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Association of Primary Language and Hospitalization for Ambulatory Care Sensitive Conditions

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Abstract

Background: Limited English proficiency is associated with decreased access to ambulatory care, however, it is unclear if this disparity leads to increased use of emergency departments (EDs) for low severity ambulatory care sensitive conditions (ACSCs).

Objective: We sought to determine the association between the patient's preferred language and hospital utilization for ACSCs.

Research Design: We conducted a retrospective cohort study of all ED visits in New Jersey in 2013 and 2014. The primary outcome was hospital admission for acute ACSCs, chronic ACSCs, and fractures (a nonambulatory care sensitive control condition). Secondary outcomes included intensive care unit (ICU) utilization and length of stay. Mixed-effect regression models estimated the association between preferred language (English vs. non-English) and study outcomes, controlling for demographics, comorbidities, and hospital characteristics.

Results: We examined 201,351 ED visits for acute ACSCs, 251,193 visits for chronic ACSCs, and 148,428 visits for fractures, of which 13.5%, 11.1%, and 9.9%, respectively, were by non-English speakers. In adjusted analyses, non-English speakers were less likely to be admitted for acute ACSCs [−3.1%; 95% confidence interval (CI), −3.6% to −2.5%] and chronic ACSCs (−2.3%; 95% CI, −2.8% to −1.7%) but not fractures (0.4%; 95% CI, −0.2% to 1.0%). Among hospitalized patients, non-English speakers were less likely to receive ICU services but had no difference in length of stay.

Conclusions: These findings suggest non–English-speaking patients may seek ED care for lower acuity ACSCs than English-speaking patients. Efforts to decrease preventable ED and increase access to ambulatory care use should consider the needs of non–English-speaking patients.

Keywords

limited English proficiency; access to care; language barriers; emergency department; hospital medicine

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More than 65 million Americans speak a language other than English at home, of which 25 million report speaking English less than very well.[1] Limited English proficiency (LEP) has been identified as a significant mediator of ambulatory health disparities and is associated with decreased access to care,[2–4] understanding of health care information[5,6] and patient satisfaction.[7] Patients lacking access to ambulatory care may be more likely to seek care at hospitals and emergency departments (EDs) for conditions which could otherwise be managed in an outpatient setting, also called ambulatory care sensitive conditions (ACSCs).[8] The use of EDs for ACSCs is associated with ED overcrowding and higher costs of care.[9]

Prior research indicates that non–English-speaking patients may have a higher rate of ED utilization,[10] be more likely to be admitted to the hospital,[11,12] and have an increased risk of unplanned readmissions and ED revisits.[12,13] However, these studies were primarily from single academic centers and examined all-cause ED visits or hospital admissions which may include many conditions unlikely to be sensitive to ambulatory care (eg, fractures). Thus, there is a need to understand whether the association between language and ED and hospital visits persists in a more representative sample of hospitals and whether language specifically impacts ED utilization for ACSCs. Understanding of the downstream impact of known disparities in access to ambulatory care among non–English-speaking patients is critical to guiding efforts by health system and payers to improve primary care quality for patients with LEP and to reduce ED overcrowding and preventable hospitalizations.

Patients without access to ambulatory care may turn to the ED as an initial site of care, whereas those with access to ambulatory care are more likely to initially seek care in outpatient settings, reserving ED visits for high severity conditions or after already receiving ambulatory care but failing to improve. Thus, we hypothesized that non–English-speaking patients would be more likely to present to EDs with lower severity ACSCs than English speaking patients. As a result of seeking care for lower severity conditions, we hypothesized that non–English-speaking patients with ACSCs would be less likely to be hospitalized or receive high-intensity inpatient care than English speaking patients. Using state administrative discharge databases, we studied adults seeking ED care in New Jersey, a large and linguistically heterogenous state which requires reporting of patients' preferred language at all hospital encounters to examine whether patients' preferred language is associated with differences in admission rates and inpatient utilization.

METHODS

We performed a population-based retrospective study of all ED visits for ACSCs in New Jersey in 2013 and 2014 using the Agency for Healthcare Research and Quality's (AHRQ) Healthcare Cost and Utilization Project family of state administrative databases.[14] During this time period, New Jersey was the only participating state that routinely collected detailed patient language preference data. Over 30% of the New Jersey population speaks a language other than English at home and 12% speak English less than very well.[1] Our study was determined to be exempt from review by the University of California San Francisco institutional review board.

