

## **Hospital Referral Regions with Large Black Patient Populations Have Higher Hip Fracture Incidence: An Analysis of the Dartmouth Atlas Data 1995-2015**

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**Purpose:** Despite measures to increase health-care access in the United States and advancements in perioperative geriatric fracture management, racial disparities in hip fracture outcomes persist. This study sought to examine the impact of geographic and racial demographic profiles in hospital referral regions (HRRs) on hip fracture incidence trends.

**Methods:** The Dartmouth Atlas Hip Fracture Hospitalizations per 1000 Medicare beneficiaries data tool was accessed for patient discharges between 1995 and 2015. Stratifying by HRR, demographic information including race, age, Medicaid eligibility, medical capacity, and age-adjusted Medicare spending per beneficiary was cross-referenced to this dataset using the Centers for Medicare and Medicaid Services (CMS) publicly available data file. Paired Student t tests were used to assess continuous variables. Pearson's  $\chi^2$  and odds ratios (ORs) were used for categorical variables. High hip fracture incidence rate was defined as 1 standard deviation above the national mean.

**Results:** HRRs with greater than 16.4% Black Medicare beneficiaries (1 standard deviation above the national mean) were significantly more likely to have a high hip fracture incidence rate (31.7% vs 9.7%  $P < 0.01$ , OR 4.3, 95% confidence interval [CI] 2.16-8.57). Hip fracture discharges per 1000 Medicare beneficiaries in the overall cohort dropped 29.2% during the 20-year study time period. A smaller decline of 18.7% was noted in high Black population-density HRRs. Disparities in hip fracture incidence rates between high Black population density HRRs and the national mean also worsened during the study period. Medicaid eligibility as a surrogate for poverty and hospital capacity staffing ratios were not associated with higher hip fracture hospitalization rates. High Black population density remained associated with higher hip fracture rates in a binomial multivariate logistic regression analysis ( $\beta = 3.66$ , 95% CI 1.76-7.62,  $P < 0.001$ ).

**Conclusion:** HRRs with large Black populations are subject to a higher hip fracture incidence even when controlling for Medicaid eligibility, or surrogate markers for health-care capacity. Rather than reflecting increased hip fracture incidence in Black patients, this study indicates predominantly Black areas have health infrastructure and population health challenges contributing to higher hip fracture incidence in those regions. Health-care policies such as the Accountable Care Organization Investment Model have successfully improved access and cost savings in rural and underserved regions through targeted geographic financial incentives for primary care physicians. Similar incentives for geriatric co-management programs developed in concert with orthopaedic trauma surgeons warrant consideration in high risk and underserved HRRs to improve access and health equity in hip fracture care and prevention.