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Racial/Ethnic Differences in 12-Month In-Hospital Survival and Hospital Utilization Trends: Evidence for a Hispanic Survival and Recovery Advantage

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Hispanic ethnicity is associated with an all-cause mortality advantage relative to non-Hispanic (NH) Whites. This advantage may be due to better outcomes at various points in the illness course, including survival and recovery from acute events. The current aim was to test the hypothesis that Hispanic ethnicity is associated with a survival and recovery advantage in the context of all-cause hospitalization. A retrospective cohort analysis of 23,028 NH White, NH Black, and Hispanic adults admitted to a large community “safety-net” hospital was conducted. Controlling for age, gender, and admitting ICD-9 codes, Hispanic patients experienced lower in-hospital mortality during the initial hospitalization. Hispanics were readmitted more frequently than NH, but were hospitalized significantly fewer total days during the 12-month study period relative to NH White patients. These findings provide initial support for a Hispanic survival advantage in the context of all-cause hospitalization and broaden the scope of health resilience associated with Hispanic ethnicity.

Keywords: health disparities, Hispanic, Latino, mortality, hospitalization

Emerging data across illness domains suggest that Hispanics experience better health than non-Hispanics, despite a significantly worse risk factor profile; this phenomenon is commonly referred to as the Hispanic Paradox. Perhaps the most striking aspect of this advantage is strong evidence that Hispanics live longer than non-Hispanic (NH) Whites, a finding first identified in the Southwest borderlands region of the United States (Markides, 1983; Markides & Coreil, 1986) in the early 1980s. These findings are often documented through death statistic estimation approaches in which mortality data from the United States Vital Statistics System is used in the numerator and representative population counts are used in the denominator (Arias, 2010; Sorlie, Backlund, Johnson, & Rogot, 1993). A persistent concern with this approach is the potential for ethnic misclassification on death certificates, leading to an underestimation of Hispanic mortality (Arias, Schauman, Eschbach, Sorlie, & Backlund, 2008; Franzini, Ribble, & Keddie, 2001; Smith & Bradshaw, 2006; Sorlie, Rogot, & Johnson, 1992; Swallen & Guend, 2003a, 2003b). However, a recent investigation found that ethnic misclassification is less than 1%, and that the overall age-adjusted mortality rate for Hispanics is approximately 20% lower than that for NH Whites (Arias, Eschbach, Schauman, Backlund, & Sorlie, 2010). Complementing the sta-
tistical estimations, a recent systematic review and meta-analysis of the longitudinal literature encompassing 58 studies (4,615,747 participants) found a 17.5% lower risk of mortality among Hispanics relative to other racial/ethnic groups (J. M. Ruiz, Steffen, & Smith, 2013). Taken together, it may be time to move beyond the question of the existence of the mortality advantage and onto an understanding of its nature and causes.

**Survival and Recovery From Acute Health Crises**

Conceptually, the observed mortality advantage may be due to better outcomes at several points in the disease course. For example, Hispanic ethnicity may connote lower illness susceptibility, a slower rate of illness progression, and/or an advantage in survival and recovery from acute health crises. Rates of acute in-hospital survival, length of stay (LOS), and rehospitalization are important proxies for measurement of this last pathway. Prior research has demonstrated racial differences in acute in-hospital survival and subsequent hospital utilization. For example, Blacks experience longer LOS, higher subsequent morbidity and rehospitalization, and greater risk of in-hospital mortality relative to Whites (Arthur, Hedges, Newgard, Diggs, & Mullins, 2008; Becker & Rahimi, 2006; Hravnak, Ibrahim, Kaufer, Sonel, & Conigliaro, 2006). The Institutes of Medicine have reported that these racial differences in survival and recovery are well documented and exist after accounting for socioeconomic factors (A. Nelson, 2002; A. R. Nelson, 2003).

