitals have observed a significant rise in the percentage of patients with LEP or requesting interpreter services [30, 31]. During the COVID-19 pandemic, patients with LEP at the end-of-life were more likely to be Full Code and die after longer hospital stays [32, 33]. The serious nature of COVID-19 and associated high morbidity and mortality rates resulted in clinicians more frequently encountering scenarios that are at high risk of misunderstanding without professional interpretation, such as end-of-life and goals-of-care discussions [34]. Thus, COVID-19 has increased the need for strategies to effectively communicate with patients with LEP.

Unfortunately, the COVID-19 pandemic has impaired communication with patients with LEP in and out of the hospital. Outside the hospital, patients with LEP in the community faced challenges in accessing important healthcare information during the COVID-19 pandemic. Although Spanish is the most spoken language among those with LEP in the US, Spanish language content on COVID-19 from hospitals provided less accessible and less diverse content than the English language versions available [35–37].

While conditions in the hospital resulting from COVID-19 created challenges for effective communication with all patients, those with LEP were particularly affected in a variety of ways [38]. Despite increasing patient need, professional interpretation became more limited. Concerns about contamination, limited the use of phone and video-based interpretation [39, 40]. Concerns about COVID-19 transmission and limited PPE supplies reserved for clinical staff resulted in decreased availability of in-person interpretation at the bedside [28, 40]. To reduce infection risk and PPE use, clinicians spent less time in the rooms of patients infected with COVID-19, and may have incentivized physicians to

“get by” with ad hoc interpretation methods [22]. For ICU patients, muffled voices under masks and background noise from intensive care units’ ventilators and other machines added additional communication challenges [39]. In addition to the above challenges, hospitals widely restricted visitors on inpatient units, resulting in family members being unable to be present at the bedside [41]. For patients with LEP, this limited their ability to have both clinical and non-clinical social interactions, resulting in isolation and distress [27, 42].

In this myriad of ways, language barriers exacerbated COVID-19-related health disparities [27]. Addressing these unique communication challenges posed by the COVID-19 pandemic is of utmost importance given the disproportionate impact of COVID-19 on Hispanic and other communities within the United States who may have language barriers.

The objective of this narrative review was to assess the existing literature and lay media for strategies and interventions employed by hospitals to provide interpreter services and support communication with patients with LEP hospitalized during the COVID-19 pandemic.

## Methods

### Literature Search

Given the gap in our knowledge about interventions implemented during the COVID-19 pandemic to better communicate with patients with LEP, we elected to perform a narrative review. The purpose of a narrative review is to evaluate the landscape of publications on a topic and identify gaps. To do so, we designed a search strategy built around limited English proficiency (LEP), COVID-19, and inpatient medicine. The following databases were used to search for articles in peer-reviewed journals: APA PsycInfo (1806 to November 2021), EBM Reviews—Cochrane Central Register of Controlled Trials (October 2022), EBM Reviews—Cochrane Database of Systematic Reviews (2005 to November 9, 2022), Embase (1974 to November 11, 2022), Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily (1946 to November 11, 2022). To expand the search, Ebsco Megafile (2020–2022) was used to search for articles in the lay media.

This search strategy was designed and conducted by an experienced librarian (LP) with input from the paper’s principal investigators (CY, AB). Database subject headings and keywords in the title and abstract were used to search for interpretation strategies during the COVID-19 pandemic for non-English speaking hospitalized patients. The complete strategy listing all terms and combinations used is listed in the Appendix. This review was exempt from Institutional

Review Board review as it reviews previously published data.

## Selection Criteria

Each title, abstract, and full-text article was reviewed independently by the study authors (CY, AB). Articles were included if the following criteria were met: (1) the article was from an English-speaking country where not speaking English is a challenge (2) the article described or assessed a novel intervention or strategy implemented during the COVID-19 pandemic to address language barriers faced by patients and families with LEP (3) the intervention or strategy was deployed in an inpatient setting (e.g., inpatient hospital unit, intensive care unit).

## Data Synthesis and Analysis

We descriptively summarized and qualitatively synthesized the data, categorizing the types of interventions implemented and any described outcomes.

## Results

### Literature Profile

The initial search yielded a total of 43 articles in peer-reviewed journals and 18 articles in the lay media. Following a review of the 61 titles and abstracts and applying our inclusion and exclusion criteria, 6 articles were included for full text review. After full text review, we included the 6 articles, all from peer-reviewed journals (see Table 1). In total, 55 articles were excluded, most because they did not describe an intervention or strategy and/or were not implemented in inpatient settings.

