Title: Segregation, Colorectal Cancer, and Socioeconomic Mediators: A Structural Equation Modeling Approach

Background: Segregation and structural racism have been found to have significant impacts on colorectal cancer outcomes. We sought to clarify the mediating effects of socioeconomic factors on this interaction.

Methods: Data on colorectal cancer were obtained from SEER. We used principle component analysis and structural equation modeling to assess the mediating effects of county-level socioeconomic and demographic variables between racial residential segregation, as measured by the index of dissimilarity, and colorectal cancer outcomes of interest (Figure 1). Outcomes of interest included advanced stage at diagnosis (AJCC stage IV), surgery for localized disease (AJCC stage I/II) and cancer-specific mortality. Principle components included 1. Poverty and need for government services (PC1), 2. income and housing measures (PC2), and 3. black share of the population (PC3).

Results: For advanced stage at diagnosis, the principle pathways went directly through segregation (coefficient 0.20, p<0.001) and PC2 (coefficient 0.02, p=0.003). The indirect pathways from segregation through PC1 (coefficient -0.015, p<0.001), PC2 (coefficient 0.014, p<0.001) and PC3 (coefficient 0.015, p=0.012) were significant for surgical resection. For cancer-specific mortality, PC1 (coefficient 0.07, p<0.001) and PC3 (coefficient 0.08, p=0.003) were the two significant pathways.

Conclusion: Taken together, these results demonstrate the black-white disparities in colorectal cancer can be explained by segregation and the downstream socioeconomic factors that have resulted from this government-complicit practice. Solutions to these disparities will need to come from changes to urban and health policy.
Figure 1: