Appendix D

Follow-On Study Final Report

Measuring the Costs of Language Barriers in Health Care

I. Project Purpose

In 2002, the Office of Minority Health (OMH), U.S. Department of Health and Human Services (HHS) set out to begin a project to address health care providers' concerns about the costs of providing linguistically appropriate services (LAS) to patients with limited English proficiency (LEP). Most health care providers focus on the costs of providing these services without knowledge of whether or not the lack of these services actually results in higher costs. In order to try and answer this latter question, OMH contracted with the COSMOS Corporation to explore the nature and extent of costs associated with not providing LAS, based on the theory that not adequately addressing language barriers in the health care setting may actually result in higher costs. As part of this contract, a panel of experts was convened to better understand how language barriers might impact health care costs and quality, a conceptual model was developed to serve as a guide for researchers as they pursue research designed to measure these impacts, and The Hektoen Institute, affiliated with the John H. Stroger, Jr. Hospital of Cook County, received a contract to design and conduct a study using this model. This report outlines how the model was used to design the study and describes the study and its results in detail.

II. Background

The conversation between physician and patient has long been recognized to be of diagnostic import and therapeutic benefit.[1] Unfortunately, many patients in the United States cannot benefit from this fundamental interaction because of language barriers. According to Census 2000, more than 46 million people in the United States do not speak English as their primary language and more than 21 million speak English less than "very well."[2] Many of these residents do not receive needed health care or the standard of care because most health care organizations provide no or inadequate interpreter services.[3-9] Many health care providers do not provide adequate interpretation because of the perceived financial burden.[10, 11] However, they do not take into account the cost of the consequences of not providing them or the potential benefits of improving communication with their patients. This is due in part to the paucity of data documenting these costs and benefits.

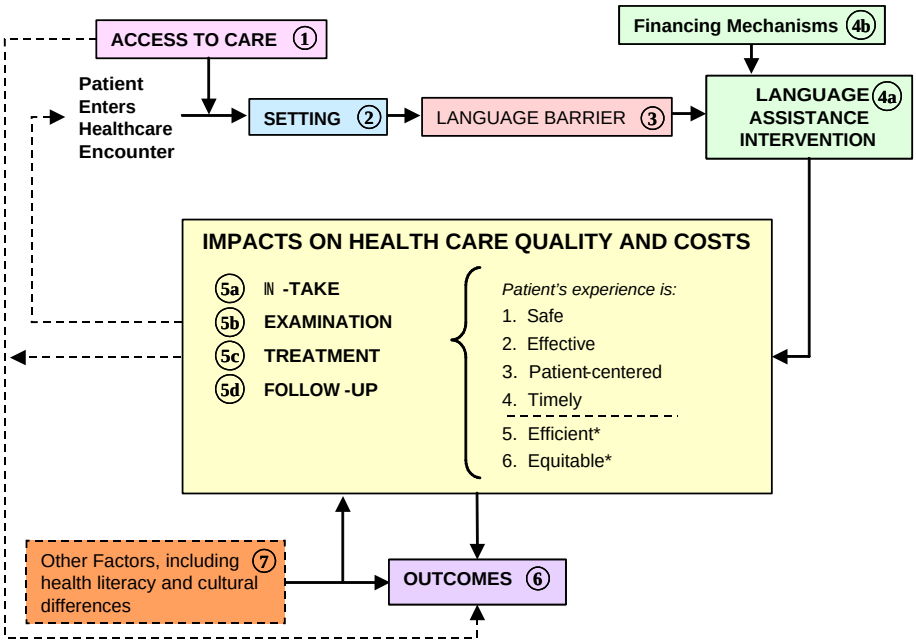
Only six studies have directly set out to measure these costs and benefits. Two studies found that use of ad hoc services has an opportunity cost for institutions in the form of staff time lost to interpreting rather than performing their primary job.[12,13] Another, based in a pediatric emergency department (ED) found that the presence of a language barrier between physician and parents accounted for a $38 increase in charges for testing and a 20 minute longer ED stay compared to encounters in which there were no language barriers.[14] Three additional studies have investigated the costs and potential cost-savings of providing professional interpreter services. They have found that the cost of providing these services is quite low relative to most health care costs[15] and that they

can reduce the cost of care provided in the ED[16] and follow-up visit charges following ED evaluation.[17] There is still a need for investigations that compare the costs of providing adequate linguistic access services to the cost of *not* providing them.

III. Conceptual Model

The conceptual model was developed in order to guide research efforts to close the gap in the current state of knowledge about the cost of language barriers. The face to face meetings of the expert panel were convened in order to develop the model. First, four expert panel members were commissioned to write and present analytic briefs that summarized current knowledge, recent literature and studies, and gaps in the understanding. The papers covered a review of language and other communication barriers in health care, how communication barriers contribute to health disparities, how communication barriers contribute to medical errors, and what is known about the costs and benefits of overcoming language barriers in health care. These papers served as a jumping off point for the expert panel members to begin to identify what should go into a conceptual model that would serve as a guide to researchers wanting to conduct research on the costs of not providing linguistically appropriate services. Over two face-to-face meetings, the panel members devised a conceptual model (Figure 1) that included six important factors that must be addressed in study design: *access to care, setting, language barrier, financing mechanisms, language assistance interventions, and impacts on health care costs and quality, and patient outcomes.*

Figure 1. Conceptual Model for Assessing the Impacts of Provider-Patient Language Barriers on Health Care Costs and Quality



***Efficiency and equity are cross-cutting and applicable to the entire model.**

Access to Care: Access refers to the patient's ability to obtain health care. Language barriers may have a significant impact at the access level and should be measured.

Setting: Setting refers to the context in which a language barrier is operating. Different health care settings will have different factors that need to be considered and measured when investigating the impact of language barriers on health and health care costs.

Language Barrier: Language barrier, within the context of health care, refers to situations in which a patient and provider or other health care staff cannot communicate with each other because either party is not fluent in the language of the other. There are as many types of language barriers as there are languages and health care settings. The specific barrier should be clearly identified in the research.

Financing Mechanisms: These mechanisms refer to how linguistic access services are paid for.

Language Assistance Intervention: These are mechanisms put into place to help LEP patients communicate with health care staff and providers and vice versa. Examples include professional interpreter services, translated materials and having bilingual staff and physicians.

Impacts on Health Care Quality and Costs: There are many impacts on health care costs, quality and utilization that may result from language barriers. The panel suggested that research focus on the quality improvement areas suggested by the Institute of Medicine: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity.

Patient Outcomes: There are a variety of patient outcomes that are impacted by language barriers and should be determined by the hypothesis of a particular study. Examples include patient satisfaction, illness endpoints, and adherence to follow-up.

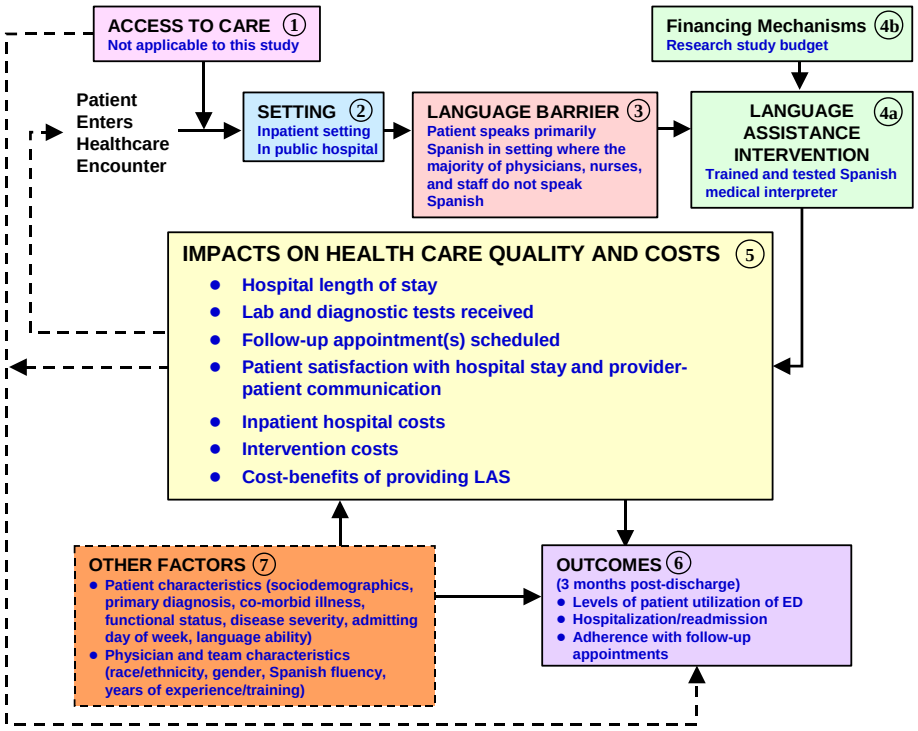
Finally, the conceptual model includes *Other Factors.* These include factors other than language barriers that may influence outcomes and costs. These factors must also be measured and accounted for in research investigating the costs of not providing LAS. Examples include sociodemographic factors, physician characteristics, and literacy.