Although comparative data with Hispanics are limited, there are hints of a Hispanic ethnicity advantage in in-hospital survival. A study of 12,555 patients hospitalized following myocardial infarction (MI) found that Hispanics had better acute survival rates than NH Whites (Barnhart, Fang, & Alderman, 2003). Similarly, a community-based observational study of 9,649 acute MI patients found that Hispanics were at lower risk of subsequent in-hospital MI as well as at lower subsequent risk of developing heart failure (Yarzebski, Bujor, Lessard, Gore, & Goldberg, 2004). Limited evidence has also suggested that Hispanics may have shorter LOS and lower rehospitalization rates compared with NH Whites in some disease contexts (Cook et al., 2006; Dávalos, Hlaing, Kim, & de la Rosa, 2010). Together, these data speak to the viability of a Hispanic recovery advantage hypothesis, but highlight the need for further investigation. In particular, data are needed that bridge disease domains and incorporate both cross-sectional and longitudinal trends.

Consistent with the broad nature of the Hispanic paradox and the need for more robust data, the current aim was to test whether Hispanic ethnicity is associated with a general survival and recovery advantage in the context of all-cause hospitalization. We used electronic medical records (EMRs) from a large, community “safety-net” hospital to examine ethnic differences in acute survival during hospitalization, as well as subsequent hospital utilization as indicators of recovery.

**Method**

**Study Design and Setting**

This study was approved by the institutional review boards of the University of North Texas, University of Texas Southwestern Medical Center, and Parkland Health & Hospital System (PHHS or Parkland). A retrospective cohort study was conducted using EMRs for all adult (>17 years) admissions between January 1 and December 31, 2008, within a single community “safety-net” hospital (PHHS, Dallas, Texas). Given our broader focus on examining differences in adult longevity and survival after acute health crises, the current study was limited to adults. Parkland Hospital is a regional, Level 1 trauma facility and burn center that operates 770 beds, 65 neonatal intensive care unit beds, and encompasses 10 centers of excellence. Parkland is a full-service health care system that, in 2008, provided over 43,000 inpatient discharges, 16,000 births (nearly 35% of all births occurring to Dallas County residents), and more than 70% of the county’s major trauma care. Parkland oversees 11 satellite care facilities located throughout the county. In 2008, Parkland’s total outpatient visits exceeded 1 million.

Parkland is the region’s preeminent safety-net hospital, with a mandate “to furnish medical aid and hospital care to indigent and needy persons residing in the hospital district” (Parkland Hospital, 2014). As such, patients histori-
cally are Dallas County residents of low socio-economic status (SES), with less than 30% having individual health insurance. Combined with its large catchment area (Dallas is the fourth largest metropolitan in the United States), largely indigent population, and community care model, patients are highly likely to stay within the PHHS system for their medical care needs.

The hospital’s staffing resources include approximately 1,315 physicians, 2,261 registered nurses, and 1,177 fellows and residents. Although the physician demographics are not as diverse as the patients served, Parkland is a leader in language translation services, including in-person and on-site phone and video-based interpreters covering translation needs for over 77 languages a year (Goedert, 2009). Spanish is by far the most requested language translation, followed by Vietnamese, Korean, and Arabic (Goedert, 2009).

Outcome Measures

Medical record numbers were used to track individual readmissions to PHHS during the study period. Admission dates and discharge dates were used to calculate LOS for each admission as well as time between readmission. There were three outcomes of interest in the current study: (a) mortality during initial hospitalization and subsequent hospitalizations during the study period; (b) LOS at first admission and across all repeated hospitalizations during the study period; and (c) hospital readmission statistics, including likelihood of readmission and time to first readmission.

Key Independent Variables

The primary independent variable was combined ethnicity/race assessed at first hospitalization and pulled for this study from the EMRs. Ethnicity was assessed with the standard Office of Management and Budget item “Are you of Hispanic or Latino origin or descent?” (Federal Register for the Office of Management & Budget, 1997). Race was self-reported from a standard list, including Black, White, and Asian. In most cases, the participant/patient completes the measure, although variations in capacity or physical health status at the time of hospital admission could necessitate registration by a family or support person. For the current study, we focused on three specific groups: NH Whites, NH Blacks, and Hispanics. Gender was also included to examine for potential interactions with race/ethnicity.