Cohort Construction

We examined patient-level data from the New Jersey State Emergency Department and State Inpatient Databases which together capture discharge information for all adults treated in hospital EDs, regardless of disposition or payer. To exclude scheduled admissions and hospital transfers, we limited our study to patients with evidence of ED service, either by the reported source of admission, revenue code, or Current Procedural Terminology (CPT) code.[15]

ACSCs

Our cohort included all adults presenting to the ED for ACSCs or fractures. ACSCs were identified using established algorithms from the AHRQ Prevention Quality Indicators.[8] Following AHRQ methodology, we examined 11 ACSCs grouped into acute conditions (pneumonia, urinary tract infection, and dehydration) and chronic conditions (chronic obstructive pulmonary disease, hypertension, congestive heart failure, asthma, diabetes short-term complications, diabetes long-term complications, and uncontrolled diabetes). We excluded 1 prevention quality indicator, lower-extremity amputation among patients with diabetes, as all patients undergoing this procedure must be admitted to the hospital. We studied fractures as a control for which ambulatory care access and quality is unlikely to impact use of ED and hospital services. Decisions to hospitalize patients with fracture are largely based on fracture site and severity, thus we used AHRQ clinical classification software to identify 5 groups of nonpathologic fractures: hip, skull and face, upper limb, lower limb, and other fractures.

Patient Language

Our primary predictor was patient preferred language. New Jersey requires hospital reporting of the patient's preferred language for all encounters; language preference is collected by patient self-report during ED intake and coded using International Standards Organization 639–2 Codes. The majority of hospitals reported detailed language codes, however, some hospitals reported only English or other undefined language. Thus, we dichotomized the reported language variable into English and non-English. We excluded 5 hospitals which universally reported that all patients spoke English, due to concerns of inaccurate reporting, as the US Census reported that > 5% of the population of each county in which the hospitals were located spoke a language other than English at home.

Outcomes

Our primary outcome was the proportion of patients who were hospitalized from the ED for each ACSC. We defined hospital admission as visits for which the disposition from the ED was either admission to the inpatient portion of the same hospital or transfer to a different acute care hospital. We excluded patients who left the ED against medical advice or died in the ED.

For the subgroup of patients admitted to the hospital from the ED, we additionally examined inpatient mortality, intensive care unit (ICU) utilization, and length of stay.

Covariates

Patient covariates included age, sex, payer (Medicare, Medicaid, dual Medicare-Medicaid, private insurance, self-pay or no-charge, and other), national quartile of median zip code income, and Elixhauser Comorbidity Index.[16] Visit covariates included admission year, month, hour, and an indicator variable for weekend versus weekday admission to control for factors associated with weekend staffing patterns. A variable for visit type was included to control for triage acuity (emergent, urgent, or elective). Hospital characteristics were identified from the 2013 American Hospital Association Annual Survey and included profit status (nonprofit vs. for-profit), teaching status (defined by membership in the Council of Teaching Hospitals and Health Systems), number of hospital beds (< 200, 200–399, and ≥ 400), and percent of hospital discharges covered by Medicaid. Data on zip code income quartile were missing for 11,823 patients and these patients were excluded as they were unlikely to reside in New Jersey.

Statistical Analysis

For each condition category (acute ACSCs, chronic ACSCs, and fractures), we compared the descriptive characteristics of the 2 preferred language groups. We compared the unadjusted proportion of ED visits that resulted in an admission by preferred language (English vs. non-English) for each category and each individual condition. For unadjusted comparisons, we conducted χ^2 testing with threshold *P*-value <0.05 to determine statistical significance. We then constructed mixed-effect multivariable logistic regression models to examine hospitalization as a function of language, patient covariates, visit covariates, hospital characteristics, an indicator variable for each condition, and hospital random effects. To account for possible differences in ED disposition by patient language, we conducted a sensitivity analysis, repeating the same mixed-effect models with the inclusion of patients who left the ED against medical advice, classifying these patients as having been discharged from the ED.