IV. Study Hypotheses

This study was designed to (1) provide data on the costs of not providing adequate interpreter services to Spanish-speaking hospitalized patients, and (2) to measure the costs and cost-benefits of an interpreter service intervention to improve the care of Spanish-speaking hospitalized patients. The overall hypothesis was that hospitalized Spanish-speaking patients who are not able to communicate adequately with their providers will generate higher inpatient costs compared to hospitalized Spanish-speaking patients who are able to adequately communicate with their physicians through the assistance of an interpreter. The secondary hypotheses were (1) that patients who cannot adequately communicate in Spanish will be less satisfied with the hospital stay and doctor-patient communication than the adequate communication group, and (2) that they will also have higher rates of post-discharge ED utilization and hospitalization and poorer adherence with scheduled outpatient visits than the adequate communication group.

The conceptual model was used to specify the setting, language barrier, intervention, impacts on health care quality and costs, and outcomes (Figure 2). Each of these factors is described in detail in the methods section. Access to care was not included in our model as patients were not eligible for the study until they had already accessed the health care system and were hospitalized.

Figure 2. Study Specific Components Within the Conceptual Model

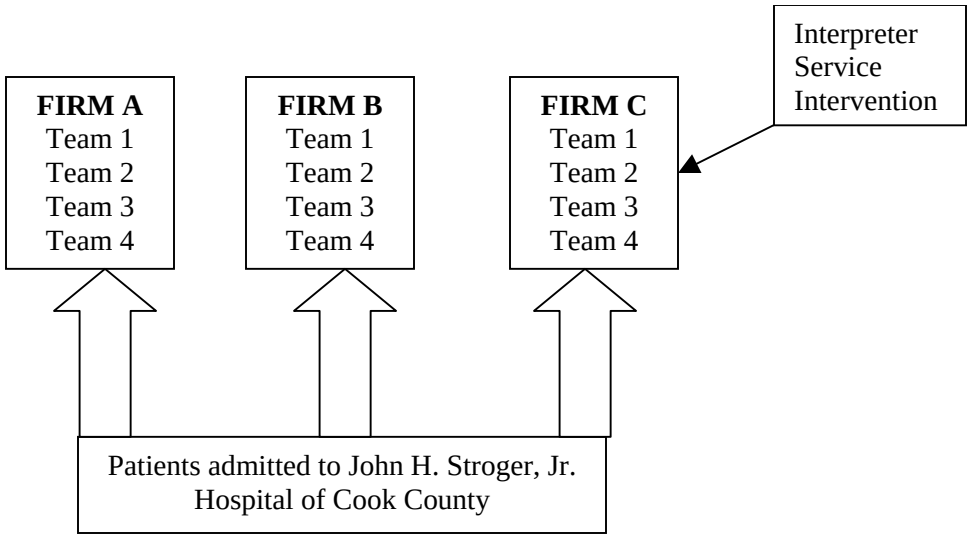


V. Methods

Setting: The research was carried out at the John H. Stroger, Jr. Hospital of Cook County, in the city of Chicago, Illinois. With an historic legacy of service and education dating back to 1835, the mission of Stroger Hospital is to serve economically disadvantaged patients with dignity and without regard to ability to pay. It is one of the largest public hospitals in the United States, caring for more than 26,000 hospitalized patients a year. Most of that care is provided to African American (70%) and Latino (20%) patients who face sociocultural, economic, and, in the case of many Latinos, language barriers to accessing adequate health care. More than 200 patients are admitted to the medicine service each week and approximately 10-15 % of those admissions are Spanish-speaking patients who met the study inclusion criteria.

All patients admitted to the medicine service are assigned to one of three teams of doctors called Firms. These Firms were organized in order to provide efficient high quality care by making a smaller group of physicians responsible for an assigned group of medicine inpatients. Each Firm is made up of four groups of doctors who work together during a month-long rotation. Each group is made up of an attending, or senior physician, and four physicians in training, two senior residents and two interns. Each group is on call every fourth night so that they each are assigned new patients every fourth day and they are responsible for them for the rest of their hospital stay. Every day one group of doctors from each Firm is on call (Figure 3). Attending and resident physicians are assigned to firms in order to keep a balance of gender, ethnicity, and experience across the three Firms. Patients are assigned to each firm at random so that the patient mix, over time, is very similar across firms. This firm system allowed for a “quasi-experimental” design in which patients’ firm and physician assignment occurred randomly. This organization of the medicine inpatient system allowed us to assign an interpreter intervention to one firm and compare what happened on that Firm compared to another Firm that did not receive the intervention. In this study, Firm C received the intervention and Firm B was the comparison firm. Firm A was not involved in the study at all.

Figure 3. Firm Organization*



*Firm C was assigned the intervention. Firm B was the comparison firm.

Language Barrier: Monolingual Spanish-speaking patients were being cared for within a hospital system in which the majority of doctors, nurses and staff do not speak Spanish.

Interpreter Service Intervention and Financing Mechanisms: The interpreter service intervention consisted of two trained Spanish-speaking medical interpreters assigned to work with Firm C patients and their physicians and nurses throughout their hospital stay. Their salaries were paid for by the study contract. Both interpreters graduated from a year-long, intensive, Daley Community College interpreter training program in which they received instruction on medical vocabulary, standards and ethics of interpreting, patient confidentiality, and working in the setting of three-way communication. They each completed 120 hours of an interpreting internship at John H. Stroger, Jr. Hospital of Cook County and Provident Hospital of Cook County. During this internship they conducted observed interpreter encounters after which they received feedback on their performance. They also had to pass a written test covering vocabulary, terminology, and technique and an oral test in which they interpreted several difficult encounters simulated by one of their two instructors. To graduate they had to successfully complete both tests and complete the internship.

One of these two interpreters was available during the hospital's busiest time period, from 7:30 am to 3:30 pm daily, 7 days a week during the study period. One interpreter covered Monday through Friday and the other covered Saturday and Sunday. The interpreters accompanied the firm teams on rounds each morning and were paged by the physicians, nurses, and patients when needed during their available hours. Each patient chart had a note alerting all staff of the interpreter availability. In addition, the interpreters checked in with study participants and firm doctors each morning to remind them of their availability. Despite these efforts the interpreters were not used for all

encounters between the hospital staff and study participants because either they were not called or because the interpreters were not available 24 hours a day. During these times, the Firm C, like Firm B patients, received "usual care."

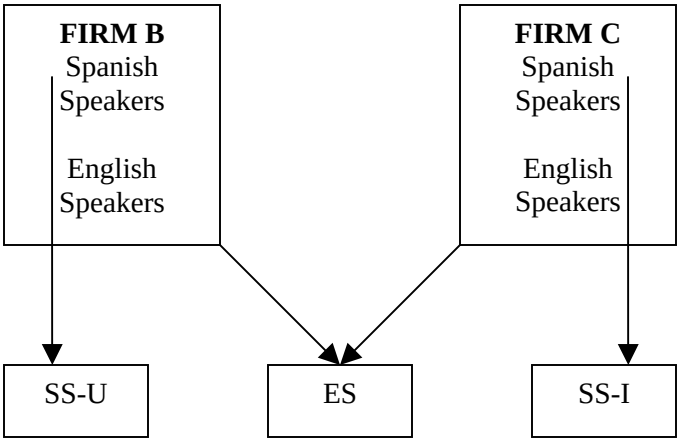
"Usual care" for Spanish-speaking patients means they spoke to their physicians and nurses in the usual manner that occurs at John H. Stroger, Jr. Hospital. This includes speaking to bilingual physicians and nurses, using available hospital interpreters, using a telephone interpreter service, family, friends, or other hospital staff or no interpreters at all when encountering health care providers and staff who cannot speak Spanish. Hospital interpreters are difficult to access in a timely manner and the telephone interpreter service is difficult to use because there are no dual headset telephones available in the hospital. As a result, the other means of communication with LEP patients are the most frequently used.