Of the included articles, four articles were based in the United States, one in the United Kingdom, and one in Canada. The interventions described in the articles fall into one of three categories: (1) interventions that increased the accessibility of language-concordant care (2) interventions that increased the accessibility of professional interpretation and (3) interventions to improve family communication and understanding. Three articles fall under the first category, two under the second, and one article falls into the third.

The languages spoken by the patients with LEP were specified in five of six articles. In those five articles, patients in Knuesel et al. (2021) [31], Herzberg et al. (2022) [43] and Alvarez-Arango et al. (2021) [44] spoke Spanish, while the patients in the articles by Wachtl et al. (2021) [45] and Kwok et al. (2021) [24] spoke a diverse set of languages, ranging from Bengali, Hindi, and Urdu to Mandarin, Cantonese, and Punjabi. Mulpur et al. (2021) [40] likely served

patients who spoke a diverse set of languages as well, though the languages were unspecified. Kwok et al. (2021) [24] and Alvarez-Arango et al. (2021) [44] quantify the total number of patients with LEP who were served by the interventions, while the other articles do not.

### Category 1: Increasing Accessibility of Language-Concordant Care

Three articles—Knuesel et al. (2021) [31], Herzberg et al. (2022) [43], and Alvarez-Arango et al. (2021) [44] leveraged bilingual staff at their hospitals to increase the accessibility of language-concordant care as more patients with LEP were hospitalized during the COVID-19 pandemic [31]. (2021) The articles describe two different approaches to engaging Spanish speaking clinicians and/or staff to support frontline healthcare teams.

#### Spanish Language Care Group (SLCG)

Knuesel et al. (2021) [31] describe the process of developing the Spanish Language Care Group (SLCG) at a large tertiary care center in the US. Study authors describe assembling Spanish-speaking physicians from an existing registry that identified clinicians with multilingual skills to address the increased number of hospitalized Spanish-speaking patients. SLCG leaders then collaborated with leadership from the inpatient medicine surge team and the Center for Diversity and Inclusion to develop a staffing strategy, assigning SLCG providers to shifts in the ED, inpatient medical units, and ICU to assist provider teams with language interpretation and other clinical tasks. Knuesel et al. (2021) [31] report “overwhelmingly positive feedback” [31] from the teams who were assigned SLCG clinicians and SLCG physicians themselves.

Herzberg et al. (2022) [43] describe the same intervention but from the perspective of a physician in the SLCG. The study authors describe the appreciation they received from patients, patients’ families, and clinicians as well as the example that the intervention set for other hospitals locally and nationally.

#### Juntos Consult Service

Alvarez-Arango et al. (2021) [44] describe the creation of a consultative service at a large tertiary care center in the US in response to rising numbers of Spanish-speaking patients. The service, called Juntos, comprised of Spanish-speaking staff who indicated certified Spanish proficiency and a willingness to be deployed to COVID units. Volunteers staffed the Juntos service from 7 am to 7 pm 7 days per week during the peak of COVID-19 admissions, followed by 8 am to 5 pm from Monday to Friday after the peak. The