For the subset of hospitalized patients, we constructed similar multivariable logistic regression models to examine the association of language and secondary outcomes of inpatient mortality and ICU utilization. We then constructed multivariable negative binomial regressions to examine the association of language and length of stay, using the same covariate structure with the addition of an indicator variable for disposition, as patients discharged to nursing facilities may have different lengths of stay due to bed availability separate from their disease resolution.

For logistic regression results, adjusted odds ratios are presented with 95% confidence intervals (CIs). For all analyses, adjusted rates for each outcome by language group were calculated using postestimation predictive margins. All analyses were conducted on Stata 14.1 (StataCorp, College Station, TX).

RESULTS

We included 600,972 ED visits at 58 hospitals in New Jersey. There were 201,351 visits for acute ACSCs, 251,193 ED visits for chronic ACSCs, and 148,428 visits for fractures, of which 13.5%, 11.1%, and 9.9%, respectively, were by patients with a preferred language other than English (Table 1). Across conditions, a greater proportion of non-English speakers had nonwhite race, Hispanic ethnicity, lived in a zip code in the lowest quartile of median household income, and had a primary payer classification of dual Medicare-Medicaid, self-pay, or no-charge. A greater proportion of non-English speakers received care at teaching hospitals and at for-profit hospitals. A detailed description of reported patient language preferences are reported in the Appendix (Table A1).

In unadjusted analyses, non-English speakers seen in the ED were significantly less likely to be admitted for 7 of 10 individual ACSCs and the composites of both acute ACSCs and chronic ACSCs (Table 2). The largest differences in admission rates were observed for pneumonia (6%), urinary tract infections (7%), and chronic obstructive pulmonary disease (6%). Although the absolute difference was small (1%), non-English speakers were also less likely to be admitted for fractures.

Figure 1 shows the predicted admission rates for each composite condition by patient language, controlling for patient covariates and hospital characteristics In adjusted analyses, non-English speakers remained significantly less likely to be admitted for acute ACSCs (adjusted percent difference in admission rates −3.1; 95% CI, −3.6 to −2.5) and chronic ACSCs (adjusted percent difference, −2.3; 95% CI, −2.8 to −1.7) but no significant difference was observed for fractures (adjusted percent difference 0.4%; 95% CI, −0.2% to 1.0%). A sensitivity analysis including the 0.5% of the sample who left the ED against medical advice, and classifying them as having been discharged from the ED, demonstrated similar findings to the main analysis.

Condition-specific analyses of ACSCs were similar to composites, with non-English speakers significantly less likely to be admitted for all acute ACSCs and 6 of 7 chronic ACSCs (Table 3). There was a nonsignificant trend towards non-English speakers being less likely to be admitted for congestive heart failure. There was no consistent trend among fracture categories, with non-English speakers significantly less likely to be admitted for skull and face fractures, more likely to be admitted for upper limb and lower limb fractures, and no difference found for hip or other fractures.

Among patients admitted to the hospital, there were no significant differences in inpatient mortality or length of stay between language groups across all conditions (Table 4). Non-English speakers were significantly less likely to receive ICU services for acute and chronic ACSCs but not fractures.

DISCUSSION

Our results indicate that language barriers may contribute to differential use of EDs for ACSCs. We found that patients with a preferred language other than English were less likely to be hospitalized when presenting to the ED with both acute and chronic ACSCs but not fractures. In addition, while English and non–English-speaking patients had similar lengths of stay and mortality rates when hospitalized, non–English-speaking patients had lower use of intensive care.

By examining both acute and chronic ambulatory conditions we were able to shed light on the extent that outpatient access, as opposed to disease control, may mediate differences in admission rates among non-English speakers. Earlier studies indicate that language barriers result in decreased access to ambulatory care.[2–4] Prior research also suggests that non-English speakers may have poorer chronic disease management of conditions such as diabetes,[7,17] hypertension,[18] and asthma[19] which could not only lead to more frequent ED visits but also higher admission rates. In addition, early outpatient management is the key factor in preventing the need for hospital care for acute ACSCs such as pneumonia and urinary tract infections. Our finding of lower admission rates for non-English speakers presenting with either acute or chronic ACSCs suggests that inadequate access is 1 driver of ED utilization in this population. However, while we were able to control for patients' insurance status, we were unable to examine patients' access to outpatient care directly, so there may be other possible explanations. For example, while we were able to control for differences in institutional practice patterns, it remains possible that individual ED providers could contribute to the observed differences in admission rates if some providers factored language proficiency into admission decisions. Alternatively, it is also possible that non–English-speaking patients may have been more likely to decline hospital admission, possibly due to concerns for loss of work-hours, responsibilities at home, costs, or other factors we were unable to assess in this study.