Sample: Study participants were recruited from the adult inpatient hospital medical service from January 19, 2005 to June 30, 2005. All patients who were admitted to Firms B and C during this time period and had a Hispanic surname and/or were identified as needing an interpreter by hospital staff were approached by research staff. These patients were invited to participate if they were 18 years of age or older and stated that they spoke only Spanish or had difficulty communicating in a language other than Spanish. In addition, we recruited English-speaking patients on Firms B and C who were admitted during the study period and were matched with Spanish-speaking participants on gender and age. Patients were excluded from participation in the study if they did not meet these inclusion criteria or were unable to consent to participation due to cognitive or mental impairments. All participants received a $20 incentive after they were discharged from the hospital. The study was approved by the Institutional Review Board of the Cook County Bureau of Health Services.

Study Groups: Participants were categorized into one of three study groups based on their language status and receipt of the interpreter service intervention (Figure 4)

(1) **SS-I**: Spanish-speaking patients who received the interpreter service intervention (Firm C Spanish speakers)
(2) **SS-U:** Spanish-speaking patients who spoke Spanish and received usual care (Firm B Spanish speakers)
(3) **ES**: English-speaking patients (Both Firms B and C English speakers).

Figure 4. Study Groups and Their Composition



Data: Data was collected to measure the impact of language barriers and the interpreter service intervention on health care utilization, quality, costs and patient outcomes. In addition, data on patient- and physician-level factors was collected in order to control for them in our analyses to make sure they did not account for any differences we found between the SS-U and SS-I groups.

Health Care Utilization, Quality, and Patient Measures: These measures consisted of hospital length of stay, radiology use and specialty consultations during the hospital stay, adherence to recommended follow-up and hospital and ED visits in the three months after hospital discharge, and patient satisfaction. Length of stay (LOS) was calculated using the date and time of admission and date and time of discharge as recorded in the electronic medical record (EMR). Adherence to recommended follow-up, ED visits and hospitalizations in the three months after hospital discharge were measured by checking the electronic medical record as to whether or not each patient went to their scheduled follow-up or had visited the ED or been hospitalized since being discharged from the study hospital admission. Data on radiology testing and consultations ordered during the hospital stay were also abstracted from the EMR. Satisfaction with the hospital stay was measured using the Hospital Consumer Assessment of Healthcare Providers and Systems (H-CAHPS; Attachment A), a 24-item instrument that was developed, validated, and translated by the Agency for Healthcare Research and Quality and the Centers for Medicare and Medicaid Services for use with English- and Spanish-speaking respondents. The preliminary version was provided by AHRQ for use in this project in December 2004. Items chosen from the H-CAHPS for analysis included those that would be impacted by communication: three items measuring nursing communication and one item measuring overall satisfaction with nursing care, three items measuring physician communication and one item measuring overall satisfaction with physician care, and two items measuring overall satisfaction with the hospital stay (Table 1). Participants completed the survey in English or Spanish at the time of discharge or mailed it in if they were discharged outside of the research assistant's normal working hours. Participants could either complete the H-CAHPS themselves or have the research assistants read it to them.

Table 1. H-CAHPS Satisfaction Questions

Nurse Satisfaction	**1. During this hospital stay, how often did nurses treat you with courtesy and respect?** 1☐ Never 2☐ Sometimes 3☐ Usually 4☐ Always	**2. During this hospital stay, how often did nurses listen carefully to you?** 1☐ Never 2☐ Sometimes 3☐ Usually 4☐ Always	**3. During this hospital stay, how often did nurses explain things in a way you could understand?** 1☐ Never 2☐ Sometimes 3☐ Usually 4☐ Always	**5. Using any number from 0 to 10 where 0 is the worst possible care and 10 is the best possible care, what number would you give the care you got from all the nurses who treated you?** 0☐ 0 Worst possible nursing care 1☐ 1 6☐ 6 2☐ 2 7☐ 7 3☐ 3 8☐ 8 4☐ 4 9☐ 9 5☐ 5 10☐ 10 Best possible nursing care
Physician Satisfaction	**6. During this hospital stay, how often did doctors treat you with courtesy and respect?** 1☐ Never 2☐ Sometimes 3☐ Usually 4☐ Always	**7. During this hospital stay, how often did doctors listen carefully to you?** 1☐ Never 2☐ Sometimes 3☐ Usually 4☐ Always	**8. During this hospital stay, how often did doctors explain things in a way you could understand?** 1☐ Never 2☐ Sometimes 3☐ Usually 4☐ Always	**9. Using any number from 0 to 10 where 0 is the worst possible care and 10 is the best possible care, what number would you give the care you got from all the doctors who treated you?** 0☐ 0 Worst possible doctor care 1☐ 1 6☐ 6 2☐ 2 7☐ 7 3☐ 3 8☐ 8 4☐ 4 9☐ 9 5☐ 5 10☐ 10 Best possible doctor care
Hospital Satisfaction	**21. During your hospital stay, did hospital staff talk with you about whether you would have the help you needed when you left the hospital?** 1☐ Yes 2☐ No	**22. During your hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?** 1☐ Yes 2☐ No	**23. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital?** 0☐ 0 Worst hospital possible 1☐ 1 6☐ 6 2☐ 2 7☐ 7 3☐ 3 8☐ 8 4☐ 4 9☐ 9 5☐ 5 10☐ 10 Best hospital possible	

Agency for Healthcare Research and Quality and the Centers for Medicaid and Medicare services, Hospital Consumer Assessment of Healthcare Providers and Systems (H-CAHPS) Survey, 11/7/03 draft.

Patient Data: Patient-level data was collected in order to control for other factors that might account for differences between the SS-U and SS-I groups. Patient variables collected included age, gender, country of birth, years lived in the United States, language ability, education, marital status, household income, number of times they had seen a doctor or had been hospitalized in the past year, and primary and additional discharge diagnoses. Hispanic participants were asked in what language they usually read, thought and spoke and chose from the following response categories: only Spanish, Spanish better than English, both equally, English better than Spanish or English only.

Education was categorized as elementary school or less, middle school, some high school, high school or General Educational Development (GED) High School Equivalency Diploma, technical school or some college or more education. Insurance status was categorized as private insurance, Medicare, Medicaid, no insurance, or other. Marital status was categorized as single/never married, married, not married but living with a committed partner, separated/divorced/or widowed. Income was categorized as <$10,000, $10,000-24,999, and $25,000 or more. Diagnoses included in the patient's discharge summary in the EMR were used to calculate a Charlson Comorbidity Index (Charlson Index, Attachment B) for each participant. The Charlson Comorbidity Index is a validated measure of illness that has been shown to predict mortality in hospitalized patients. This index was used to control for differences in disease severity and health for each participant as the sicker patients would likely have longer LOS and need for specialty consultations, post-hospitalization ED visits, etc. Each participant was also asked to keep a log of positive and negative experiences they had communicating with hospital staff, if interpreters were used and whom those interpreters were. The diaries were written in English and Spanish (Communication Diary, Attachment C). Participants wrote in the diaries themselves and sometimes the research assistants helped them fill them out.

Physician Data: Attending physicians were categorized as native Spanish speakers, non-native proficient Spanish speakers, and non-Spanish speakers. Physicians were categorized into the non-native proficient Spanish speaker category by testing the Spanish oral language proficiency of those physicians who were not native Spanish speakers and stated that they spoke Spanish with their patients (Spanish Language Proficiency Assessment, Attachment D).

Cost Data: Costs will be calculated using the average costs of care provided at John H. Stroger, Jr. Hospital and the costs of providing the interpreter service intervention. For example, if on average the patients in the SS-U group stay in the hospital longer than those in the SS-I group and there are no other differences between the groups, the costs of language barriers would be calculated as (Figure 5):

Figure 5. Average Cost of Language Barriers

Excess time in the hospital/per patient in SS-U	X	Cost of hospital day per patient	—	Cost of interpreter service per patient	==	Cost of language barriers

Analyses: Analyses were conducted to test the hypotheses that satisfaction, LOS, inpatient service utilization and post-discharge emergency department (ED), hospital and follow-up outpatient care utilization differed between the SS-I and SS-U groups. In order to investigate whether or not differences between SS-I and SS-U groups might have resulted from differences in the Firms taking care of patients rather than the intervention, we also assessed whether or not there were differences in these variables among English speakers across the two firms. If there was a difference between the SS-U (Firm B) and

SS-I (Firm C) groups in any factor due to language barriers, there should be no difference between the English speakers on Firms B and C. However, if there are differences between SS-U and SS-I patients and there are similar differences between English speakers on Firms B and C, then the differences between the SS-U and SS-I were likely due to firm effects and not language barriers.