Emerging evidence has documented significant heterogeneity in physical health risk and outcomes between Hispanics of different backgrounds (Daviglus et al., 2012; Hoyert & Xu, 2012). Although further disaggregation of the Hispanic/Latino sample by ancestral origins was desirable to examine whether within-group differences were evident in this context, such data were not available in the EMRs. However, U.S. Census data for Dallas County, the hospital’s catchment area, characterizes the Hispanic population as 87% Mexican. Similarly, persons of Mexican origin accounted for 87% of Hispanics who participated in a community research registry in Dallas County (Bishop, Tiro, Lee, Bruce, & Skinner, 2011), and 89% of Hispanics in the registry identified Parkland Hospital as their source of care. Together, these data characterize the Hispanic population from which this sample was drawn as predominantly of Mexican origin.

Analytic Strategy

Several different analytic strategies were necessary to understand the diverse scaling of dependent variables. The analyses examined differences at both initial hospitalization and across all hospitalizations to create a clearer picture of associated trends. Given our broad interest in hospital utilization, the potentially confounding effects of age and admitting diagnosis were controlled for, either by entering age and the numeric ICD-9 code as covariates, or by entering these variables in a first block in the case of a sequential regression analysis. For continuous dependent variables, analyses of covariance (ANCOVAs) were used to identify differences between race/ethnicities. Binomial dependent variables were analyzed using sequential logistic regression analyses. In the case of aggregated number of readmissions over the 12-month study period, we used a generalized linear model with a logarithmic linking function, assuming a Poisson distribution, to determine racial/ethnic differences.
Results

Sample Characteristics

A total of 24,119 unique adults were admitted between January 1 and December 31, 2008. These admissions were noninclusive of child-birth-related visits or postpartum admissions, unless a problem or difficulty was noted through ICD-9 coding. Analyses focused on the three largest racial/ethnic groups, which accounted for 95.4% of the total sample. This final sample of 23,028 patients was comparably distributed between NH Blacks (34.7%), NH Whites (33.6%), and Hispanics (31.7%). Outcome data were available for 99.2% (22,842) of the sample.

As shown in Table 1, Hispanic patients were significantly younger than NH Whites and NH Blacks, \(F(2, 22841) = 205.6, p < .001\), and far more likely to be married than the other groups, \(\chi^2(2, 22840) = 1223.8, p < .001\). Similar proportions of Hispanic and NH Black men and women were admitted, whereas nearly 60% of NH Whites admitted were men.

The most common reason for first admission were broadly categorized as signs, symptoms, and ill-defined conditions (ICD-9 codes 780–799), accounting for 26.9% of all admissions; shortness of breath represented the chief complaint. Examination by group revealed that Hispanics were less likely than NH Blacks and NH Whites to be admitted for mental disorders or circulatory disorders, but were more likely to be admitted for digestive and genitourinary disorders (i.e., disorders of the reproductive organs or urinary system), along with complications related to pregnancy. In contrast, NH Whites were least likely to be admitted for cancer, endocrine, and genitourinary disorders, as well as ill-defined (i.e., unknown etiology) conditions. However, NH Whites were twice as likely as Hispanics and three times as likely as NH Blacks to be hospitalized for injury and poisoning. NH Blacks were most likely to be admitted for circulatory disorders and infectious and parasitic diseases. Collapsing across