Similar to prior studies, we found that inpatient mortality and length of stay of admitted patients were identical between language groups.[13,20,21] This suggests that similar clinical thresholds for admission may have been applied by ED clinicians. Our finding that non–English-speaking patients were less likely to receive ICU services for ACSCs, may indicate either that admitted non-English speakers had lower acuity of illness, or that in-hospital communication barriers drove differential care. Further research is needed to understand this observed difference in care delivery.

Our findings have important implications for health systems and policymakers seeking to improve health disparities. First, our study was possible due to the detailed language reporting to a centralized database required by New Jersey, these data should be routinely collected and reported in a standardized fashion by both health systems and payers to facilitate better understanding of the role of language in health care. Second, our findings suggest a disparity in ED utilization for ACSCs which may be ameliorated through investment in improving access to high-quality language interpretation and outpatient clinical services for non–English-speaking patients. Prior work has shown that increased access to professional interpreter services in the hospital setting improves communication[22] and decreases 30-day readmission and expenditures.[23] Other studies of interpreter use in the ED have demonstrated improved communication and patient satisfaction but have not examined clinical outcomes.[24–26]

Our study has significant strengths over prior studies of language and hospital care which have largely been limited to academic medical centers, even though patient populations, language services, and physician practice patterns may differ broadly between hospitals. Using New Jersey administrative databases, we were able to examine the association of language across all nonfederal hospitals in the state and to control for hospital characteristics including size, teaching, profit, and safety-net status. However, findings for New Jersey may not be generalizable to the remainder of the United States.

Our study examines hospitalizations that took place in 2013 and 2014, a time of significant health care policy change. In 2013, New Jersey expanded Medicaid eligibility as part of the Affordable Care Act legislation. In addition, the Affordable Care Act included multiple provisions aimed at addressing health disparities and enhancing requirements for insurance documents to be translated for LEP patients. Thus, it is possible that ED care patterns for ACSCs have changed since our study period. Prior studies have observed that Medicaid expansion produced increases in insurance coverage within a year,[27] with high uptake for low-income individuals and individuals with LEP suggesting that our study.[28,29] Our study, which controlled for insurance status, would likely reflect the immediate impact of increased access to health insurance. The expansion has also been associated with increased utilization of outpatient services[27] and decreased ED utilization,[30,31] however, we are not aware of any studies which specifically examined the impact of the Affordable Care Act on use of EDs for ACSCs.

Our study has other limitations. We examined patient self-reported preferred language preference as a proxy for LEP. Although some patients may report a non-English preferred language despite English fluency, this would bias our results towards the null. Our dataset lacked information on access to and use of interpreter services during ED and hospital visits, limiting our understanding of the role of communication in admission decisions. Prior studies have indicated that even when available, uptake of interpreter services may be variable,[32,33] there are clear improvements in hospital communication and outcomes with increased access to professional intepreters.[22–24] Administrative databases are reliant on billing codes which may have limited accuracy, to address this we used validated prevention quality indicator measures from AHRQ.[8] Administrative databases do not include vital signs or test results which may inform clinical management decisions, however, we were able to control for other important patient factors which may inform admission decisions including age, medical comorbidities, and primary payer.

In conclusion, non–English-speaking patients seeking ED care were less likely to be admitted for ACSCs, and when hospitalized, less likely to receive ICU care compared with English-speaking patients, suggesting that differential utilization may be driven by poorer access to high-quality ambulatory care. With the growth of alternative payment models and accountable care organizations, targeted improvement in outpatient language services and primary care access for non–English-speaking patients are likely to be cost-effective investments for health systems working to reduce preventable hospital utilization.

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APPENDIX

TABLE A1.