**Table 1** Summary of articles describing interventions to address language barriers during the COVID-19 pandemic

Article	Setting	Patient Population	Description of intervention ± evaluation	Findings
Alvarez-Arango et al. (2021), [44] survey, USA	–Large academic teaching hospital –All inpatient units, including the ICU and labor and delivery	Spanish speaking patients admitted to inpatient units	–Spanish-speaking clinicians responded to consults from medical teams –Consults aimed to explain treatments and facilitate discharge by gathering information and assisting with referrals to community resources –Surveys sent to individuals placing consults and Juntos volunteers	–127 patient consults, 40.9% consults from medical surgical units, 37% from medical ICUs—81% of clinicians were very satisfied and 15% satisfied with care provided by Juntos consultants –Among Juntos consultants, 71% very satisfied and 14% satisfied with experience
Herzberg et al. (2022), [43] perspective, USA	–Large academic teaching hospital –Specific units unspecified	Spanish-speaking patients admitted to inpatient units	–Spanish-speaking physicians provided language-concordant care –Assigned in shifts to assist care teams	–Appreciation reported from patients, families, clinicians –Reported as model for other hospitals
Knuesel et al. (2021), [31] perspective, USA	–Large academic teaching hospital –All inpatient units, including the ICU and ED	Spanish-speaking patients in the ED, inpatient units, and ICU	–Spanish-speaking physicians provided language-concordant care –Assigned in shifts to assist care teams	–High subjective satisfaction of Spanish-speaking physicians –Reported positive feedback from patient care teams
Kwok et al. (2021), [24] pre/post-survey, Canada	–University-affiliated community teaching hospital –ED	Patients with ILEP in ED	–“Interpreter on wheels” initiated [electronic tablet mounted on a rolling stand with speakers] –Staff and patients surveyed pre/post implementation	–477 virtual interpretation encounters lasting 4123 min between 3/2020 and 5/31/20 –Mandarin and Cantonese most frequently used –Staff and patients rated interpretation mean of 4.43/5
Mulpur et al. (2021), [40] perspective, USA	–Large academic teaching hospital –Specific units unspecified	Patients requiring language assistance services, specific languages unspecified	–Preexisting Vocera Smartbadge device newly programmed with telephone interpreter number	–Doubled number of telephone interpretation minutes used from quarter 1 to quarter 2 of 2020 –Reported positive feedback from clinicians
Wachtl et al. (2021), [45] quantitative, UK	–2 large London NHS hospitals –ICU	–Family members of ICU patients, some with language barriers –Languages: Bengali, Hindi, Urdu, Portuguese, Turkish, Arabic, and Albanian	–5 min animation describing MV, risks, benefits, and alternatives narrated by native speaker emailed to families of patients admitted to ICU—Families surveyed prior to and after animation implementation	–Increased reported understanding of treatment, risks, benefits, and alternatives –No change in reported level of anxiety by families

ED Emergency department, ICU Intensive Care Unit, LEP limited English proficiency, MV mechanical ventilation

Juntos consult service was available to all inpatient teams, including from the ICU and labor and delivery. Surveys were sent to all individuals placing Juntos consults as well as all Juntos volunteers. The survey showed that the majority of referrals stemmed from the medical and ICUs. Satisfaction with the program was high overall, with 85% of individuals placing consults reporting being very satisfied with the care delivered and 71% of Juntos volunteers reporting being very satisfied with their experience. [44]

## Category 2: Increasing Accessibility of Professional Interpretation

Two articles – Mulpur et al. (2021) [40] and Kwok et al. (2021) [24]—describe approaches that use technology to increase the accessibility of professional interpretation given the challenges that the COVID-19 pandemic posed to in-person interpretation.

### Wearable Technology Connection to Phone Interpretation

Mulpur et al. (2021) [40] describe an approach where the phone number for telephone interpretation was programmed onto Smartbadge wearable technology already worn by clinicians. Clinicians were then able to verbally request professional telephone interpreter services while at the bedside, which would seamlessly emanate from the speaker on the Smartbadge. As a result of this intervention, Mulpur et al. (2021) [40] reported that the number of minutes of telephone interpretation doubled between the first and second quarters of 2020 and clinicians reported an increased sense of connectedness with patients due to the interpreter’s voice seeming to originate from their chest.

### Interpreter on Wheels

Kwok et al. (2021) [24] describe a trial of an “[Interpreter on Wheels](#)” (IOW), an electronic tablet mounted on a rolling stand with an audio and visual interpretation service. The tablet was available to Emergency Department staff in the hopes of decreasing the use of bilingual staff as ad hoc interpreters by increasing accessibility of professional interpreters. During the two month trial, Kwok et al. (2021) [24] reported 477 virtual interpretation encounters in a variety of languages, most commonly Mandarin and Cantonese. Staff and patients expressed satisfaction, rating the device a cumulative 4.43/5. However, Kwok et al. (2021) [24] were unable to determine the impact of the IOW on the frequency of bilingual clinicians being used as ad hoc interpreters during the trial period.

## Category 3: Improving Family Understanding

Wachtl et al. (2021) [45] describe the implementation of an animated patient education video in two London National Health Services (NHS) hospitals aimed at increasing families’ understanding of mechanical ventilation and its risks, benefits, and alternatives in the setting of pandemic visitor restrictions. Developed to serve both English-speaking and non-English speaking families now separated from loved ones in the ICU by COVID-19-related visitor restrictions, the animated video was made available in English, as well as the four most spoken non-English languages by patients served by the regional NHS Trust—Bengali, Hindi, Turkish, and Polish. In total, 45 English-speaking and 26 non-English speaking families were included in the intervention. The investigators conducted surveys of the families’ self-reported understanding of mechanical ventilation before and following implementation of the intervention. The study authors found that the 20 English-speaking and 12 non-English speaking families surveyed after implementing the intervention reported increased understanding of mechanical ventilation and its risks, benefits, and alternatives, but no change in their levels of anxiety.

## Discussion

The purpose of this narrative review was to identify the strategies and interventions described in the literature to address the unique communication challenges faced by hospitalized patients and their families with LEP during the COVID-19 pandemic.

Prior to the COVID-19 pandemic strategies beyond language interpretation to support patients with LEP have included specific clinic days with language-congruent clinicians [46], huddles between clinicians and interpreters [47], continuing education sessions on caring for patients with LEP [48], electronic apps for health promotion and communication providers [49], and chronic disease education via group video visits by community health workers [50]. Most interventions described in the literature occur in non-hospitalized patients, such those seen in outpatient clinics or through community outreach [46, 49, 51]. However, these strategies may not be applicable when caring for individual patients in higher-acuity settings, such as those who are hospitalized or in ICU. Finally, few communication strategies have been described for communicating with patients with LEP regarding critical illness and end-of-life care [52], unfortunately more prevalent during the COVID-19 pandemic.

Overall, the five interventions described in the six articles all report positive outcomes and are generally replicable,

though would likely require significant resources to sustainably serve the needs of all patients with LEP, regardless of primary language. The interventions described by Mulpur et al. (2021) [40] and Kwok et al. (2021) [24] are the most sustainable strategies as they require one-time investments in technologies. In addition, these interventions also provide better access to language services for all patients with LEP, regardless of primary language. Conversely, Wachtl et al. (2021) [45] made the video animation available in 4 languages and it might require significant resources to make the animation available in several other languages. Both the Spanish Language Care Group (SLCG), as described by Herzberg et al. (2022) [43] and Knuesel et al. (2021) [31], and the Juntos consult service, as described by Alvarez-Arango et al. (2021) [44] relied on Spanish-speaking staff. The former embedded clinician volunteers with frontline medical teams while the latter created a consult service that could be utilized as needed by any inpatient team [31, 43, 44]. Compared to the setup of the Juntos consult service, the setup of the SLCG likely allowed for more immediate language assistance while potentially requiring more volunteer time.

While care by language-concordant clinicians is optimal, resulting in better outcomes for patients, there are many challenges facing this kind of intervention [18]. First, there will certainly remain a shortage of language-concordant clinicians for patients in the foreseeable future. Studies have shown that the most commonly spoken languages among clinicians and medical trainees in the United States do not align with the most commonly spoken languages by patients with LEP. This is true for both the regions in which they practice and in the US as a whole [53–55]. Second, Spanish-fluent staff were available to assist other medical teams only as a result of pandemic-related disruptions of their typical clinical work. In the case of the Spanish Language Care Group, the bilingual clinicians were available while their typical clinical activities were suspended by the COVID-19 pandemic [31]. Once normal hospital operations and academic activities began to return, the Juntos consult service began to struggle with coverage, as volunteers had to meet their clinical responsibilities while also covering the Juntos pager [44]. Finally, given the limited number of bilingual staff available, interventions that utilize these individuals' unique language skills perpetuates the so-called minority or cultural tax. This tax, as described by Alvarez-Arango et al. (2021) [44] describes the increased frequency of which minority staff, trainees, and faculty face additional, often uncompensated, duties and responsibilities to advance an institution's diversity, equity, and inclusion work.

Some limitations of this narrative review include the following. First, as with all narrative reviews, we depend on our search strategy to capture relevant articles. To maximize the chances of capturing all relevant articles, we worked with an

expert librarian to develop the comprehensive search strategy and broadened the search beyond academic articles to include published perspectives and articles in the lay media. While we are confident that our expert librarian captured the pertinent articles, it is possible that in the limited time since the search was finalized in November 2022, additional articles have since been published that were not included. Second, despite our broad search strategy, this narrative review captured few relevant articles, particularly original research articles. As COVID-19 has disrupted research in other fields [56], it is possible that the burdens that COVID-19 placed on healthcare systems in the US and beyond limited the ability for systems to develop, implement, assess and document novel interventions in the academic literature, while coping with the patient care demands placed upon clinicians during the pandemic.