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of Study Population by Race/Ethnicity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures</th>
<th>NH White ((n = 7,739))</th>
<th>NH Black ((n = 7,991))</th>
<th>Hispanic ((n = 7,112))</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, year(^a)</td>
<td>48.0 (17.2)</td>
<td>49.4 (15.9)</td>
<td>44.1 (17.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Male sex(^b)</td>
<td>4,628 (59.8)</td>
<td>3,925 (49.1)</td>
<td>3,677 (51.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Married(^b)</td>
<td>2,168 (28.0)</td>
<td>1,345 (16.83)</td>
<td>3,029 (42.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>First admission ICD-9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disease of or problems related to(^b):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infectious/parasitic (001–139)</td>
<td>59 (0.8)</td>
<td>111 (1.4)</td>
<td>63 (0.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Neoplasms (140–239)</td>
<td>225 (2.9)</td>
<td>370 (4.6)</td>
<td>291 (4.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Endocrine, nutritional, metabolic, immunity (240–279)</td>
<td>170 (2.2)</td>
<td>316 (4.0)</td>
<td>223 (3.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Blood/blood organs (280–289)</td>
<td>45 (0.6)</td>
<td>170 (2.1)</td>
<td>93 (1.3)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Mental disorders (290–319)</td>
<td>319 (4.1)</td>
<td>248 (3.1)</td>
<td>76 (1.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Nervous system/sense organs (320–389)</td>
<td>218 (2.8)</td>
<td>189 (2.4)</td>
<td>174 (2.4)</td>
<td>.16</td>
</tr>
<tr>
<td>Circulatory system (390–459)</td>
<td>591 (7.6)</td>
<td>860 (10.8)</td>
<td>405 (5.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Respiratory system (460–519)</td>
<td>146 (1.9)</td>
<td>227 (2.8)</td>
<td>159 (2.2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Digestive system (520–579)</td>
<td>357 (4.6)</td>
<td>441 (5.5)</td>
<td>647 (9.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Genitourinary system (580–629)</td>
<td>262 (3.4)</td>
<td>492 (6.2)</td>
<td>561 (7.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Pregnancy, childbirth (630–679)</td>
<td>27 (0.3)</td>
<td>46 (0.6)</td>
<td>114 (1.6)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Skin, subcutaneous tissue (680–709)</td>
<td>261 (3.4)</td>
<td>304 (3.8)</td>
<td>314 (4.4)</td>
<td>&lt;.005</td>
</tr>
<tr>
<td>Musculoskeletal, connective tissue (710–739)</td>
<td>522 (6.7)</td>
<td>566 (7.1)</td>
<td>472 (6.6)</td>
<td>.56</td>
</tr>
<tr>
<td>Congenital anomalies (740–759)</td>
<td>3 (0.0)</td>
<td>4 (0.0)</td>
<td>13 (0.2)</td>
<td>&lt;.006</td>
</tr>
<tr>
<td>Perinatal period (760–779)</td>
<td>0 (0.0)</td>
<td>1 (0.0)</td>
<td>0 (0.0)</td>
<td>.40</td>
</tr>
<tr>
<td>Ill-defined conditions (780–799)</td>
<td>1,893 (24.5)</td>
<td>2,569 (32.1)</td>
<td>2,130 (29.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Injury and poisoning (800–999)</td>
<td>2,378 (30.7)</td>
<td>832 (10.4)</td>
<td>1,134 (15.9)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Unreported</td>
<td>263 (3.4)</td>
<td>245 (3.1)</td>
<td>243 (3.4)</td>
<td></td>
</tr>
</tbody>
</table>

Note. NH = non-Hispanic.
\(^a\) Values are \(M (SD)\). \(^b\) Values are \(n (\%)\).
circulatory disorders and neoplasms, which capture the three leading causes of death in the United States, NH Blacks were more likely to be admitted for a major cause of death \( (n = 1,230) \) than either NH Whites \( (n = 816) \) or Hispanics \( (n = 696) \), \( \chi^2(2, 22091) = 133.9, p < .001 \).

