Two Decades of Cancer Burden in a Racially, Ethnically Diverse U.S. Gulf Coast Population: The Joint Roles of Environmental Injustice and Persistent Poverty

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1. Background
The Houston Methodist Neal Cancer Center (HMNCC) catchment area is a racially/ethnically diverse 8-county region in Southeastern Texas. This region has 20.6 percent non-Hispanic Black and 38 percent Hispanic/Latino residents. Almost one-third (31%) of residents live in poverty and 19 percent lack health insurance. A ProPublica report examining U.S. cancer-causing industrial air pollution found numerous "hotspots" in Texas, including locations within the HMNCC catchment area. Finally, climate change in the U.S. Gulf Coast will likely exacerbate barriers to cancer prevention and control services, including screening, diagnosis, and timely receipt of care. Given these geographical characteristics, we will construct a large-scale data linkage of cancer registry data, environmental burden data, social determinants of health (SDOH) datasets, and shifting demographics to examine cancer burden patterns in our region.

2. Goals
A cancer "exposome" will be built, consisting of census tract-level cancer rates/temporal patterns, environmental burden, demographics, and SDOHs. This linked data infrastructure will give rise to extensive analysis of our highly diverse catchment area, including longitudinal patterns in cancer burden at the neighborhood-level. We will use geospatial mapping and hotspot analysis to effectively design, target, and deliver appropriate services/interventions to our vulnerable communities.

3. Solutions and Methods
All data sources will be linked at the census tract level. Texas population-based cancer registry data will initially leverage the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) data from 2000-21; Texas Cancer Registry approval for data access has been granted; data are forthcoming, for future analysis. Age-adjusted cancer incidence and mortality rates will be examined for the HMNCC 8 county catchment area, the state of Texas, and the U.S. We will also examine stage at diagnosis, temporal trends, and rises in early-onset cancers. The U.S. Centers for Disease Control and Prevention's Environmental Justice Index tool will be examined. Demographics (e.g., race/ethnicity) and persistent poverty will be examined using U.S. Census Bureau data. The Area Deprivation Index and Racial Isolation Index will be integrated as metrics of SDOH. Join point regression will be used to model longitudinal patterns in overall, liver, and lung cancer burden. Data visualization/mapping will be performed using ArcGIS. The SEER specialized dataset, "Incidence Data for Detailed Asian/Pacific Islander Groups Database," will be used to examine cancer burden for our rapidly growing Asian population in a disaggregated manner.

4. Outcomes
A primary outcome will be detailed mapping and digital visualizations to inform targeted Cancer Prevention and Control (CPC) efforts, in close partnership with HMNCC Community Outreach and Engagement (COE), to identify and intervene in areas of greatest medical need throughout our catchment area. Our cancer exposome will give rise to a project portfolio for training of early career investigators in CPC and health equity research. Examination of cancer burden in disaggregated Asian subgroups will allow us to project, and be ready to address, the concomitant shifts in cancer burden.

5. Lessons Learned and Future Directions
These efforts will help inform HMNCC focused CPC-COE initiatives in our catchment area including design, development, and delivery of interventions and implementation science for our most medically vulnerable communities. Given projections of a near-doubling in Asian American residents in our region, our efforts need to be sharply mindful of future shifts in our cancer burden.