Preferred Language Categories

	n (%)		
Preferred Languages	**Acute ACSCs**	**Chronic ACSCs**	**Fractures**
English	174,237 (86.5)	223,198 (88.9)	133,735 (90.1)
Spanish	15,942 (7.9)	14,964 (6.0)	7410 (5.0)
Other unspecified language	7506 (3.7)	8850 (3.5)	4526 (3.1)
Arabic	428 (0.2)	552 (0.2)	292 (0.2)
Portuguese	476 (0.2)	414 (0.2)	327 (0.2)
Italian	362 (0.2)	419 (0.2)	288 (0.2)
Russian	251 (0.1)	286 (0.1)	215 (0.1)
Hindi	216 (0.1)	232 (0.1)	148 (0.1)
Korean	240 (0.1)	206 (0.1)	301 (0.2)
Chinese	229 (0.1)	206 (0.1)	242 (0.2)
Other specified language	1464 (0.7)	1866 (0.7)	944 (0.6)

All languages reported by hospitals using the International Standards Organization (ISO) 639–2 Codes. Other specified language includes 51 other language categories, top 10 language categories reported here. Other unspecified language reported by hospitals using ISO code for "Other languages."

ACSC indicates ambulatory care sensitive conditions.

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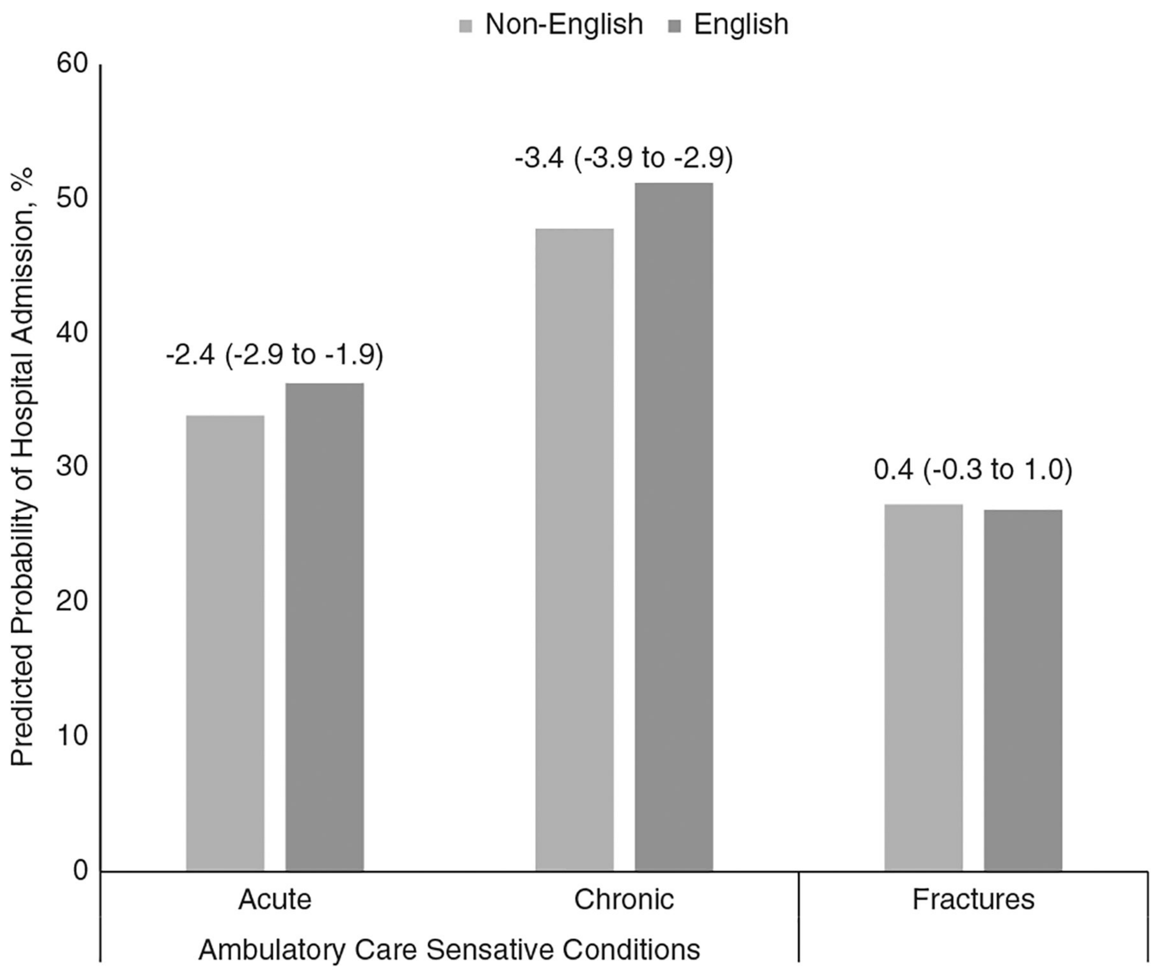

FIGURE 1.