### New Contribution to Literature

Our narrative review is the first to describe communication strategies directly implemented to address the unique communication challenges posed by COVID-19 for hospitalized patients with LEP.

This narrative review shows that there are a few novel strategies described in the literature that were used to address the unique communication challenges faced by patients with LEP during the COVID-19 pandemic. In the interventions that were described, the outcomes of the interventions, while seemingly positive, were not systematically measured, making the overall impact of the intervention difficult to evaluate. In addition, the ability of the interventions to scale up to address all patients with LEP, regardless of primary language, and to remain feasible beyond the initial surges of the COVID-19 pandemic are somewhat questionable. Future research should focus on developing strategies to improve communication with patients with LEP in pandemic conditions (e.g., with high patient volume, PPE shortages, limited family visits) that can serve all patients with LEP and can be maintained over longer periods of time. Given the increasing population of patients with LEP, this area of research remains a challenge and a priority.

### Appendix

Database(s): APA PsycInfo 1806 to November Week 1 2022, EBM Reviews—Cochrane Central Register of Controlled Trials October 2022, EBM Reviews—Cochrane Database of Systematic Reviews 2005 to November 9, 2022, Embase 1974 to 2022 November 11, Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions 1946 to November 11, 2022.

Search Strategy:		
#	Searches	Results
1	exp Communication barriers/	12,394
2	("language interpreter*" or "medical interpreter*" or "non-native english").ti,ab	2152
3	((communication adj3 (barriers or method*)) or "asian american*" or "hispanic american*" or interpreter* or "language barrier*" or LEP or "limited english" or "Limited English Proficiency" or multilingual or "second language" or speaker* or speaking or translate or translating or translation or Translator*).ti,ab	787,969
4	exp Translating/	8315
5	1 or 2 or 3 or 4	797,974
6	exp COVID-19/	486,595
7	((("Corona virinae" or "corona virus" or Coronavirinae or coronavirus or COVID or nCoV or HCoV) adj4 ("19" or "2019" or novel or new)) or (("Corona virinae" or "corona virus" or Coronavirinae or coronavirus or COVID or nCoV or HCoV) and (wuhan or china or chinese)) or "Corona virinae19" or "Corona virinae2019" or "corona virus19" or "corona virus2019" or Coronavirinae19 or Coronavirinae2019 or coronavirus19 or coronavirus2019 or COVID19 or COVID2019 or nCoV19 or nCoV2019 or "SARS Corona virus 2" or "SARS Coronavirus 2" or "SARS-COV-2" or "Severe Acute Respiratory Syndrome Corona virus 2" or "Severe Acute Respiratory Syndrome Coronavirus 2").ti,ab	652,422
8	6 or 7	691,551
9	exp Hospitalization/	807,130
10	exp Inpatients/	252,557
11	exp Emergency Service, Hospital/	107,773
12	exp Intensive Care Units/	369,062
13	exp Critical Care/	867,922
14	exp Hospitals/	1,675,401
15	exp Hospital Medicine/	1993
16	exp Hospital-Patient Relations/	9493
17	"Length of Stay"/	360,479
18	Personnel, Hospital/	41,403
19	Medical Staff, Hospital/	62,739
20	("critical care" or "emergency department" or "emergency unit*" or "emergency ward*" or hospital* or ICU or ICUs or inpatient* or "in-patient*" or "intensive care*" or "length of stay").ti,ab	9,708,452
21	or/9–20	10,880,295
22	5 and 8 and 21	2176

#	Searches	Results
23	limit 22 to english language [Limit not valid in CDSR; records were retained]	2136
24	limit 23 to yr="2020 -Current"	2135
25	limit 24 to (letter or dissertation abstract or conference abstract or editorial or erratum or note or addresses or autobiography or bibliography or biography or blogs or comment or dictionary or directory or interactive tutorial or interview or lectures or legal cases or legislation or news or newspaper article or overall or patient education handout or periodical index or portraits or published erratum or video-audio media or webcasts) [Limit not valid in APA PsycInfo,CCTR,CDSR,Embase,Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) PubMed not MEDLINE,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	836
26	24 not 25	1299
27	Remove duplicates from 26	850

## Declarations

**Conflict of interest** The authors have no relevant financial or non-financial interests to disclose. No funds, grants, or other support was received.