Initial analyses were conducted to investigate whether or not there were differences between the SS-U and SS-I groups and between English speakers on Firm B and C. After looking for these differences, multivariate analyses were conducted to determine whether or not these differences could be accounted for by the other patient and physician factors. The description below outlines each of these two sets of analyses.

For sociodemographic variables, health care utilization prior to hospitalization, and health status measures, t-tests were used for normally distributed variables, rank sum tests for skewed or discrete variables, and Chi-square tests for binary variables. For the outcome measures, rank sum tests were used to examine differences in LOS, satisfaction scores, radiology testing and consultations per person, and Chi-square tests of association for the binary outcomes: three-month ED visit, hospitalization, and outpatient follow-up measures were treated as binary variables (were or were not seen in the ED, readmitted, or seen in scheduled follow-up). Multivariate regression modeling was used to further explore and test the effects of the intervention on these outcomes. Ordinal logistic regression modeling was used for the satisfaction measures, logistic regression was used for binary outcomes, and Cox proportional hazards modeling was used for LOS.

Only co-variates in which there was significant variation across the firms were used in the models in the initial analyses. Significant co-variates differed slightly for the Spanish and English speakers and, as a result, the models for Spanish speakers and English speakers were slightly different. Models for the Spanish speakers were adjusted for gender, age, racial/ethnic identification, number of times seen by a physician in the past year, number of hospitalizations in the last year, self-rated health, Charlson Comorbidity Index, and physician Spanish proficiency. Models for the English speakers were adjusted for gender, age, racial identification, education, marital status, number of times seen by a physician in the past year, number of hospitalizations in the last year, self-rated health, and Charlson Comorbidity Index.

Comments made regarding communication issues in the Spanish-speaking patient diaries were also tabulated and categorized as negative or positive. The relative proportion of comments between the SS-I and SS-U groups were then compared.

VI. Results

Patient Demographic Characteristics

The sample included 323 adult inpatients: 124 in the SS-I group, 99 in the SS-U group, and 100 English speakers (Table 2). There were no significant differences between the SS-I and SS-U groups in any sociodemographic characteristics, history of health care

Table 2. Demographic Characteristics and Health Care Measures

	Spanish Intervention Firm C (n = 124)	Spanish Usual Care Firm B (n = 99)	English Intervention Firm C (n= 52)	English Usual Care Firm B (n=48)
Age (yrs; SD)	51 (16)	47 (17)	46 (15)	47 (12)
Gender (% female)	50	59	42	52
Ethnicity (%)				
Mexican	80	87	7	10
Caribbean	4	3	3	2
Central/S.American	16	10	1	2
Black	0	0	76	73
White/other	0	0	13	13
Years in USA (m;SD)	13 (13.3)	12 (11.3)	NA	NA
Language (%)				
Spanish only	84	83	2	2
Spanish > English	16	15	3	2
Both equally	0	2	3	6
English > Spanish	0	0	1	2
English only	0	0	91	88
Education (%)				
Elementary	52	56	6	6
Middle School	11	8	2	4
Some High School	18	17	12	26
High School or GED	10	10	29	28
Some or > College	8	9	51	36
Income(%)				
< $10,000	60	61	57	45
$10,000 - 24,999	24	26	28	36
$25,000 or more	4	1	15	18
Don't know	12	12	0	1
Insurance (%)				
None	89	92	69	66
Federal	6	5	23	25
Private	1	0	4	7
Other	4	3	4	2
Seen MD in last year (%)	75	68	73	75
Hospitalized in last year (%)	46	38	66	50
Self rated health status (%)				
Fair or poor	76	69	69	75
Charlson Index (m;SD)	1.7 (1.9)	1.5 (1.8)	1.7 (2.1)	1.4 (1.7)

utilization, report of self rated health, or Charlson Comorbidity Index (Table 2). In addition, there were no differences in these variables in the English speakers across firms (Table 2). Essentially it appears as if the patients had been randomized because the Spanish speakers and the English speakers on each firm, on average, have the same characteristics.

Physician Characteristics

There were a total of 58 doctors who attended on both firms during the study period: 26 in the usual care firm and 32 in the intervention firm (Table 3). There were a few native Spanish-speaking attending physicians and most of the other attending physicians who said they spoke Spanish with their patients were deemed proficient. There were significantly more attending physicians who spoke Spanish on the firm taking care of SS-I patients than on the Firm taking care of SS-U patients ($p<0.001$). The majority of physicians on both firms were male.

Table 3. Attending Physician Characteristics

	Usual Care Firm B (n=32)	**Intervention Firm C (n=26)**
Female, n (%)	7 (27)	13 (40)
Native Spanish Speakers, n (%)	2 (8)	3 (9)
Tested for Proficiency, n (%)	3 (8)	8 (25)
Number Proficient	2	6
Proficient Spanish speakers, n (%)[a]	4 (15)	9 (28)

[a] p for difference between firms <0.001

Satisfaction Scores

Two hundred and ninety five participants completed the satisfaction surveys. The remaining 28 never completed the satisfaction instrument and 2 of the 295 satisfaction surveys were so incomplete that they needed to be dropped from the analysis. The complete satisfaction scores ranged from 3 (very dissatisfied) to 22 (very satisfied) for nursing and physician communication and from 1 (very dissatisfied) to 14 (very satisfied) for overall hospital stay. The median scores for nursing communication, physician communication, and for overall hospital stay were all high indicating that patients overall were very satisfied with communication and the hospital stay. There were no significant differences across the groups in mean satisfaction with nursing communication, physician communication, or overall hospital stay between SS-I and SS-U groups or across English speakers in the two firms (Table 4a). These results did not change significantly after adjustment, but there was a strong and significant effect of having a Spanish-speaking physician on satisfaction with the physician and overall hospital stay in the adjusted model. If a patient spoke Spanish and his/her physician spoke Spanish, the odds that he/she would report higher satisfaction with physician communication and overall hospital stay was twice as great than if his/her physician did not speak Spanish (Table 4b). In addition, the impact of having a Spanish-speaking physician was greatest for Spanish-speaking patients on Firm B, where interpreters were not as readily available.

Table 4a. Satisfaction Scores[a]

	Spanish Intervention Firm C	Spanish Usual Care Firm B	P	English Intervention Firm C	English Usual care Firm B	P
Nursing Communication[b] (m; SD Median)	18.8 (3.5) 20	18.6 (3.3) 19.5	0.78	19.7 (3.6) 21	19.3 (3.3) 20	0.29
Physician Communication[b] (m; SD Median	20.6 (1.9) 21	20.2 (2.5) 21	0.17	20.0 (3.4) 22	19.7 (3.6) 21	0.28
Overall Hospital [c] (m; SD Median)	13.0 (2.0) 14	13.0 (2.0) 14	0.84	12.3 (2.4) 13.8	12.1 (2.5) 13	0.62

[a]Unadjusted results. No significant change after adjustment

Table 4b. Odds Ratios of the Impact of Spanish-Speaking Physicians on Satisfaction Scores[a]

	All Spanish-speaking Physicians	P	Spanish-speaking Physicians Firm C	P	Spanish-speaking Physicians Firm B	P
Nursing Communication	1.16 (0.64, 2.09)	0.62	1.21 (0.59, 2.51)	0.92	1.21 (0.59. 2.51)	0.60
Physician Communication	1.95 (1.03, 3.69)	0.04	1.59 (0.74, 3.43)	0.24	3.08 (0.93, 10.3)	0.07
Overall Hospital	2.22 (1.04, 4.73)	0.04	1.98 (0.82, 4.74	0.13	3.14 (0.62, 15.9)	0.17

[a]Adjusted for Firm, sex, age, race/ethnicity, number of times visited a doctor in the past year, number of times hospitalized in the last year, health status, Charlson Score

[b]Presented as odds ratios with 95% confidence intervals in parentheses. Odds ratios greater than one indicate that the odds of Spanish-speaking patients reporting high satisfaction are greater for those that had a Spanish-speaking attending physicians than those who did not. The confidence intervals indicate whether or not the result is significant or close to significant and where, 95% of the time, an estimate of the odds ratio will fall. Confidence intervals that span 1.0 are not significant; however, if the bottom limit is close to 1.0 then the odds ratio would likely be significant in a larger study.

