Does Where You Live Matter? Evaluating the Association between the Healthy Place Index® and Timing of Hip Fracture Repair Hospital Course

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INTRODUCTION: Racial and insurance coverage disparities have been associated with delay to surgery and increased length of stay (LOS) in patients undergoing surgery for hip fracture.^{1,2} Communities comprised of minority racial/ethnic groups often have lower socioeconomic status (SES) and decreased access to healthcare, which may contribute to these disparate outcomes.³ Other potentially contributing social or environmental factors to disparate experiences in a patient's hospital course following hip fracture are less known. Therefore, we utilized a novel measurement to assess a zip code's demographics and community conditions known as the Healthy Place Index® (HPI) and hypothesized that a lower HPI value will be associated with disparities in a patient's hospital course following hip fracture.

METHODS: This cross-sectional study included patients 18 years and older admitted to an institution in Southern California for surgical repair of hip fracture management [CPT codes: 27125, 27130, 27235, 27236, 27244, 27245, 27248, 27269, 27506] from 2017 to 2023. Of the 769 patients identified, 721 had zip codes within California and were included in this study. Each zip code correlated with a predetermined HPI value. HPI is a scoring tool created by the Public Health Alliance of Southern California to assess healthy community conditions.⁴ "Permission is hereby granted to use, reproduce, and distribute these materials for noncommercial purposes, including educational, government and community uses, with proper attribution to the Public Health Alliance of Southern California including this copyright notice. Use of this publication does not imply endorsement by the Public Health Alliance of Southern California."⁴ The zip codes are scored on a scale of 0 to 100 based on an evaluation of economic, education, social, transportation, neighborhood, housing, clean environment, and healthcare access conditions; 100 is considered most healthy.⁴ Patients were divided by HPI value into low (below median) and high (median and above). Differences in demographics were evaluated using t-tests and chisquare analyses as appropriate. We then assessed the association of HPI with hospital length of stay (LOS), time to surgery, and time from surgery to discharge. We adjusted for age, gender (female or male), race (null, Asian, Black or African-American, Native American or other Pacific Islander, White, Other or Mixed race, Unknown), homeless status (ves or no), transfer status (yes or no), insurance category (Commercial, Medicare, Medicaid, Other), and cardiac testing (received echocardiogram, electrocardiogram, and/or cardiac device implant or interrogation) in seguential models using analysis of covariance.

RESULTS: Average age was 73 +/- 17 years, 58% were women, 60% were White, 29% were of Hispanic/Latino ethnicity, and 76% spoke English as primary language. Compared to high HPI, patients in low HPI had higher proportions of Hispanic/Latino ethnicity (46% vs. 11%, p<0.001), Spanish as primary language (34% vs. 4%, p<0.001), and transfers from outside hospital (38% vs. 11%, p<0.001); and lower proportions of White race (46% vs 74% p<0.001), English as primary language (62% vs. 90%, p<0.001), and cardiac testing (29% vs. 16%, p<0.001). Average LOS was 5.7 +/- 5 SD days (high HPI 5.9 +/- 5.9 SD days, low HPI 5.5 +/- 3.9 SD days, p=0.28); average time from admission to surgery was 1.2 +/- 1.6 SD days (same values for high and low HPI, p=0.74); and average time from surgery to discharge was 4.4 +/- 4.3 SD days (high HPI 4.6 +/- 5.2 SD days, low HPI 4.2 +/- 3.17 SD days, p=0.26). There were no significant correlations between HPI and LOS (r=0.04, P=0.28), time to surgery (r=0.01, p=0.58), or time to discharge (r=0.04, p=0.26). In unadjusted and fully adjusted analyses, HPI was not significantly associated with LOS, time to surgery, or time to discharge. Homeless status was the strongest indicator for increased LOS (p<0.001). Cardiac testing, Other or Mixed race, and Black or African-American race were significant contributors to longer times from admission to surgery (p<0.001, p=0.02, p=0.03), whereas transfer status contributed to a shorter time (p=0.03). Cardiac testing also contributed to a longer time to discharge (p<0.001).

DISCUSSION AND CONCLUSION: HPI was not associated with hospital LOS, delayed time from admission to surgery or delayed time from surgery to discharge for hip fracture repair. While HPI provides an idea of the resources for a zip code, individual level factors in this patient population were key indicators of a patient's episode of care for hip fracture. Notably, housing support and being transferred from another hospital were social factors that were not captured by the HPI but are key contributors to patients' care plans and their time in the hospital. Transfer status, furthermore, may represent patients who may wait the longest for surgery. Continued work in this area is warranted to maximize a patient's episode of care as a patient's zip code-related HPI may not consistently provide insight into potential disparities.