## References

- Zong J, Batalova J. The limited English proficient population in the United States in 2013. 2015.
- Wilson JH. Investing in English skills: the limited English proficient workforce in US metropolitan areas. Washington D C: Brookings Institute; 2014.
- Yehekel A, Rawal S. Exploring the "patient experience" of individuals with limited english proficiency: a scoping review. *J Immigr Minor Health*. 2019;21(4):853–78.
- Espinoza Suarez NR, Urtecho M, Nyquist CA, Jaramillo C, Yeow ME, Thorsteinsdottir B, et al. Consequences of suboptimal communication for patients with limited English proficiency in the intensive care unit and suggestions for a way forward: a qualitative study of healthcare team perceptions. *J Crit Care*. 2021;61:247–51.
- Barwise AK, Nyquist CA, Suarez NRE, Jaramillo C, Thorsteinsdottir B, Gajic O, et al. End-of-life decision-making for ICU patients with limited English proficiency: a qualitative study of healthcare team insights. *Crit Care Med*. 2019;47(10):1380–7.
- Divi C, Koss RG, Stephen P, Loeb JM. Language proficiency and adverse events in US hospitals: a pilot study. *Int J Qual Health Care*. 2007;19(2):60–7.
- Schenker Y, Wang F, Selig SJ, Ng R, Fernandez A. The impact of language barriers on documentation of informed consent at