Length of Stay and Health Care Utilization

There was a significant difference in mean length of stay between SS-I and SS-U groups with patients in the SS-I groups staying on average 0.97 days less than the SS-U group (p=0.03; Table 5). This was also true across the firms for the English-speaking groups with English-speaking patients in the intervention firm staying on average 1.2 days less than English-speaking patients on the usual care firm although this difference was not statistically significant (p=0.29; Table 5). There were no significant differences

between the SS-I and SS-U groups in ED visits or hospitalizations after discharge, radiology tests or consultations ordered while hospitalized. There was a significant difference across the firms for the English-speaking participants on one of these variables: radiology testing. English speakers on the intervention firm received significantly less tests than those on the usual care firm (p=0.01; Table 5).

Table 5. LOS and Utilization Outcomes[a]

	Spanish Intervention Firm C	Spanish Usual Care Firm B	P	English Intervention Firm C	English Usual care Firm B	P
Length of Stay (m; SD)	5.00 (4.06)	5.97 (5.38)	0.03	3.5 (1.9)	4.7 (3.4)	0.29
Adherence to follow-up (%)	68	69	0.82	52	60	0.43
ED visits after DC (m; SD)	.15 (.47)	.08 (.37)	0.06	0.42 (1.19)	0.52 (1.24)	0.76
Hospitalization after DC (m; SD)	.34 (.80)	.35 (.71)	0.70	0.44 (0.89	0.29 (0.80)	0.29
Radiology Tests/Person (m; SD)	2.07 (3.11)	2.39 (2.73)	0.18	1.36 (1.33)	2.77 (2.92)	0.01
Consults/person (m; SD)	0.46 (0.63)	0.58(0.66)	0.17	0.38 (0.57)	0.51(0.62)	0.23

[a]Unadjusted results. No significant change after adjustment

Patient Communication Diaries

Qualitative data from the 95 journals completed by SS-I patients (88% response rate) and the 77 journals completed by the SS-U patients (77% response rate) was also analyzed. In keeping with the results of the quantitative findings, the proportion of negative and positive comments regarding communication was the same in the SS-U and SS-I groups (Table 6). For example, there were 66 comments from SS-I patients indicating that they experienced good or excellent communication with their physicians and 70 comments from SS-U patients indicating that they had also experienced good or excellent communication. However, not all journals were complete for all days and not all of them contained comments so the conclusions that can be drawn from this data are limited. It does, however, provide some insight into the reasons why no difference was observed between the SS-U and SS-I groups. The reported quality of communication between the two groups did not appear to vary because either the interpreter service intervention was not strong enough and/or the quality of communication for the SS-U group was also high.

Table 6. Counts and Examples of Journal Comments by Group					
Communication Rating	**SS-U MDs**	**SS-I MDs**	**SS-U RNs**	**SS-I RNs**	**Examples of Quotes***
Poor	9	18	30	45	RN: "With the nurse I don't say anything because she doesn't understand me" MD: "The doctor's Spanish isn't very good and I don't understand much"
Partial	27	16	24	20	RN: "She speaks more or less. Nurse is Philippina. She asked me how I felt" MD: "There is little doctors tell us (in Spanish) but I did understand them"
Excellent	70	66	38	36	RN: "The nurses explained everything to me. The nurses try to communicate with me in Spanish and they do it very well" MD: "..the doctor speaks perfect Spanish. I understood him one hundred percent. He speaks very well in his second language.."
Total Count	106	100	92	101	
Who Interpreted					
Hand signals used	3	6	9	6	"I understand more or less thanks to the hand signals they use to communicate"
Family member	7	6	9	11	"My brother interpreted for me…"
Communication with Interpreter	10	16	6	6	"The interpreter was able to communicate everything exactly so that I could understand"
Other staff member	1	1	2	--	"A young man came with the doctor to translate"
No interpreter or effort made to communicate	3	12	2	7	"Not even one interpreter has come. Not one"
Total Count	24	41	28	30	

* All comments were from SS-I participants

Cost of Language Barriers

In summary, no important differences between the SS-U and SS-I groups were uncovered in this study, so it is not possible to say that the language barrier in the SS-U group due to inadequate interpreter services generated higher costs or that the intervention that the SS-I group received reduced costs. If the difference between the SS-I

and SS-U groups was due to the interpreter intervention, however, it would have a significant impact on cost of the hospital stay. The cost of one day of hospital stay at John H. Stroger, Jr. Hospital of Cook County (Stroger Hospital) is $2,200/per person and the cost of the study intervention was $240/per person in the intervention group. An intervention that reduced hospital stay by 0.97 days at Stroger Hospital would save $1,894 per person in the interpreter service group (=$2,200 x 0.97 - $240).

VII. Conclusions

There was only one significant difference between the SS-I and SS-U groups in this study: patients in the SS-I group stayed in the hospital significantly longer than those in the SS-U group. However, there was a similar, but not significant, difference in length of stay between the intervention and usual care firms for the English speakers, suggesting that the difference between the SS-I and SS-U groups could be due to firm effects, rather than the intervention. There were no differences between the SS-I and SS-U groups in satisfaction, hospital care utilization, or post-discharge ED visits and hospitalizations. However, having a Spanish-speaking attending physician had a significant impact on physician and overall hospital satisfaction for Spanish-speaking patients and this impact was mainly driven by improvement in satisfaction for Spanish-speaking patients in the SS-U group.

If the difference between the SS-I and SS-U groups was due to the interpreter, it would have a significant impact on cost of the hospital stay. In this study, it would have saved $1,894 per person in the study. This would be a substantial cost savings and dramatically improve efficiency of hospital care by opening up beds for patients who need them. This study precludes directly drawing this conclusion about the impact of language barriers and interpreters on the cost of hospitalizations. It is suggestive, however.

There are a number of reasons why no clear impact of language barriers or the interpreter intervention on the cost and quality of hospital care was demonstrated in this study. First, the Firm effects may be masking the effect of language barriers and interpreter intervention. If there were no differences between the firms in length of stay, there may have been a clearer impact of the interpreter intervention. The finding of the strong effect of Firm on LOS was unexpected. Prior to this study, there was no reason to expect big differences in Firm LOS. This was likely due to differences in attending practice across the two Firms. Another reason there may not have been an effect is the fact that there are a number of attending physicians and residents at Stroger Hospital that speak Spanish. The potential impact of the Spanish-speaking attending physicians was controlled for, but not for the impact of Spanish-speaking residents. However, in a retrospective review, there were equal numbers of Spanish-speaking residents on both Firms (approximately 20% of residents). It may be that the interpreters did not add to the impact of resident physicians and attending physicians who are already doing a lot to reduce language barriers in both firms. The intervention would likely have a more profound effect in a setting where there are fewer language concordant physicians. The interpreter service intervention may not have been strong enough. Interpreters were only

available 8 hours of every day and their use depended on nurses, physicians, and other staff voluntarily calling upon them for their services. More extended interpreter coverage, one with integration of their services into the care routine, may have had a greater impact. Interpreters may not have as great an impact on a hospital stay where patients are closely monitored and followed over a number of days versus a setting like an ED where physicians have to make decisions about whether or not it is safe to let a patient go home. Finally, the satisfaction measure used in this study may not have been sensitive enough to measure the impact of the interpreter services on communication in the hospital.

Despite these limitations, this study demonstrates that conducting well-designed and controlled studies to investigate the impact of language barriers and interventions to reduce those barriers is more than feasible. In addition, it provides information on the extremely small cost of providing inpatient hospital interpreter services relative to the total cost of a hospital stay. Two hundred and forty dollars is a small price to pay to ensure that hospital staff, particularly physicians and nurses, are able to provide the standard of care to all patients: to be able to understand and speak to them. The fact that there was no impact of this enhanced communication on the outcome measures in this study does not diminish the importance of providing excellent care to patients with limited English proficiency.

