Expanding Urban Tree Canopy as a Community Health Climate Adaptation Strategy

A Health Impact Assessment of the Ann Arbor Urban & Community Forest Management Plan

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Health Impact Assessment

• Tool to incorporate health into community planning & decision-making

• Judges the potential effects of a policy, plan, or project on health

• Quantify health risk/benefit to population

• Considers health disparities & engages stakeholders
STEPS OF HIA

1) **Screening** – Determine need and value of a HIA

2) **Scoping** – Determine which health impacts to evaluate, methods for analysis, and workplan

3) **Assessment** – Profile existing health conditions; Evaluate potential health impacts

4) **Recommendations** – Provide strategies to manage identified adverse health impacts

5) **Reporting** – Develop HIA report; Communicate findings & recommendations

6) **Monitoring** – Track impacts on decision-making processes, the decision, and impacts of the decision on health determinants
Purpose: Examine potential health and psychosocial outcomes associated with targeting tree planting opportunities in residential areas of Ann Arbor with low tree canopy and populations vulnerable both directly to extreme heat events and to health conditions affected by heat and tree canopy.

Objective: Identify low tree canopy neighborhoods that were most vulnerable to adverse health outcomes associated with very hot weather because of the neighborhood’s high risk for selected health conditions.
Benefits of Urban Forest

As an Extreme Heat Adaptation Strategy:

• Reduce the urban heat island effect

• Reduce risk of heat-related morbidity & mortality

• Decrease ground-level ozone
Why would an HIA be valuable?

- Links between tree canopy and health are clear.
- Plans have been proposed, but decisions/opportunities to inform planting strategies can be made.
- Interest from community and other stakeholders in Ann Arbor that health is considered in the forestry planning process.
- Resources from CDC/MDCH were available to conduct a HIA.
- Lack of time constraints – findings could be submitted as a comment to the forestry plan and to decision makers.
Scoping

• **HIA Advisory Committee Meeting**
  - Identified potential health issues, behaviors that contribute, policies that influence behaviors, and data sources
  - Identified Intermediary Impacts (Ex: physical activity, improved air quality, decreased crime)

• **Survey conducted to rank 6 most important health outcomes.**
Pathway Diagram Illustrating the Relationship of Heat, Tree Canopy & Population Risk Factors on the Priority Health Outcomes & Intermediate Factors

- **Risk Factors**
  - Age
  - Education
  - Income

- **Heat Stress**

- **Health Outcomes**
  - Asthma
  - COPD
  - Diabetes
  - Hypertension
  - Mental distress
  - Obesity

- **Intermediate Factors**
  - Air pollution
  - Crime
  - Lack of Physical Activity

- **Heat**

- **Tree Canopy**
**Data Sources & Literature**

- Washtenaw County Health Improvement Plan (HIP)
- Healthcare Cost & Utilization Project (HCUP)
- Michigan Incident Crime Reporting (MICR)
- Michigan Inpatient Database (MIDB)
- U.S. Census
- Review of Peer Reviewed Literature & Research
- Michigan Behavioral Risk Factor Surveillance Survey (MiBRFSS)

<table>
<thead>
<tr>
<th>Health Outcome</th>
<th>Causal factors affecting improved health outcomes</th>
<th>Epidemiologic data quality/quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>-Indirectly through reduced air pollution and stress reduction</td>
<td>Good/moderate</td>
</tr>
<tr>
<td>COPD</td>
<td>-Directly via temperature reduction. -Indirectly via effect of tree canopy on air pollution</td>
<td>Good/Very sparse</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-Indirectly via increased physical activity, weight reduction</td>
<td>Good/Sparse</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-Directly via temperature reduction. -Indirect via physical activity, stress reduction</td>
<td>Good/Sparse</td>
</tr>
<tr>
<td>Mental distress/stress</td>
<td>- Directly via temperature reduction. -Indirectly via physical activity</td>
<td>Good/Moderate</td>
</tr>
<tr>
<td>Obesity</td>
<td>-Indirect via physical activity</td>
<td>Very good/Very good</td>
</tr>
</tbody>
</table>
Conducted a spatial analysis to determine where an increase in tree canopy would be the most beneficial to residents’ health.

Examine socioeconomic and demographic characteristics of residential areas, and the amount of tree canopy cover in those areas to determine where an increase in tree canopy would be the most beneficial to residents’ health.

- Demographic / socioeconomic data- ACS, 2005-2009, 5-year estimates
- Residential areas shapefile- City of Ann Arbor's Data Catalog
- Tree canopy shapefile- Midwest Urban Tree Canopy (UTC) Project
Method for Assessing Heat Vulnerable Neighborhoods

1. Define Ann Arbor residential areas

2. Identify residential areas with low tree canopy

3. Review relationship of priority health outcomes to heat and to tree canopy

4. Identify high risk populations: demographic factors predictive of high risk (BRFS, HIP)

5. Determine neighborhoods vulnerable to each health outcome – high risk and low tree canopy

6. Prioritize neighborhoods with multiple vulnerabilities
Identification of Highly Vulnerable Residential Areas for Each Priority Health Outcome
Identification of Highly Vulnerable Residential Areas for Each Priority Health Outcome
Neighborhoods with <30% Tree Canopy & Increased Vulnerability to ≥3 Adverse Outcomes
Recommendations

• Ann Arbor consider 6 residential areas as priority areas for targeted tree planting.
• Conduct a windshield or walking survey in priority neighborhoods to identify specific locations to plant trees.

Next steps….
• Collaborate with City of Ann Arbor to engage community regarding HIA results and recommendations.
• Annual monitoring review of forestry program impact.
Questions?

Thank you

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