### In-Hospital Mortality

A stepwise sequential logistic regression analysis was conducted to analyze racial/ethnic differences in the likelihood of in-hospital mortality during the first admission during the study period. Age and numeric ICD-9 codes were entered into the analysis first to control for their effects on the omnibus trends. Significant racial/ethnic differences in the risk for in-hospital mortality emerged, Wald's \( \chi^2(2) = 10.19, p < .001 \) (see Table 2). To investigate these effects, the race/ethnicity indicator was dummy-coded using Hispanics as the reference group. The results showed that NH Whites were at significantly greater risk of in-hospital mortality compared with Hispanics, Wald’s \( \chi^2(1) = 4.57, p < .05 \), odds ratio \( (OR) = 1.328 \). No differences were found between Hispanics and NH Blacks, Wald’s \( \chi^2(1) = .438, p = ns \). Overall model fit indices showed that the inclusion of gender and race/ethnicity as variables significantly improved model prediction, \( \chi^2(3) = 19.25, p < .001 \). The analysis revealed a statistically significant effect for race/ethnicity, Wald’s \( \chi^2(2) = 10.58, p < .005 \). Pairwise comparisons of survival over time between Hispanics and NH White revealed a trending effect, suggesting that NH Whites were at greater risk of in-hospital mortality over time, Wald’s \( \chi^2(1) = 2.91, p = .088 \), \( OR = 1.205 \). No significant effects were detected between Hispanics and NH Blacks, Wald’s \( \chi^2(1) = 1.85, p = ns \), \( OR = .858 \).

### Table 2

**Likelihood of In-Hospital Mortality at Initial Hospitalization**

<table>
<thead>
<tr>
<th>Model fit</th>
<th>( \chi^2 )</th>
<th>( p )</th>
<th>Block</th>
<th>( \Delta \chi^2 )</th>
<th>( p )</th>
<th>Step</th>
<th>( \Delta \chi^2 )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final</td>
<td>157.81</td>
<td>&lt;.001</td>
<td>Final</td>
<td>22.29</td>
<td>&lt;.001</td>
<td>Final</td>
<td>10.10</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Nagelkerke ( R^2 )</td>
<td>.046</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

#### Logistic regression model

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>Wald ( \chi^2 )</th>
<th>( df )</th>
<th>( p )</th>
<th>( OR )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.037</td>
<td>.003</td>
<td>135.79</td>
<td>1</td>
<td>&lt;.001</td>
<td>1.038</td>
</tr>
<tr>
<td>ICD-9</td>
<td>.000</td>
<td>.000</td>
<td>2.34</td>
<td>1</td>
<td>.126</td>
<td>1.000</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic vs. NH White</td>
<td>.283</td>
<td>.133</td>
<td>4.57</td>
<td>1</td>
<td>.033</td>
<td>1.328</td>
</tr>
<tr>
<td>Hispanic vs. NH Black</td>
<td>-.099</td>
<td>.142</td>
<td>.483</td>
<td>1</td>
<td>.487</td>
<td>.906</td>
</tr>
<tr>
<td>Gender</td>
<td>.349</td>
<td>.110</td>
<td>10.10</td>
<td>1</td>
<td>.001</td>
<td>1.418</td>
</tr>
</tbody>
</table>

*Note.* NH = non-Hispanic; \( OR \) = odds ratio.
Length of Stay

An ANCOVA using age and numeric ICD-9 codes as covariates was conducted to analyze differences in LOS on initial hospitalization between racial/ethnic groups. As shown in Table 3, a statistically significant effect for race/ethnicity was observed, $F(2, 22163) = 15.70, p < .001, \eta^2_p = .001$. As shown in Figure 1, Hispanic patients were hospitalized significantly fewer days compared with both NH Whites (6.24 days vs. 7.24 days, respectively) and NH Blacks (6.61 days), with NH Blacks experiencing shorter stays than NH Whites.

The aggregated LOS across all hospitalizations was calculated as a simple sum of the LOS for each hospitalization for a given case. The resulting total LOS was analyzed using the ANCOVA strategy described above. Consistent with the initial hospitalization findings, Hispanic patients were hospitalized more than a full day less over the 12-month study period relative to both NH Whites (8.28 days vs. 9.55 days, respectively) and NH Blacks (9.76 days).