VIII. Recommendations

As outlined in the report of which this study is a part and in a recent call for research[18], there is a huge need for research that investigates the impact of language barriers and interventions to reduce those barriers on the cost and quality of care. This study should be used as an example of how the model detailed in this report can be used to successfully conduct research that can answer the important questions about cost and language barriers. It can also serve as a guide to other investigators on how to design studies that isolate the effects of language barriers and interventions to reduce them on the cost and quality of care. In order to better isolate these effects, future studies should measure the impact of language barriers in a setting in which there are very few LAS, including language concordant physicians and staff. While the vast majority of physicians caring for patients in this study did not speak Spanish, there may have been just enough to reduce language barriers. A randomized controlled trial in which physicians as well as patients are randomized would also avoid the physician practice effects that appear to be driving the differences in Firms in this study. Finally, future studies of interpreter services should institute an intervention that covers most of patients' waking hours in the hospital so as to maximize the impact of the intervention.

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Attachment A: Hospital CAHPS

Hospital CAHPS®

SURVEY INSTRUCTIONS

- Answer all the questions by checking the box to the left of your answer.
- You are sometimes told to skip over some questions in this survey. When this happens you will see an arrow with a note that tells you what question to answer next, like this:

☐ Yes

☑ No ➔ ***If No, Go to Question 1 on Page 1***

{This box should be placed on the Cover Page}

All information that would let someone identify you or your family will be kept private.* {SPONSOR NAME} *will not share your personal information with anyone without your OK. You may choose to answer this survey or not. If you choose not to, this will not affect the benefits you get.

You may notice a number on the cover of this survey. This number is ONLY used to let us know if you returned your survey so we don't have to send you reminders.

If you want to know more about this study, please call XXX.

Draft—Not for Circulation
This questionnaire may not be used without permission

This Hospital CAHPS® Questionnaire is being developed under the sponsorship of the Agency for Healthcare Research and Quality (AHRQ) and the Center for Medicare & Medicaid Services (CMS).

Please answer the questions in this survey about this stay at [FACILITY NAME]. Do not include any other hospital stay in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?

1☐ Never
2☐ Sometimes
3☐ Usually
4☐ Always

2. During this hospital stay, how often did nurses listen carefully to you?

1☐ Never
2☐ Sometimes
3☐ Usually
4☐ Always

3. During this hospital stay, how often did nurses explain things in a way you could understand?

1☐ Never
2☐ Sometimes
3☐ Usually
4☐ **Always**

4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?

1☐ Never
2☐ Sometimes
3☐ Usually
4☐ Always
9☐ I never pressed the call button

5. Using any number from 0 to 10 where 0 is the worst possible care and 10 is the best possible care, what number would you give the care you got from all the nurses who treated you?

0☐ 0 Worst possible nursing care
1☐ 1
2☐ 2
3☐ 3
4☐ 4
5☐ 5

6 ☐ 6
7 ☐ 7
8 ☐ 8
9 ☐ 9
10 ☐ 10 Best possible nursing care

YOUR CARE FROM DOCTORS

6. During this hospital stay, how often did doctors treat you with courtesy and respect?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

7. During this hospital stay, how often did doctors listen carefully to you?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

8. During this hospital stay, how often did doctors explain things in a way you could understand?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

9. Using any number from 0 to 10 where 0 is the worst possible care and 10 is the best possible care, what number would you give the care you got from all the doctors who treated you?

0 ☐ 0 Worst possible doctor care
1 ☐ 1
2 ☐ 2
3 ☐ 3
4 ☐ 4
5 ☐ 5

6 ☐ 6
7 ☐ 7
8 ☐ 8
9 ☐ 9
10 ☐ 10 Best possible doctor care

THE HOSPITAL ENVIRONMENT

10. During this hospital stay, how often were your room and bathroom kept clean?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

11. During this hospital stay, how often was the area around your room quiet at night?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

YOUR EXPERIENCES IN THIS HOSPITAL

12. During this hospital stay, did you need help from doctors, nurses or other hospital staff in getting to the bathroom or in using a bedpan?

1 ☐ Yes
2 ☐ No ➔ **If No, Go to Question 14**

13. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?

1 ☐ Never
2 ☐ Sometimes
3 ☐ Usually
4 ☐ Always

14. During this hospital stay, did you need medicine for pain?

1 ☐ Yes

2☐ No ➔ **If No, Go to Question 17 on Page 3**

15. During this hospital stay, how often was your pain well controlled?

1☐ Never
2☐ Sometimes
3☐ Usually
4☐ Always

16. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

1☐ Never
2☐ Sometimes
3☐ Usually
4☐ Always

17. During this hospital stay, did doctors, nurses, or other hospital staff ever ask if you were allergic to any medicine?

1☐ Yes
2☐ No

18. During this hospital stay, were you given any medicine that you had not taken before?

1☐ Yes
2☐ No ➔ **If No, Go to Question 20**

19. Before giving you the medicine, did hospital staff describe possible side effects in a way you could understand?

1☐ Yes
2☐ No

WHEN YOU LEFT THE HOSPITAL

20. After you left the hospital, did you go directly to your own home, to someone else's home, or to another health facility?

1☐ Own home
2☐ Someone else's home
3☐ Another health facility ➔ **If Another, Go to Question 23**

21. During your hospital stay, did hospital staff talk with you about whether you would have the help you needed when you left the hospital?

1☐ Yes
2☐ No

22. During your hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?

1☐ Yes

[2] ☐ No

OVERALL RATING OF HOSPITAL

Please answer the following questions about the stay at the hospital _____ shown on the cover. Do not include any other hospital stays in your answer.

23. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital?

[0] ☐ 0 Worst hospital possible
[1] ☐ 1
[2] ☐ 2
[3] ☐ 3
[4] ☐ 4
[5] ☐ 5
[6] ☐ 6
[7] ☐ 7
[8] ☐ 8
[9] ☐ 9
[10] ☐ 10 Best hospital possible

24. Would you recommend this hospital to your friends and family?

[1] ☐ Definitely no
[2] ☐ Probably no
[3] ☐ Probably yes
[4] ☐ Definitely yes

ABOUT YOU

There are only a few remaining items left.

25. In general, how would you rate your overall health?

[1] ☐ Excellent
[2] ☐ Very good
[3] ☐ Good
[4] ☐ Fair
[5] ☐ Poor

26. In general, how would you rate your overall mental or emotional health?

1☐ Excellent
2☐ Very good
3☐ Good
4☐ Fair
5☐ Poor

27. What is the highest grade or level of school that you have completed?

1☐ 8th grade or less
2☐ Some high school, but did not graduate
3☐ High school graduate or GED
4☐ Some college or 2-year degree
5☐ 4-year college graduate
6☐ More than 4-year college degree

28. Are you of Hispanic or Latino origin or descent?

1☐ Yes, Hispanic or Latino
2☐ No, not Hispanic or Latino

29. What is your race? Please choose one or more.

1☐ White
2☐ Black or African-American
3☐ Asian
4☐ Native Hawaiian or other Pacific Islander
5☐ American Indian or Alaskan Indian or Alaskan Native
8☐ Other (please print):

_____

30. What language do you mainly speak at home?

1☐ English
2☐ Spanish
8☐ Some other language (please print): _____

31. Did someone help you complete this survey?

[1]☐ Yes ➔ **Go to Question 32**

[2]☐ No ➔ **Please return the survey in the postage-paid envelope.**

32. How did that person help you? Check all that apply.

[1]☐ Read the questions to me

[2]☐ Wrote down the answers I gave

[3]☐ Answered the questions for me

[4]☐ Translated the questions into my language

[5]☐ Helped in some other way

THANK YOU

Please return the completed survey in the postage-paid envelope.

Attachment B: Charlson Index

Charlson Index

Last Updated: November 27, 2003

Introduction

The Charlson Index contains 19 categories of comorbidity, which are primarily defined using ICD-9-CM diagnoses codes (a few procedure codes are also employed). Each category has an associated weight, taken from the original Charlson paper[1], which is based on the adjusted risk of one-year mortality. The overall comorbidity score reflects the cumulative increased likelihood of one-year mortality; the higher the score, the more severe the burden of comorbidity.

Use the Charlson Index with caution - the ICD-9-CM codes used in the program can refer either to complication or comorbidity diagnoses. Unless these can be reliably differentiated it is possible that the burden of comorbid disease might be overestimated. The best way to avoid the confusion of complications with comorbidities is to remove the complications. For hospital datasets this can be done using the diagnosis type variable.

When this is not possible the use of this macro is not precluded: the effect of complications on the comorbidity estimates provided by this macro is limited since individual diagnoses are not used directly in calculating the comorbidity score. Rather, these determine attribution to comorbidity categories which are scored as binary variables. This binary attribution within a comorbidity category limits the effect of complications since both the comorbidity and complication codes often fall in the same disease category.

