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Leveraging Geospatial Data to Support an Implementation Science Approach to Address Lung Cancer Burden

T. DeBois, A. Brecher, D. Edmunson, E. Gonzalez, C. Zeigler-Johnson, L. Fleisher, S. Lynch

Fox Chase Cancer Center, Temple Health

1. Background
The lung cancer mortality rate in Philadelphia is 16 percent higher than the national rate. Cigarette smoking is a major risk factor for lung cancer, and smoking rates can be more than double the national average in some Philadelphia neighborhoods. Thus, both screening and smoking cessation efforts are paramount to improving the lung cancer burden in this area. To support prevention efforts, Fox Chase Cancer Center operates a comprehensive Tobacco Treatment Program (TTP) that employs an Implementation Science (IS) approach and provides over 1,000 individuals with various therapeutic strategies to support smoking cessation. To maximize often limited resources and support a precision public health approach to lung cancer prevention, we have begun to introduce geospatial analyses into the implementation and evaluation of our TTP.

2. Goals
Using TTP as a case study, here we introduce for the first time how the existing IS Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework can be adapted and improved with the incorporation of geospatial data and analyses.

3. Solutions and Methods
We define each element of RE-AIM in terms of a geospatial question and corresponding analysis, including visualization of mortality rates, TTP participants, clinics, community partners, and built environment, including smoking rates and location of tobacco retailers, by smaller Philadelphia neighborhoods.

4. Outcomes
Each dimension of the newly adapted geospatial RE-AIM framework results in a map that can help identify 1) target areas for intervention (Reach), 2) the degree to which the program is serving those areas (Effectiveness), 3) opportunities for partnership to support delivery (Adoption), 4) contextual factors influencing how the intervention is best delivered (Implementation), and 5) strategies for long-term integration of the intervention (Maintenance) (see Figure).

5. Lessons Learned and Future Directions
Our adapted approach is novel and can utilized by cancer centers as a framework to link together behavioral, implementation, health disparities, and catchment area research. Further, it has aided in enhancing the evaluation of clinical programming in the context of catchment area disparities.

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