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

Using Spatiotemporal Analyses and Demographic Benchmarking to Evaluate Expansion in Cancer Center Outreach

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1. Background

Community Outreach and Engagement (COE) offices at cancer centers are responsible for delivering health education and outreach across their service area. As Moffitt's service area expanded from 15 to 23 counties, its COE office needs to demonstrate how outreach impact has grown geographically and over time from 2020-2025. We utilized our Research Electronic Data Capture (REDCap)-based outreach tracking system to standardize historic outreach metrics from previously utilized data management systems and create a seven-year outreach file spanning 2019-2025.

2. Goals

- Quantify the spatial growth of COE outreach from 2019 to 2025
- Compare the demographics of residents living within 5-, 10-, and 15-mile areas around outreach locations to evaluate whether event placement aligns with priority populations

3. Solutions and Methods

Outreach data from 2019-2025 were merged, geocoded, and converted into annual raster layers to assess spatial and temporal change in outreach coverage; 2019 was included because 2020's activity was largely virtual. Directional distributions were generated yearly to observe shifts in the orientation and spread of outreach. ArcGIS Pro's Emerging Hot Spot Analysis identified areas where activity expanded significantly after January 1, 2023, the year of catchment-area expansion. Demographic characteristics of census block groups within independent 5-, 10-, and 15-mile drive-time thresholds were summarized using 2023 American Cancer Society estimates. To compare demographic composition to catchment-area benchmarks, block group-level binomial generalized linear models with a logit link were fit using population counts and denominators. Estimated marginal means and 95-percent confidence intervals were compared with catchment reference proportions, with thresholds considered significantly different when the catchment value fell outside the model-based confidence interval.

4. Outcomes

There were 1,397 in-person or hybrid (virtual and in-person) events between 2019-2025, reflecting when outreach team members were present and 52.4 percent of all outreach activity. In-person outreach activity grew by approximately 7.6 percent annually between 2019 and 2025. Emerging Hot Spot Analysis identified new and consecutive hot spots within priority expansion regions, indicating that outreach activity has recently expanded into these areas and has increased consistently over sequential years following the 2023 catchment-area expansion. Using catchment-area proportions as reference benchmarks (e.g., Hispanic = 0.243, Non-Hispanic [NH] Black = 0.110, Limited English Proficiency [LEP] Spanish = 0.036), where a drive-time estimate is considered significantly above or below catchment when its entire 95-percent confidence interval lies above or below the catchment value, we found that Hispanic populations and Spanish-speaking LEP households exceeded catchment proportions at 5, 10, and 15 miles, NH Black populations were above catchment at 5 and 15 miles.

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5. Lessons Learned and Future Directions

This research introduces an analytic framework for quantifying outreach growth across both time and geography, turning institutional goals into measurable outcomes. Spatial change detection provides the evidence base for strategic decisions, showing where outreach has expanded and where gaps remain. Limitations include the use of zip codes when full addresses were not documented (n=11). This project builds upon our previous work developing an end-to-end outreach data management system, adapting historic outreach in a way that will also feed into our outreach dashboard for Artificial Intelligence use in Power Business Intelligence. Future analyses will include a 2016-2025 outreach to summarize a decade of cancer prevention impact and growth.

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Figure 1: Emerging Hotspot Analysis