Incorporating the Temporal Dimension into Studies of Built Environment and Colorectal Cancer Outcomes

Jesse J. Plascak, Ph.D.[1]; Heather Hampel, M.S.[2]; Kevin Henry, Ph.D.[3]; Steve J. Mooney, Ph.D.[4]; Andrew G. Rundle, Ph.D.[5]; Wilmot Sowa, M.P.H.[1]; Peter Stanich, M.D.[1]; Antoinette Stroup, Ph.D.[6]; Xinyi Xu, Ph.D.[1]
[1]Ohio State University, Columbus, Ohio, United States; [2]City of Hope, Duarte, California, United States; [3]Temple University, Philadelphia, Pennsylvania, United States; [4]University of Washington, Seattle, Washington, United States; [5]Columbia University, New York, New York, United States; [6]Rutgers The State University of New Jersey, New Brunswick, New Jersey, United States

Microscale built environment characteristics are modifiable factors related to the social environment and colorectal cancer (CRC) behavioral risks, but with limited evidence of associations with CRC outcomes. Similarly, there is limited evidence of the temporal dynamics – CRC case residential history, built environment temporal assessment feasibility, built environment temporal construct variation – underlying CRC and built environment measures. Accordingly and anticipating small effect estimates, we proposed to investigate associations between time-varying built environment factors and CRC outcomes through linkages with a populous state central cancer registry. Individual-level CRC case data will be from the New Jersey State Cancer Registry, including: race-ethnicity, geocoded residential history, stage at diagnosis, tumor grade, subsite, microsatellite instability status, *KRAS* testing status, first-course treatment, and vital status information. Eligibility were those diagnosed between 2014-2019 with their first, primary, histologically confirmed, invasive CRC, ages 20 years or older as a resident of urban areas of New Jersey. Census tract-level covariates calculated from administrative datasets include socioeconomic composition (Yost index), racial-ethnic residential segregation, and geographic healthcare access. Microscale built environment measures of walkability, neighborhood physical disorder, and engagement will be from virtual neighborhood audits of 100,000 streetscapes across study area locations and dates (“pre-diagnosis”: 2009-2019 and “post-diagnosis”: 2014-2023 [end of follow-up]). Stochastic spatio-temporal interpolation models (Universal Kriging) were validated and will be used to estimate built environment measures based on each CRC case’s residential history. We will test associations between built environment factors and stage at diagnosis, tumor grade, subsite, microsatellite instability status, and CRC survival time, adjusted for individual- and census tract-level covariates. We will also investigate the role of residential selective mobility on CRC survival; residential moves into health-adverse (-promoting) built environments based on worse (better) CRC outcomes at diagnosis. Results could motivate larger, more comprehensive studies of built environment factors and CRC outcomes, providing evidence for practice and policy relevant pathways to reducing CRC morbidity and mortality.