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Using a Data-Driven Approach to Define Priority Areas for Mobile Cancer Screening

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1. Background

Mobile screening units (MSUs) are an evidence-based approach known to reduce barriers and increase access to preventive services such as cancer screening. However, less is known about how to plan and prioritize where MSUs are deployed to maximize impact and reduce the burden of disease. Here, we developed a geographically informed index to rank and prioritize census tracts for cancer screening, thereby creating a scoring metric for deploying the MSU across our 7-county cancer center catchment area which currently includes Philadelphia, Delaware, Montgomery, and Bucks County in Pennsylvania and Camden, Burlington, and Gloucester County in New Jersey.

2. Goals

We aim to use recent national mortality data to demonstrate the geographical disparity of major cancer mortality rates in the US and its shift compared to previous data.

3. Solutions and Methods

We utilized cancer-relevant publicly available data reported at the census tract, prioritizing data that were most likely to be associated with disparities in cancer screening, prevalence, or outcomes. This included data from the Social Vulnerability Index (socioeconomic status, percent of residents without health insurance, percent of residents reporting minority race or ethnicity, percent renting their housing, and percent with no transportation) as well as data from the Centers for Disease Control and Prevention (CDC) Places (percent screened for breast cancer, cervical cancer, and colon cancer). Data was transformed from CDC Places to be percentage in need of breast cancer, cervical cancer, and colon screening rather than percentage screened. To construct the index, each of the variables was ranked from highest to lowest across all census tracts in Pennsylvania and New Jersey with a non-zero population (n=1,184). A percentile rank was then calculated for each census tract over each of these variables. Finally, an overall percentile rank for each tract was calculated. Index scores range from 0.000000 (low priority for cancer screening) to 1.000000 (high priority for cancer screening).

4. Outcomes

Developing standardized, data-driven approaches to deploy MSUs is an important mechanism to prioritize the resources needed for these efforts and increase overall impact. Future studies include validation studies utilizing cancer disparities data in our catchment area and creating disease specific index scores to use with cancer specific screening initiatives.

5. Lessons Learned and Future Directions

Creating a visualization of a composite score for cancer risk assessment can be challenging, as many decisions, such as whether to weight variables, need to be addressed. It is also challenging to validate these novel risk assessment tools. Future directions include refining the tool to achieve maximum success in identifying priority neighborhoods for screening, as well as using the graphical representation of neighborhood risk as an evaluation tool for mobile screening success.

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