Adjusted admission rates for ambulatory care sensitive conditions (ACSCs) by preferred language. Note: Adjusted differences between marginal predicted admission rates for non-English and English speakers are presented for each condition category with 95% confidence intervals. Acute ACSCs include pneumonia, urinary tract infection, and dehydration. Chronic ACSCs include diabetes, hypertension, congestive heart failure, asthma, and chronic obstructive pulmonary disease. Predicted probabilities generated using postestimation margins following mixed-effect logistic regression models controlling for patient covariates (age, sex, payer, zip code income quartile, Elixhauser Comorbidity Index), visit covariates (year, month, hour, weekend indicator, and visit type), hospital characteristics (teaching status, profit status, size, and hospital share of Medicaid discharges), an indicator variable for specific ACSC or fracture diagnosis, and hospital random effects.

TABLE 1.

Characteristics of English and Non–English-speaking Patients Presenting to the Emergency Department with Ambulatory Care Sensitive Conditions

	Acute Ambulatory Care Sensitive Conditions		Chronic Ambulatory Care Sensitive Conditions		Fractures	
	Non-English (N = 27,114)	English (N = 174,237)	Non-English (N = 27,995)	English (N = 223,198)	Non-English (N = 14,693)	English (N = 133,735)
Demographics						
Age [median (interquartile range)] (y)	49 (32–70)	56 (33–78)	62 (48–75)	60 (46–76)	53 (35–710)	57 (38–76)
Female [n (%)]	21,077 (77)	123,901 (71)	16,387 (58)	124,068 (56)	7391 (50)	75,259 (56)
Race/ethnicity [n (%)]						
White	4442 (16)	109,141 (63)	5245 (19)	123,337 (55)	3615 (25)	98,981 (74)
Black	1358 (5)	36,948 (21)	2141 (8)	69,538 (31)	562 (4)	16,748 (13)
Hispanic	14,910 (55)	18,320 (11)	13,794 (49)	20,092 (9)	6877 (47)	9902 (8)
Asian	1307 (5)	3117 (2)	1574 (6)	3210 (1)	982 (7)	2744 (2)
Other *	4744 (18)	4912 (3)	4884 (17)	5266 (2)	2379 (16)	3754 (3)
Declined/unknown	353 (1)	1799 (1)	357 (1)	1755 (1)	278 (2)	1606 (1)
Primary payer [n (%)] †						
Medicare	5274 (19)	64,456 (37)	8388 (30)	93,074 (42)	3093 (21)	45,909 (34)
Medicaid	3631 (13)	20,850 (12)	3635 (13)	26,544 (12)	1182 (8)	9307 (7)
Dual Medicare/Medicaid	1782 (7)	8889 (5)	2780 (10)	13,140 (6)	758 (5)	3865 (3)
Private insurance	6103 (23)	55,939 (32)	5875 (21)	57,583 (26)	3592 (24)	50,842 (38)
Self-pay	5034 (19)	15,220 (9)	3470 (12)	19,292 (9)	3299 (22)	12,962 (10)
No-charge	4989 (18)	6323 (4)	3622 (13)	11,291 (5)	1679 (11)	3959 (3)
Other	301 (1)	2560 (1)	225 (1)	2274 (1)	1090 (7)	6891 (5)
Median household income quartile [n (%)]						
Lowest	4962 (18)	23,173 (13)	5550 (20)	38,474 (17)	2185 (15)	12,281 (9)
Second	7238 (27)	22,078 (13)	7455 (27)	31,308 (14)	3484 (24)	13,362 (10)
Third	7464 (28)	40,797 (23)	7808 (28)	55,587 (25)	4195 (29)	29,368 (22)
Highest	7450 (27)	88,189 (51)	7182 (26)	97,829 (44)	4829 (33)	78,724 (59)
Elixhauser comorbidities [mean (SD)]	1.2 (1.8)	1.9 (2.1)	2.8 (2.1)	3.2 (2.3)	0.8 (1.4)	1.1 (1.6)
Hospital characteristics [n (%)]						
Teaching hospital	22,441 (83)	136,048 (78)	24,600 (88)	176,964 (79)	12,162 (83)	103,769 (78)

