

## **Racial Disparities in Cancer Service Gaps in Florida: Comparing Diagnostic and Treatment Access in Counties Within and Outside NCI Cancer Center Service Areas**

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### **1. Background**

There are four National Cancer Institute (NCI)-Designated Cancer Centers in Florida, providing coverage for 51 of the state's 67 counties (76.1 percent). However, 16 counties—representing 27 percent of Florida's rural counties—remain outside the service areas of an NCI-designated center. When geographic gaps in cancer care exist, it is critical to examine, within those area gaps, whether specific demographic groups disproportionately bear the burden of cancer. Sub-group analyses are necessary for identifying populations who may experience compounded barriers due to both geographic isolation and structural inequities.

### **2. Goals**

- Measure the spatial accessibility to diagnostic services and county-level cancer mortality in Florida counties that are covered by the NCI vs. those that are not
- Measure the county-level burden of cancer by race/ethnicity in NCI covered vs. non-covered counties in Florida

### **3. Solutions and Methods**

Using ArcPro 2.9, we georeferenced 3,228 diagnostic radiology centers and 444 cancer treatment centers across Florida, Alabama, Mississippi, and Georgia. The Generate Origin-Destination Links tool was used to calculate the number of clinics within 25, 50, and 100 miles of each county centroid. County-level age-adjusted cancer mortality by race/ethnicity was obtained from the U.S. Centers for Disease Control and Prevention WONDER. For Black/African American, white, and Hispanic/Latino populations, we fit separate generalized linear regression models with mortality as the dependent variable and NCI coverage status and distance to diagnostic facilities as independent variables. Spatial autocorrelation was assessed using Moran's I.

### **4. Outcomes**

Compared with non-NCI counties, NCI-covered counties had 4.6 times more diagnostic facilities within 25 miles. Black/African American populations showed the largest NCI-coverage effect ( $\beta = -41.026$ ) and the strongest association between mortality and distance to diagnostic centers ( $\beta = 5.155$ ,  $R^2 = 0.3725$ ), with a 10.1 percent higher mortality rate in non-NCI counties (181.98 vs. 165.26 deaths per 100,000). White populations had a 3.1 percent higher mortality rate in non-NCI counties and a moderate distance-to-diagnostic-center association ( $\beta = 3.094$ ,  $R^2 = 0.2890$ ). Hispanic/Latino populations exhibited positive distance-to-diagnostic-center effects ( $\beta = 3.674$ ) but had 5.7 percent lower mortality in non-NCI counties. Although county-level data were insufficient for regression modeling, Asian/Pacific Islander populations had a 7.8 percent higher mortality rate in non-NCI counties ( $N = 8$ ). Overall, non-NCI counties had a 5.3 percent higher cancer mortality rate (168.31 vs. 159.90 deaths per 100,000).

### **5. Lessons Learned and Future Directions**

Black/African American communities in Florida are disproportionately affected by geographic barriers to diagnostic services in counties not included in an NCI-Designated Cancer Center catchment area. They experience the largest mortality difference between NCI-covered and non-covered counties and the strongest association between distance to diagnostic care and cancer mortality. Our findings suggest that

*Category: Catchment Area Data, Social Determinants of Health, and Equity – Completed Project – Student/Trainee*

catchment area strategies implemented by NCI-Designated Cancer Centers are associated with lower cancer mortality, while geographic barriers intensify existing racial disparities in non-NCI-covered counties. Future analyses will include distance measurements to cancer treatment centers. Systems science approaches could provide a structured framework for analyzing these disparities in greater depth. Tools such as causal loop diagramming, boundary mapping, and group model building can help clarify how geographic isolation, availability of diagnostic facilities, transportation barriers, delayed screening, and community-level behaviors interact over time to influence mortality outcomes.