Readmission

Differences in the likelihood of readmission following initial discharge were analyzed using a sequential logistic regression analysis, entering age and numeric ICD-9 codes first to control for their effects. The addition of race/ethnicity and gender in the second step significantly improved the model fit, $\Delta \chi^2(3) = 64.69, p < .001$, Nagelkerke $R^2 = .023$. Race/ethnicity was dummy-coded using Hispanics as the reference group. Pairwise comparisons showed that Hispanics were 17.7% less likely to be readmitted over the 12-month study period relative to NH Blacks, but 13.5% more likely to be readmitted than NH Whites (see Table 4).

An ANCOVA analyzing differences in the average LOS (in days) between readmissions revealed statistically significant effects for race/ethnicity, $F(2, 22164) = 24.25, p < .001, \eta^2_p = .002$, but not for gender, $F(1, 22164) = 1.69, p = ns$. Post hoc analysis (least significant difference) revealed that Hispanics had significantly longer intervals between readmissions compared with NH Whites (9.59 days vs. 8.12 days, $p < .005$), but significantly shorter intervals between readmissions than NH Blacks (11.43 days, $p < .001$).

Discussion

This study examined whether Hispanic ethnicity is associated with a survival and recovery advantage in the context of all-cause hospitalization. After accounting for age, sex, and admitting diagnosis, Hispanic patients were observed to experience lower in-hospital mortality relative to NH White patients during the initial hospitalization within the study period. Although no mortality differences were observed between Hispanic and NH Black patients, the results do support a Hispanic survival advantage compared with NH Whites in the context of all-cause hospitalization and expand the known

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**Table 3**

Differences in Length of Stay

<table>
<thead>
<tr>
<th>Initial hospitalization</th>
<th>Variable</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>15.77</td>
<td>&lt;.001</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>ICD-9</td>
<td>1</td>
<td>17.68</td>
<td>&lt;.001</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>2</td>
<td>15.70</td>
<td>&lt;.001</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>52.49</td>
<td>&lt;.001</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity × gender</td>
<td>2</td>
<td>2.29</td>
<td>.101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>22,163</td>
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</tr>
</tbody>
</table>

**Aggregated across all hospitalizations over 12 months**

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>$F$</th>
<th>$p$</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>34.27</td>
<td>&lt;.001</td>
<td>.002</td>
</tr>
<tr>
<td>ICD-9</td>
<td>1</td>
<td>3.06</td>
<td>.080</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>2</td>
<td>7.78</td>
<td>&lt;.001</td>
<td>.002</td>
</tr>
<tr>
<td>Gender</td>
<td>1</td>
<td>58.77</td>
<td>&lt;.001</td>
<td>.003</td>
</tr>
<tr>
<td>Race/ethnicity × gender</td>
<td>2</td>
<td>1.56</td>
<td>.210</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>22,164</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Post hoc tests**

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean diff.</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic vs. NH White</td>
<td>-.731</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Hispanic vs. NH Black</td>
<td>-.937</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>NH Black vs. NH White</td>
<td>.206</td>
<td>ns</td>
</tr>
</tbody>
</table>

*Note. NH = non-Hispanic; diff. = difference.*
health advantages associated with Hispanic ethnicity.

Hispanic ethnicity was also associated with lower hospital utilization relative to non-Hispanics. Specifically, the average initial LOS for Hispanic patients was significantly shorter than that of non-Hispanics. Although less likely to be readmitted compared with NH Black patients, Hispanics were more likely to be readmitted compared with NH Whites. However, when comparing aggregated hospital LOS over the 12-month study period, Hispanics were hospitalized more than a full day less than both NH Black and NH White patients. We note that differences in LOS should be interpreted with caution at this stage. Although the evidence would be consistent with an ethnic advantage in recovery, it is also possible that shorter LOS and longer time to rehospitalization reflect individual-level factors such as distrust of the health care system or treatment-seeking delay (Morgenstern, Steffen-Batey, Smith, & Moye, 2001; Sung, 1999; Wasserman, Flannery, & Clair, 2007) as well as system-level disparities in quality of care (A. Nelson, 2002; A. R. Nelson, 2003). Future research should examine the reliability of these observed differences and clarify their nature.