- a hospital with on-site interpreter services. *J Gen Intern Med.* 2007;22:294–9.
8. Barwise A, Jaramillo C, Novotny P, Wieland ML, Thongprayoon C, Gajic O, et al. Differences in code status and end-of-life decision making in patients with limited English proficiency in the intensive care unit. *Mayo Clin Proc.* 2018;93(9):1271–81.
  9. Karliner LS, Kim SE, Meltzer DO, Auerbach AD. Influence of language barriers on outcomes of hospital care for general medicine inpatients. *J Hosp Med.* 2010;5(5):276–82.
  10. John-Baptiste A, Naglie G, Tomlinson G, Alibhai SMH, Etschells E, Cheung A, et al. The effect of English language proficiency on length of stay and in-hospital mortality. *J Gen Intern Med.* 2004;19:221–8.
  11. Jiang HJ, Andrews R, Stryer D, Friedman B. Racial/ethnic disparities in potentially preventable readmissions: the case of diabetes. *Am J Public Health.* 2005;95(9):1561–8.
  12. Oca SR, Navas A, Leiman E, Buckland DM. Effect of language interpretation modality on throughput and mortality for critical care patients: a retrospective observational study. *J Am Coll Emerg Physicians Open.* 2021. <https://doi.org/10.1002/emp2.12477>.
  13. Office for Civil Rights. Guidance to federal financial assistance recipients regarding Title VI and the prohibition against national origin discrimination affecting limited English proficient persons. Health and Human Services: Civil Rights. Published 26 July 2013. <https://www.hhs.gov/civil-rights/for-providers/lawsregulations-guidance/guidance-federal-financial-assistance-title-vi/index.html>. Accessed 6 Mar 2022.
  14. Abbato S, Greer R, Ryan J, Wayne P, Good P. The impact of provision of professional language interpretation on length of stay and readmission rates in an acute care hospital setting. *J Immigr Minor Health.* 2019;21(5):965–70.
  15. Flores G. The impact of medical interpreter services on the quality of health care: a systematic review. *Med Care Res Rev.* 2005;62(3):255–99.
  16. Schiaffino MK, Ruiz M, Yakuta M, Contreras A, Akhavan S, Prince B, et al. Culturally and linguistically appropriate hospital services reduce Medicare length of stay. *Ethn Dis.* 2020;30(4):603–10.
  17. Barwise A, Tschida-Reuter D, Sutor B. Adaptations to interpreter services for hospitalized patients during the COVID-19 pandemic. *Mayo Clin Proc.* 2021;96(12):31843185.
  18. Diamond L, Izquierdo K, Canfield D, Matsoukas K, Gany F. A systematic review of the impact of patient–physician non-English language concordance on quality of care and outcomes. *J Gen Intern Med.* 2019;34(8):1591–606.
  19. Joseph C, Garruba M, Melder A. Patient satisfaction of telephone or video interpreter services compared with in-person services: a systematic review. *Aust Health Rev.* 2017;42(2):168–77.
  20. Locatis C, Williamson D, Gould-Kabler C, Zone-Smith L, Detzler I, Roberson J, et al. Comparing in-person, video, and telephonic medical interpretation. *J Gen Intern Med.* 2010;25(4):345–50.
  21. Espinoza Suarez NR, Urtecho M, Jubran S, et al. The roles of medical interpreters in intensive care unit communication: a qualitative study. *Patient Educ Couns.* 2021;104(5):1100–1108.
  22. Diamond LC, Schenker Y, Curry L, Bradley EH, Fernandez A. Getting by: underuse of interpreters by resident physicians. *J Gen Intern Med.* 2008;24(2):256–62.
  23. Patel DN, Wakeam E, Genoff M, Mujawar I, Ashley SW, Diamond LC. Preoperative consent for patients with limited English proficiency. *J Surg Res.* 2016;200(2):514–22.
  24. Kwok MMK, Chan RK, Hansen C, Thibault K, Wong HY. Access to translator (AT&T) project: interpreter on wheels during the COVID-19 pandemic. *BMJ open qual.* 2021;10(1):e001062.
  25. Silva MD, Genoff M, Zaballa A, Jewell S, Stabler S, Gany FM, et al. Interpreting at the end of life: a systematic review of the impact of interpreters on the delivery of palliative care services to cancer patients with limited English proficiency. *J Pain Symptom Manage.* 2017;51(3):569–80.
  26. Khoong EC, Steinbrook E, Brown C, Fernandez A. Assessing the use of Google Translate for Spanish and Chinese translations of emergency department discharge instructions. *JAMA Intern Med.* 2019;179(4):580.
  27. Ortega P, Martínez G, Diamond L. Language and health equity during covid-19: lessons and opportunities. *J Health Care Poor Underserved.* 2020;31(4):1530–5.
  28. Pilkington B, Campoverde A. The bioethics of translation: Latinos and the healthcare challenges of COVID-19. *Am Catholic Studies.* 2020;131(3):11–7.
  29. Tai DBG, Shah A, Doubeni CA, Sia IG, Wieland ML. The disproportionate impact of COVID-19 on racial and ethnic minorities in the United States. *Clin Infect Dis.* 2021;72(4):703–6.
  30. Hartford EA, Carlin K, Rutman LE, Lion KC. Changes in rates and modality of interpreter use for pediatric emergency department patients in the COVID-19 era. *Jt Comm J Qual Patient Saf.* 2022;48(3):139–46.
  31. Knuesel S, Chuang W, Olson E, Betancourt J. Language barriers, equity, and COVID-19: The impact of a novel Spanish language care group. *J Hosp Med.* 2021;16(2):109–11.
  32. Chua IS, Shi SM, Jia Z, Leiter R, Rodriguez JA, Sivashanker K, et al. Differences in end-of-life care between COVID-19 inpatient decedents with English proficiency and limited English proficiency. *J Palliat Med.* 2022;25(11):1629–38.
  33. Moin EE, Okin D, Jesudasan SJ, Dandawate NA, Gavralidis A, Chang LL, et al. Code status orders in patients admitted to the intensive care unit with COVID-19: A retrospective cohort study. *Resuscit Plus.* 2022;10:100219.
  34. Regenstien M, Andres E, Wynia MK. Appropriate use of non-English-language skills in clinical care. *JAMA.* 2013;309(2):145–6.
  35. Dhawan N, Subbiah IM, Yeh JC, Thompson B. Healthcare disparities and the COVID-19 pandemic: analysis of primary language and translations of visitor policies at NCI-designated comprehensive cancer centers. *J Pain Symptom Manage.* 2021;61(5):e13–6.
  36. Higashi RT, Sweetenham JW, Israel AD, Tiro JA. COVID-19 communication from seven health care institutions in north Texas for English- and Spanish-speaking cancer patients: Mixed method website study. *JMIR Cancer.* 2021;7(3):1–14.
  37. LEP.gov. 2015 U.S. national limited English proficient (LEP) population maps - number by state.
  38. Istanbulian L, Rose L, Yunusova Y, Dale C. Barriers to and facilitators for supporting patient communication in the adult ICU during the COVID-19 pandemic: a qualitative study. *J Adv Nurs.* 2022;78(8):2548–60.
  39. Diamond LC, Jacobs EA, Karliner L. Providing equitable care to patients with limited dominant language proficiency amid the COVID-19 pandemic. *Patient Educ Couns.* 2020;103(8):1451–2.
  40. Mulpur E, Turner T. Reducing barriers to language assistance during a pandemic. *J Immigr Minor Health.* 2021;23(5):1126–8.
  41. Valley TS, Schultz A, Nagle MT, Miles LJ, Lipman K, Ketcham SW, et al. Changes to visitation policies and communication practices in Michigan ICUs during the COVID-19 pandemic. *Am J Respir Crit Care Med.* 2020;202(6):883–5.
  42. Kucirek NK, Thomas NJ, Norman JS, Athavale P, Jaradeh K, Hsiang EY, et al. Stories from COVID-19 reveal hospitalized patients with limited English proficiency have always been uniquely prone to social isolation. *J Gen Intern Med.* 2021;36(3):786–9.
  43. Herzberg EM, Barrero-Castillero A, Matute JD. The healing power of language: caring for patients with limited english proficiency and COVID-19. *Pediatr Res.* 2022;91(3):526–8.