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	Acute Ambulatory Care Sensitive Conditions		Chronic Ambulatory Care Sensitive Conditions		Fractures	
	Non-English (N = 27,114)	**English (N = 174,237)**	**Non-English (N = 27,995)**	**English (N = 223,198)**	**Non-English (N = 14,693)**	**English (N = 133,735)**
Hospital size [n (%)]						
Small (25–199 beds)	4662 (17)	37,981 (22)	5192 (19)	50,086 (22)	2709 (18)	29,899 (22)
Medium (200–399 beds)	13,112 (48)	71,518 (41)	13,505 (48)	88,442 (40)	6821 (46)	51,863 (39)
Large (≥ 400 beds)	9340 (34)	64,738 (37)	9298 (33)	84,670 (38)	5163 (35)	51,973 (39)
Ownership [n (%)]						
Nonprofit	24,769 (91)	167,727 (96)	25,309 (90)	214,915 (96)	13,348 (91)	129,112 (97)
For-profit	2345 (9)	6510 (4)	2686 (10)	8283 (4)	1345 (9)	4623 (3)
Share Medicaid discharged [median (interquartile range)]	22 (16–29)	20 (13–24)	22 (15–29)	19 (12–23)	22 (13–28)	16 (11–22)

Non-English language preference includes all primary languages other than English.

* Other race includes Multiracial, American Indian, Alaskan Native, and undifferentiated other race.

† No-charge includes indigent and charity care. Other payer includes worker's compensation, Title V, CHAMPUS, and other government programs.

TABLE 2.

Unadjusted Admission Rates for Ambulatory Care Sensitive Conditions by Preferred Language

	Non-English Speakers		English Speakers		
	No. ED Visits	**No. Admitted [n (%)]**	**No. ED Visits**	**No. Admitted [n (%)]**	***P***
Acute ambulatory care sensitive conditions	27,114	7053 (26)	174,237	63,971 (37)	< 0.001
Pneumonia	4885	2874 (59)	41,637	27,190 (65)	< 0.001
Urinary tract infection	19,376	2652 (14)	103,707	21,437 (21)	< 0.001
Dehydration	2853	1527 (54)	28,893	15,344 (53)	0.67
Chronic ambulatory care sensitive conditions	27,995	12,624 (45)	223,198	111,865 (50)	< 0.001
Asthma	2855	205 (7)	27,787	2393 (9)	0.009
Chronic obstructive pulmonary disease	9248	3979 (43)	77,329	38,045 (49)	< 0.001
Hypertension	5994	816 (14)	37,363	6284 (17)	< 0.001
Congestive heart failure	5457	4922 (90)	49,396	44,554 (90)	1.00
Short-term diabetes complications	847	783 (92)	7174	6800 (94)	0.005
Long-term diabetes complications	2816	1568 (56)	20,691	12,117 (59)	0.004
Uncontrolled diabetes	778	351 (45)	3458	1672 (48)	0.1
Fractures	14,693	3622 (25)	133,735	36,202 (27)	< 0.001
Hip	972	948 (98)	13,322	12,941 (97)	0.5
Skull and face	1563	232 (15)	10,965	1810 (17)	0.1
Upper limb	5819	676 (12)	48,971	4615 (9)	< 0.001
Lower limb	3954	948 (24)	37,211	7834 (21)	< 0.001
Other	2385	818 (34)	23,266	9002 (39)	< 0.001

Admitted patients include patients admitted to the same hospital for which they sought ED care and patients transferred from ED to a different acute care hospital. A total of 5179 patients (0.9%) who left the emergency department against medical advice were excluded from the primary analyses: 1077 patients with acute ambulatory care sensitive conditions (10% non-English speakers), 3578 patients with chronic ambulatory care sensitive (9% non-English speakers), and 524 patients with fractures (10% non-English speakers).

