A Health Impact Assessment of Targeted Tree Planting in Ann Arbor, Michigan and Identification of Neighborhoods Vulnerable to Climate Change

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Purpose

- Conduct Health Impact Assessment (HIA) to examine health and psychosocial benefits associated with targeting tree plantings to residential areas where there are both low canopy and populations highly vulnerable to extreme heat events.
- Inform the City of Ann Arbor’s Urban Forestry Management Plan (AA-UFCMP) regarding priority tree planting.

Objectives:

1. Identify health outcomes associated with tree canopy.
2. Determine spatial distributions of highly vulnerable populations in Ann Arbor in neighborhoods with low tree canopy.
3. Develop recommendations to prioritize tree plantings in these neighborhoods.

Research Questions:

- Are vulnerable populations living in neighborhoods with low tree canopy?
- Are neighborhoods with low tree canopy at risk for higher rates of heat-related illnesses such as, asthma, COPD, diabetes, hypertension, and mental distress?

Methods

1. Determine demographic measures of age and poverty by block level to identify neighborhoods likely to be vulnerable to adverse health effects of heat events.
2. Obtain Urban Tree Canopy (UTC) analysis to identify low canopy residential areas.
3. Conduct screening with HIA Steering Committee and residents to identify priority health outcomes.
4. Review literature for health outcomes associated with tree canopy and demographic risk factors for community priority health outcomes.
5. Determine community baseline health status using existing prevalence and surveillance data for Ann Arbor and Washtenaw County.
6. Create map overlays to identify areas with low tree canopy, high heat vulnerability, and high vulnerability to priority health outcomes.

Definitions & Data Sources:

- Priority Health Outcomes: Asthma, Chronic Obstructive Pulmonary Disease (COPD), Diabetes, Hypertension, Mental Distress, Obesity; 2009–11 MI Behavioral Risk Factor Survey (MI BRFSS), 2010 MI Inpatient Data Base (MIDB); 2010 Washtenaw County Health Improvement Plan (HIP)
- Low Tree Canopy: Defined by the City of Ann Arbor as <30% residential surface area covered by tree leaves and branches when viewed from above; Shapeline from Midwest UTC Project
- Health Outcome Vulnerability: See definitions in Table 1; from 2010 US Census

Results

- Figure 1: Residential Areas with <30% Tree Canopy & Vulnerable to COPD
- Figure 2: Residential Areas with <30% Tree Canopy & Vulnerable to Hypertension
- Figure 3: Residential Areas with <30% Tree Canopy & Vulnerable to Diabetes
- Figure 4: Residential Areas with <30% Tree Canopy & Vulnerable to Asthma
- Figure 5: Residential Areas with <30% Tree Canopy & Vulnerable to Obesity
- Figure 6: Residential Areas with <30% Tree Canopy & Vulnerable to Mental Distress

Discussion

- Mapping vulnerability for individual health outcomes revealed differences among neighborhoods.
- Demographic risk factors for health outcomes often co-located in same neighborhoods.
- Areas which appear vulnerable to several health outcomes, we recommend that these highly vulnerable areas be prioritized for tree planting by the city’s Urban Forestry program.

Next Steps:

1. HIA review by City of Ann Arbor urban planners before submission to decision makers (e.g. Ann Arbor City Council, Mayor).
2. Disseminate results to stakeholders, urban forestry groups, etc.
3. Collaborate with City of Ann Arbor to engage community regarding HIA results and recommendations.

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3 http://www.zrn.org/governmentpublicservicehealthenvironment/healthicity/Project/LocalTree_CanopyAnalysis.asp