How the Index works:

The Index may be calculated either for a single record (separation) or over a defined period of time prior to an index event. Every diagnosis and procedure code is analysed to see if it falls within one of the 16 comorbid conditions. If one of these is found, a flag (1) for that condition is set. These flags are weighted appropriately and summed to generate values:

```
PCHRLSON   - Charlson variable computed from admissions prior to
             and including the event.

XCHRLSON   - Charlson variable computed from the event admission only.

PCOMP      - Component variables for the Charlson variable observed
             on admissions prior to the event. (Note: there are 61
             component variables)

XCOMP      - Component variables for the Charlson variable
             which were observed on the event admission. (Note:
             There are 61 component variables)

AGGREGATES - Combinations of PCOMP and XCOMP variables which are
             used for final determination of the Charlson score.
```

SAS CODE

A SAS macro is available from MCHP that will compute the Index. This SAS code corresponds to the original Charlson work

- This program was based on 1993 ICD9-CM codes for various conditions. If you are using the index on other years you should check to confirm there have been no major changes in ICD codes.

The following table (from Schneeweis et al, 2003) provides the weights used in this recent paper along with the original weights.

Table 4: Conditions According to the Romano Adaptation of the Charlson Index for Use with Claims Data (Romano et al, 1993a, 1993b) with original Charlson Index Weights (Charlson et al, 1987) and Weights Derived from New Jersey Medicare Data (N=235,881) for the Same Conditions

Conditions	Prevalence in New Jersey (%)	Original Charlson Weights	New Jersy Odds-ratio Estimates*	95% Confidence Interval	Assigned N Medicare Weights**
Myocardial Infarct	4.3	1	1.23	(1.15-1.31)	1
Congestive heart failure	15.1	1	2.09	(2.01-2.17)	2
Peripheral vascular disease	13.3	1	1.55	(1.49-1.61)	1
Cerebrovascular disease	11.4	1	1.42	(1.36-1.48)	1
Dementia	6.2	1	2.16	(2.06-2.27)	3
Chronic pulmonary disease	12.4	1	1.66	(1.59-1.73)	2
Connective tissue disease	2.2	1	1.09	(0.98-1.21)	0
Ulcer disease	3.4	1	1.03	(0.96-1.11)	0
Mild liver disease	0.3	1	1.73	(1.41-2.12)	2
Diabetes	12.0	1	1.37	(1.31-1.44)	1
Hemiplegia	2.1	2	1.44	(1.33-1.56)	1
Moderate or severe renal disease	1.6	2	2.64	(2.34-2.76)	3
Diabetes with end organ damage	5.1	2	1.57	(1.48-1.67)	2
Any tumor	5.8	2	1.85	(1.75-1.95)	2
Leukemia	†	2			
Lymphoma	†	2			
Moderate or severe liver disease	0.1	3	3.24	(2.47-4.26)	4
Metastatic solid tumor	1.7	6	5.94	(5.50-6.40)	6
AIDS	0.1	6	3.26	(2.13-4.98)	4

*Odds ratio of dying during the follow up comparing patients with the condition versus subjects without.
**A 35% increase in risk of dying is reflected in a one point increase in weights (see appendix for scoring rule).
† Leukemia and lymphoma are included in the "any tumor" category in Romano's adaptation of the Charlson Index for use with claims data (Romano, Roos, and Jollis 1993a,1993b).

The following codes are included in the aforementioned SAS program

```
Diag:
   * Angina 1
         '413  ' - '4140 ','4148 ' - '4149 ',
           '4292 '
   * Angina 2
         '4111 ' - '4118 '
   * Arrhythmia 1
         '42612' - '4269 ','427  ' - '4270 ',
           '4272 ' - '42732','4278 ' - '42789'
   * Arrhythmia 2
         '4274 ' - '4275 ','4260 ','4271 ',
           'V450 '
   * Vascular Heart Disease 1
         '394  ' - '39490' , '424  ' - '42400' ,
           '395  ' - '39590' , '4241 ' - '42410' ,
           '396  ' - '39690' , '397  ' - '39710' ,
           '4242 ' - '42430' , '3979 '- '39790' ,
           '4249 ' - '42490' , '421  ' - '42299'
   * Vasuclar Heart Disease 2
         'V433 '
   Myocoardial inforaction (acute)
         '410  ' - '41099'
   Myocardial Infarction (old)
         '412  '
   CHF

         '428  ' - '4289 ' , '4293 ',
         '40201', '40211', '40291',
           '425  ' - '4259 '
   * Hypertension 1
         '401  ' - '4019 ','405  ',
           '4051 ' - '40599'
   * Hypertension 2
         '402  ' - '40291'   '403  ' - '40390',
           '404  ' - '40490','4050 ' - '40509'
   Peripheral vascular disease
         '441  ' - '4419 ' ,
           '442  ' - '4429 ' ,
           '4431 ' - '4439 ' , '4471 ',
           '440  ' - '4409 ' ,
           '7854 '
   Cerbrovascular disease
         '7843 ','438  ' ,
           '9970 ', '36234',
           '7814 ',
           '430  ' - '436  ','437  ' - '4371 ',
           '4379 '
   COPD 1
          '491  ' - '4949  '|'496  '
   COPD 2
          '4150 '  ,'4168 ' - '4169 '
   * Neuro CT - Parkensonism, etc
         '332  ' - '3321 ','3334 ',
           '340  ', '3335 ',
           '345  ' - '3459 ',
           '334  ' - '3349 ','335  ' - '3359 ',
           '3411 ' - '3419 ','3481 ', '3319  ',
           '3483 '
    Dementia
         '290  ' - '2909 ','331  ' - '3312 '
```

```
Paralysis
      '342  ' - '3429 ','3440 ' - '3449 '
* Endo other
      '243  ' - '2449 ' ,
        '2532 ' -          , '2537 ' - '2539 ' ,
        '2554 ' - '2555 ', '242  ' - '2429 ' ,
        '2450 ' - '2459 ', '252  ' - '2521 ',
        '2553 ',DX(K) = '2556 ','255  ' - '2551 '
Diabetes
      '250  ' - '2501 '
DKA, etc.
      '2501 ' - '2503 '
Diabetes with sequelae
      '2504 ' - '25099'
Chronic Renal Failure 1
      '585  ' - '586  '
Chronic Renal Failure 2
      'V451 ','V420 ',
        'V56  '- 'V569'
Various cirrhodites
      '5712 ','5715 '- '5716 '|
        '5718 ' - '5719 '
Moderate-severe liver disease
      '5722 ' - '5724 ',
        '4560 ' - '45629'
Ulcers
      '531  ' - '53499'
* Inflammatory Bowel Disease
      '555  ' - '5556 '
Various Cancers
   ('140  ' - '14090')  LIPCA
   ('141  ' - '14990')  ORALCA
   ('150  ' - '15090')  ESOPHCA
   ('151  ' - '15190')  STOMCHCA
   ('152  ' - '15290')  SMLINTCA
   ('153  ' - '15480')  COLONCA
   ('155  ' - '15790')  LIVBILCA
   ('158  ' - '15990')  OTHDIGCA
   ('160  ' - '16190')  UPAIRCA
   ('162  ' - '16390')  LUNGCA
   ('164  ' - '16590')  OTCHSTCA
   ('170  ' - '17190')  PRMBONCA
   ('174  ' - '17590')  BREASTCA
   ('179  ' - '18490')  FEMGUCA
   ('185  ',  'V1046')  PROSTCA
   ('186  ' - '18790')  MALEGUCA
   ('188  ' - '1899 ')  BLDKIDCA
   ('190  ' - '19090')  EYECA
   ('191  ' - '19290')  CNSCA
   ('193  ' - '19490')  ENDOCA
   ('195  ' - '19590')  OTHERCA
   ('196  ' -  '1990')  SECONDCA
    '200  ' - '2038 ', '2730 ',
    '204  ' - '2089 '  LEUKEMIA

Procedures:
   Vasular 2
      '3813' - '3814', '3816',
         '3818','3843' - '3844',
         '3846', '3848','3833' - '3834',
```

```
            '3836', '3838',
            '3922' - '3926', '3929'
CVD
            '3812', '3842'
Renal 2
      '3927','3993' - '3995',
        '3942','5498'
Liver 2
       '391 ', '4291'
Prostca
      '605 ', '624 ', '6241'
```

* Items commented out in Dartmouth-Manitoba version of index. Several variations have been made over time to the index (Roos, Stranc, James, Li, 1997 & Deyo 1992). In the Dartmouth-Manitoba version this code is provided as commented lines.