The *P*-value for χ^2 test of difference in the proportion of patients admitted comparing non-English and English speakers.

ED indicates emergency department.

TABLE 3.

Predicted Probabilities of Admission for Individual Conditions by Preferred Language

	Predicted Probability of Admission		
	Non-English Speakers	English Speakers	Difference (95% CI)
Acute ambulatory care sensitive conditions	33.9	36.3	−2.4 (−2.9 to −1.9)
Pneumonia	61.1	65.9	−4.8 (−6.0 to −3.6)
Urinary tract infection	19.3	20.2	−0.9 (−1.5 to −0.3)
Dehydration	51.4	55.1	−3.7 (−5.5 to −1.8)
Chronic ambulatory care sensitive conditions	47.8	51.2	−3.4 (−3.9 to −2.9)
Asthma	6.5	9.3	−2.8 (−3.9 to −1.8)
Chronic obstructive pulmonary disease	45.3	50.5	−5.2 (−6.3 to −4.2)
Hypertension	14.0	17.7	−3.7 (−4.7 to −2.7)
Congestive heart failure	89.8	90.4	−0.6 (−1.5 to 0.3)
Short-term diabetes complications	92.3	95.0	−2.7 (−4.8 to −0.6)
Long-term diabetes complications	56.2	59.9	−3.6 (−5.5 to −1.7)
Uncontrolled diabetes	47.1	51.5	−4.4 (−8.3 to −0.5)
Fractures	27.3	26.9	0.4 (−0.2 to 1.0)
Hip	97.7	97.1	0.6 (−0.4 to 1.6)
Skull and face	13.2	16.3	−3.1 (−4.9 to −1.4)
Upper limb	10.9	9.5	1.4 (0.5–2.3)
Lower limb	22.7	21.3	1.3 (0.0–2.7)
Other	38.0	38.6	−0.6 (−2.6 to 1.3)

Predicted probabilities generated using postestimation margins following mixed-effect logistic regression models controlling for patient covariates (age, sex, payer, zip code income quartile, Elixhauser Comorbidity Index), visit covariates (year, month, hour, weekend indicator, and visit type), hospital characteristics (teaching status, profit status, size, and hospital share of Medicaid discharges), an indicator variable for specific ambulatory care sensitive conditions or fracture diagnosis, and hospital random effects.

CI indicates confidence interval.

TABLE 4.

Adjusted Clinical Outcomes of English and Non–English-speaking Patients Hospitalized for ACSCs and Fractures

	Acute ACSCs			Chronic ACSCs			Fractures		
	Non-English (N = 7009)	**English (N = 63,332)**	**Difference (95% CI)**	**Non-English (N = 12,556)**	**English (N = 110,271)**	**Difference (95% CI)**	**Non-English (N = 2778)**	**English (N = 21,218)**	**Difference (95% CI)**
Inpatient mortality (%)	1.8	2.0	−0.2 (−0.6 to 0.2)	1.8	1.8	0.0 (−0.3 to 0.2)	1.4	1.4	0.0 (−0.4 to 0.4)
Intensive care unit (%)	21.9	23.7	−1.7 (−2.8 to −0.7)	38.9	40.3	−1.4 (−2.4 to −0.6)	20.7	20.2	0.5 (−0.9 to 2.0)
Mean length of stay (d)	4.9	4.9	0.0 (0.0–0.0)	5.2	5.1	0.0 (0.0–0.1)	4.9	4.8	0.1 (−0.1 to 0.2)

Admitted patients include patients admitted to same hospital for which they sought emergency department care, excludes patients transferred from the emergency department to different acute care hospitals.

Adjusted outcomes generated using postestimation margins following mixed-effect regression models controlling for patient covariates (age, sex, payer, zip code income quartile, Elixhauser Comorbidity Index), visit covariates (year, month, hour, weekend indicator, and visit type), hospital characteristics (teaching status, profit status, size, and hospital share of Medicaid discharges), an indicator variable for specific ACSCs or fracture diagnosis, and hospital random effects.

ACSC indicates ambulatory care sensitive conditions; CI, confidence interval.