The findings add to the small but growing literature demonstrating a Hispanic illness survival and recovery advantage. Relative to NH Whites, Hispanics have been shown to experience lower in-hospital mortality following hospitalization for acute infectious conditions such as pneumonia (Hausmann et al., 2009) and diseases such as heart failure (Yarzebski et al., 2004). Growing evidence has also demonstrated Hispanic survival advantages following treatment for lung cancer (Patel, Schupp, Gomez, Chang, & Wakelee, 2013) and renal failure (Arce, Goldstein, Mitani, & Winkelmayer, 2013), after controlling for demographic variables and disease severity. Together these data support the possibility that the Hispanic mortality paradox may be due in part to a greater
ability to recover from health emergencies, with further study warranted.

Notably, these findings come in the context of the Affordable Care Act, which in part mandates reduction in hospital utilization costs (Kocher & Adashi, 2011). Much of these cost management efforts are aimed at reducing preventable hospital readmission rates with significant financial penalties for those hospitals that do not meet expected goals. However, readmission rate has several limitations as a proxy for cost as indirectly demonstrated here (Axon & Williams, 2011; Benbassat & Taragin, 2000). Hispanics in the current study had higher readmission rates but lower aggregated LOS. Considering that the estimated cost of community hospitalization in United States was $9,700 in 2010 (Pfuntner, Wier, & Steiner, 2013), the average cost for Hispanic patients would have been $14,754.96 compared with $17,018.10 for NH Whites, an estimated difference of $2,263 per person. Hence, if Hispanics’ short LOS is determined to be an advantage and not disparity, the moderating and mediating factors may offer an important alternative pathway to cost savings.

Future research should seek to replicate these findings over a longer follow-up as well as identify associated explanatory factors. For example, several authors have posited that Hispanic cultural values such as simpatía (importance of displaying kindness and maintaining interpersonal harmony), familismo (importance of keeping warm family relationships), and personalismo (valuing and building warm relationships) may contribute to broad health advantages by engendering greater social support (Gallo, Penedo, Espinosa de los Monteros, & Arguelles, 2009; J. Ruiz & Steffen, 2011).

More broadly, these findings have important implications for understanding racial/ethnic differences in hospitalization trends, as well as larger implications of minority health and health disparities. We know of no other studies published in the last decade comparing cross-sectional and longitudinal adult hospital utilization trends among these three racial/ethnic groups. The findings not only support a Hispanic survival advantage and lower utilization relative to NH Whites, but they also demonstrate observable differences between Hispanics and NH Blacks in LOS and readmission rates, thereby challenging a generalizable notion of minority health. In addition, differences in outcomes such as LOS have important economic implications, given the cost of hospitalization and recent health care mandates (Orszag & Emanuel, 2010) to lower rehospitalization rates and total LOS. Moreover, a general trend of survival and recovery advantage does not suggest that there may be disease or event contexts in which Hispanic disparities may exist. Future research should clarify such possibilities.

### Table 4

<table>
<thead>
<tr>
<th>Model</th>
<th>( \chi^2 )</th>
<th>( p )</th>
<th>Block</th>
<th>( \Delta \chi^2 )</th>
<th>( p )</th>
<th>Step</th>
<th>( \Delta \chi^2 )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final</td>
<td>330.23</td>
<td>&lt;.001</td>
<td>Final</td>
<td>64.69</td>
<td>&lt;.001</td>
<td>Final</td>
<td>7.22</td>
<td>.007</td>
</tr>
<tr>
<td>Nagelkerke ( R^2 )</td>
<td>.023</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Logistic regression model