44. Alvarez-Arango S, Tolson T, Knight AM, Presny SK, Cruz-Oliver DM, Aloe S, et al. Juntos: a model for language congruent care to better serve Spanish-speaking patients with COVID-19. *Health Equity*. 2021;5(1):826–33.
45. Wachtl M, Ledesma F, Malcolm H, Toal C, Kavanagh C, Hadley J, et al. Animation supported communication on intensive care; a service improvement initiative. *J Intensive Care Soc*. 2021;23(4):433–8.
46. Blundell AR, Moustafa D, Bartenstein DW, Smith GP, Hawryluk EB. Language-centered approach to care improvement in a pediatric dermatology clinic. *Pediatr Dermatol*. 2021;38(S2):161–3.
47. Barwise A, Yeow M-e, Partain DK. The premise and development of Check in—Check-In for Exchange of Clinical and Key Information to enhance palliative care discussions for patients with limited English proficiency. *Am J Hosp Palliat Care*. 2021;38(6):533–8.
48. Greene E, Adam J. “Providing care across a language barrier”—a program at the intersection of inter-professional education and co-curricular engagement. *Curr Pharm Teach Learn*. 2020;12(12):1461–9.
49. Thonon F, Perrot S, Yergolkar AV, Rousset-Torrente O, Griffith JW, Chassany O, et al. Electronic tools to bridge the language gap in health care for people who have migrated: Systematic review. *J Med Internet Res*. 2021;23(5):1–14.
50. Nouri SS, Avila-Garcia P, Cembali AG, Sarkar U, Aguilera A, Lyles CR. Assessing mobile phone digital literacy and engagement in user-centered design in a diverse, safety-net population: Mixed methods study. *JMIR Mhealth Uhealth*. 2019;7(8):1–11.
51. Shah MK, Gibbs AC, Ali MK, Narayan K MV, Islam N. Overcoming the digital divide in the post-COVID-19 “reset”: enhancing group virtual visits with community health workers. *J Med Internet Res*. 2021;23(7):1–6.
52. Barwise A, Balls-Berry J, Soleimani J, Karki B, Barrett B, Castillo K, et al. Interventions for end of life decision making for patients with limited English proficiency. *J Immigr Minor Health*. 2020;22(4):860–72.
53. Diamond LC, Mujawar I, Vickstrom E, Garzon MG, Gany F. Supply and demand: association between non-English language-speaking first year resident physicians and areas of need in the USA. *J Gen Intern Med*. 2020;35(8):2289–95.
54. Diamond L, Grbic D, Genoff M, Gonzalez J, Sharaf R, Mikesell C, et al. Non-English language proficiency of applicants to US residency programs. *JAMA*. 2014;312(22):8–10.
55. Doximity. Language barriers in U.S. health care: understanding communication trends between U.S. physicians and patients. 2017. Report No.: 3854020090.
56. Huang C, Gao S, Barwise A, Lai X, Huang W, Xiao Y. The impact of COVID-19 pandemic on the initiation of interventional clinical trials conducted in intensive care units. *J Crit Care*. 2022;69:154019.

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.