MORE INFORMATION:

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Contact

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Attachment C: Medical Communication Diary

Cook County Hospital

The Collaborative Research Unit
1900 W. Polk St. 15th Floor
Chicago, IL 60612

This project is conducted by:
Dr. Elizabeth Jacobs, MD y Dr. Laura Sadowski, MD

Medical Communication Diary

"Improving communication in the hospital"

Patient's Name _____

Room No. _____

Project Assistant's Name_____

Pager # _____

The Interpreter (s)

Please, describe your experience with the **interpreter (s)**. (How would you assess the way in which the interpreter(s) communicated between you and your doctor?)

Indicate for each visit.

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Date_____

Patient's ID # _____

Room No._____

For each visit, circle an option.	**Visit No. 1**	**Visit No. 2**	**Visit No. 3**	**Visit No. 4**	**Visit No. 5**
Who did you communicate with during the visit? Doctor/Nurse	Dr Rn	Dr Rn	Dr Rn	Dr Rn	Dr Rn
Visit times					
Did you speak Spanish with the Doctor/Nurse?	Yes No	Yes No	Yes No	Yes No	Yes No
If your Doctor/Nurse did not speak Spanish, who helped you?					
1) Hospital Interpreter	1	1	1	1	1
2) Another doctor who speaks Spanish	2	2	2	2	2
3) Another Nurse who speaks Spanish	3	3	3	3	3
4) Another person from the hospital	4	4	4	4	4
5) Family	5	5	5	5	5
6) Friend	6	6	6	6	6
7) Other_____	7	7	7	7	7
8) Nobody	8	8	8	8	8
How would you assess the level of Spanish comprehension from the person who assisted you?					
A = Excellent	A	A	A	A	A
B = Good	B	B	B	B	B
C = Regular	C	C	C	C	C
D = Bad	D	D	D	D	D
E = Very Bad	E	E	E	E	E

The Dr (s)

Please, describe your experience with the **Doctor (s)**. (How would you assess the way the doctor communicated with you?)

Indicate for each visit.

The Nurse (s)

Please, describe your experience with the **Nurse (s)**. (How would assess the way the nurse(s) communicated with you?)

Indicate for each visit.

Cook County Hospital

The Collaborative Research Unit
1900 W. Polk St. 15th Floor
Chicago, IL 60612

Este proyecto está dirigido por:
Dr. Elizabeth Jacobs, MD y Dr. Laura Sadowski, MD

Diario de Comunicación Médica

"Mejorando la comunicación en el hospital"

Nombre del Paciente _____

Habitación No. _____

Nombre del asistente del proyecto _____

Pager # _____

El Intérprete (s)

Por favor, describa su experiencia con el **intérprete(s)**. (Como calificaría la forma en que el intérprete(s) se comunicó con usted y su doctor?)

Indique para cada visita.

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Fecha_____

Paciente ID # _____

Habitación No._____

En cada visita circule una opción.	**Visita No. 1**	**Visita No. 2**	**Visita No. 3**	**Visita No. 4**	**Visita No. 5**
Con quién se comunicó durante la visita? Doctor/Enfermero	Dr Enfer	Dr Enfer	Dr Enfer	Dr Enfer	Dr Enfer
Hora de las visitas					
Habló Español con el Dr/Enfermero?	Sí No	Sí No	Sí No	Sí No	Sí No
Si su Doctor/Enfermero no habla Español quién le ayudó? 1) Interpréte del Hospital 2) Otro doctor habla Español 3) Otro Enfermero habla Espan 4) Otra persona del hospital 5) Familiar 6) Amigo 7) Otro_____ 8) Nadie	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8
Cómo califica usted el grado de comprensión de Español de la persona que le atendio. A = Excelente B = Bueno C = Regular D = Malo E = Muy Malo	A B C D E	A B C D E	A B C D E	A B C D E	A B C D E

El Dr (s)

Por favor, describa su experiencia con el **Doctor (s)**. (Como calificaría la forma en que el doctor (s) se comunicó con usted?)

Indique para cada visita.

El Enfermero (s)

Por favor, describa su experiencia con el **Enfermero (s)**. (Como calificaría la forma en que el enfermero(a) se comunicó con usted?)

Indique para cada visita.

Attachment D: Spanish Language Proficiency Assessment

Spanish Language Proficiency Assessment

To evaluate the Spanish proficiency of residents and attendings, we used the American Council on the Teaching of Foreign Languages (ACTFL) speaking revised proficiency guidelines (1999). We decided that an intermediate-high level was sufficient to communicate adequately with a Spanish-speaking person because doctors are able to avoid using the past tense in conversations with patients and because two research assistants, a native Spanish speaker and a heritage Spanish speaker, believed that patients are satisfied with their communication with doctors possessing an intermediate-high level of proficiency. An intermediate-high level of proficiency in Spanish is characterized by the ability "to converse with ease and confidence when dealing with most routine tasks and social situations of the Intermediate level" (Breiner-Sanders, Lowe, Miles, and Swender, 1999, 4). For doctors, the medical setting serves as the basis for routine tasks and social situations. The assessed medical professionals could handle uncomplicated tasks "requiring an exchange of basic information related to work…, though hesitation and errors [were sometimes] evident" (Ibid., 4).

Unlike ACTFL's Oral Proficiency Interview (OPI), our interviews did not require probes and level checks to determine a sustainable level of performance. We defined a ratable sample as one which demonstrated that the examinee could successfully navigate a case created by Dr. Laura Sadowski Please see the attached case. This scenario attempted to elicit a conversation between a doctor (the examinee) and a standardized patient (a Spanish-speaking research assistant and one of the examiners). The standardized patient sought to obtain an introduction from the doctor; a review of the patient's medical history; an explanation of initial lab results; a diagnosis; an explanation of additional, necessary, diagnostic testing, including a description of a spinal tap and an explanation of how a spinal tap is done; an explanation of the treatment management decisions; and a follow-up meeting. Doctors able to communicate this information were rated as "fluent." Doctors unable to complete these tasks were rated "not fluent."

Two research assistants conducted the OPI, a native or heritage speaker of Spanish and a native speaker of English who received training in conducting the OPI. The research assistant who was a native or heritage speaker of Spanish acted as the standardized patient while the English-speaking research assistant took notes. Upon completion of the fifteen-minute interview, the two research assistants compared notes and feelings of satisfaction (Liz, we never quantified what "satisfaction" was) to determine whether the doctor was fluent or not.

Shortcomings of this assessment tool include that it is not validated and does not include the components of the ACTFL OPI needed to elicit a rateable sample.

(Breiner-Sanders, KE, Lowe, P., Miles, J., and Swender, E. ACTFL Proficiency Guidelines—Speaking Revised 1999. *Foreign Language Annals*, Vol. 33, No. 1.

Role-Play Situation for Spanish Fluency Assessment

This scenario attempts to duplicate an in-patient visit. As the doctor, you are entering the patient's room for a consult.

1. You need to confirm the patient's information, explain the initial hospital management – hydration, insulin to correct blood glucose with close monitoring – and diagnostic, and find the source of the fever/infection.
2. To find the source of the fever/infection, you will have to explain the diagnostic workup necessary in this situation, including side effects/risks and followed by an explanation of the next steps.
3. Because you need to "rule out" meningitis, possible diagnostic testing would include ordering a CT scan of the brain and a lumbar puncture as well as a likely antibiotic treatment regiment.
4. Although the patient's mental status is "obtunded," please communicate with the patient as if she would understand or consider the observer (note taker) a family member with power of attorney for health.

As with any patient, the patient who you are seeing will have questions and concerns.

Patient: 35-year-old female with worsening headache, fevers, and becoming sleepy.

PMH: Diabetic for 7 years (fair control – doesn't monitor sugar at home);
Hypertension for 2 years – good control.

Meds: Takes Glucophage 850 bid, Avandia 4mg daily and Enalapril 20 mg daily.
No allergies

On Admission: temp 101.6 F, BP 140/70, HR 94,
reg; drifts off to sleep throughout exam

Rest exam normal – non-focal neuro exam.

Initial labs: glucose 340
BUN 35
Creatinine 1.9
WBC 14.8 with 80% PMNs
Rest normal including UA and Chest X- ray