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>Wald ( \chi^2 )</th>
<th>df</th>
<th>( p )</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
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<td>.001</td>
<td>98.41</td>
<td>1</td>
<td>&lt;.001</td>
<td>1.010</td>
</tr>
<tr>
<td>ICD-9</td>
<td>−.001</td>
<td>&lt;.001</td>
<td>117.67</td>
<td>1</td>
<td>&lt;.001</td>
<td>0.999</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic vs. NH White</td>
<td>−.145</td>
<td>.042</td>
<td>11.76</td>
<td>1</td>
<td>.001</td>
<td>0.865</td>
</tr>
<tr>
<td>Hispanic vs. NH Black</td>
<td>.163</td>
<td>.040</td>
<td>16.49</td>
<td>1</td>
<td>&lt;.001</td>
<td>1.177</td>
</tr>
<tr>
<td>Gender</td>
<td>.089</td>
<td>.033</td>
<td>7.21</td>
<td>1</td>
<td>.007</td>
<td>1.093</td>
</tr>
</tbody>
</table>

Note. NH = non-Hispanic; OR = odds ratio.
Limitations

Importantly, these results derive from a single public hospital system serving a primarily lower socioeconomic population. Hence, they may not generalize to all persons or groups. However, we should note that the nation’s 2,700 public hospitals are the primary providers of medical care for the 50 million uninsured people in the United States and that Parkland Hospital is ranked among the 20 largest U.S. public hospitals (Roney, 2012). Moreover, Parkland’s balanced diversity between the three predominant racial/ethnic groups is nearly unparalleled and provides an excellent context for comparative research.

We should also note that these results are not adjusted for potential differences in socioeconomic indicators (Kondo, 2012; Kondo et al., 2009), including income or insurance status. Although historical data have suggested that the majority of patients in PHHS are of lower SES across racial/ethnic groups, the relative impact of SES may vary by group and was not studied here. It is also possible that the moderating effect of SES may vary across race/ethnicity as it pertains to hospitalization and other health outcomes. Hispanics in this study were predominantly of Mexican descent, reflecting the region’s makeup. Future work should seek to replicate these findings with Hispanics of other backgrounds and in other regions of the country. These data represent snapshots of general trends and do not speak to differences within specific conditions or take into account any premorbid conditions. Likewise, the first hospitalization within the study period does not preclude the possibility of hospitalization prior to 2008. We found that approximately 22% of patients in this cohort were rehospitalized within the study period, a trend that likely applies to individual’s hospitalized in the second half of 2007. Moreover, these data do not include illness events and hospital utilization outside PHHS.

Conclusion

These findings provide initial support for a Hispanic survival advantage in the context of all-cause hospitalization and broaden the scope of health resilience associated with Hispanic ethnicity. Evidence of ethnic differences in hospital utilization should be investigated to determine whether they reflect a recovery advantage or disparities in medical care.

Abstracto

El grupo étnico hispano es asociado con una ventaja de mortalidad en todas las causas, comparado a los blancos no hispanos (NH). Esta ventaja puede ser debido a mejores resultados en varios puntos a través del transcurso de la enfermedad, incluyendo la sobre-vivencia y la recuperación de eventos agudas. El objetivo actual era examinar la hipótesis que el grupo étnico hispano es asociado con una ventaja en supervivencia y recuperación en el contexto de todas las causas de hospitalización. Se llevó a cabo un análisis de población retrospectivo de 23,028 blancos NH, negros NH, e hispanos admitidos en un hospital comunitario para personas de bajos recursos. Controlando la edad, el sexo y el código ICD-9 de los pacientes admitidos, los pacientes hispanos tuvieron menos mortalidad en el hospital durante su primera hospitalización. Los hispanos reingresaron con más frecuencia pero fueron hospitalizados por un total de menos días durante el periodo de doce meses del estudio, relativo a pacientes blancos NH. Estos resultados proveen apoyo inicial de una ventaja hispana en supervivencia y recuperación en el contexto de todas las causas de hospitalización, y amplifican el alcance de la capacidad de recuperación de la salud asociada con el grupo étnico hispano.

References


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