Urban Nearby Nature and Health Care Savings: An Overview

Kathleen Wolf, Ph.D.
Research Social Scientist

University of Washington (Seattle)
School of Environmental and Forest Sciences

USFS Pacific Northwest Research Station

EDRA 48 Madison
3 June 2017
primary action plan
research supplement

value of research
to U&CF growth
Research Needs Framework

A  Understand Ecosystem/Ecological Services
B  Promote Human and Community Health
C  Planting, Inventory, and Analysis for Forest and Environmental Health
D  Prepare for Pests, Threats, Climate and Associated Changes and Risks
E  Enable Civic Stewardship and Improved Local Governance
F  Integrate Knowledge Networks and Data for Urban Socio-Ecological Systems
Outline

- nearby nature health benefits
- economic valuation process & results
- outreach products
WHO Health Definition

A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (1946)
Social Determinants
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
USDA Forest Service, U&CF Program
University of Washington
NGO partners

Thanks!
to U of WA students:
Katrina Flora
Mary Ann Rozance
Sarah Krueger

Research Reviews & Summaries
Local Economics

Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums. Then, it shows how nonmarket valuations can support local decision-making.

Fast Facts

- The presence of larger trees in yards and as street trees can add from 3% to 15% to home values throughout neighborhoods.

- Averaging the market effect of street trees on all house values across Portland, Oregon yields a total value of $1.35 billion, potentially increasing annual property tax revenues $15.3 million.

- A study found 7% higher rental rates for commercial offices having high quality landscapes.

- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.

- Shoppers indicate that they will travel greater distance and a longer time to visit a district having high quality trees, and spend more time there once they arrive.
Green Cities: Good Health
database of >4,000 peer reviewed publications
Outline

nearby nature health benefits

economic valuation process & results

outreach products
Analysis Process

- scale of individual to community
  - screen for benefits
- urban forestry, parks, gardens, etc.
  - green condition
- market & non-market
  - valuation strategy
process #1: screen for benefits
Metro Nature & Health Evidence Framework

Synthesis of 40 years of peer-reviewed literature

Discovery: Human Health Benefits Across the Life Cycle
Nearby nature experiences are important across the entire life cycle, from cradle to grave.

Contributing analysts:
Dr. Stephen Grado & Marcus Measells, MSU; Dr. Alicia Robbins, Weyerhaueser
process #2: understand green condition
Landscape

Community

Garden

credit: Ignacio Bunster-Ossa
Diversity in Metro Nature

Nearby Nature includes a variety of spaces and places:

- Urban Forest Canopy
- Biophilic Design
- Parks and Gardens
- Green Stormwater Infrastructure
Stormwater Ecosystem Services

green infrastructure

goal: co-design for co-benefits

Image courtesy of the Center for Urban Forest Research
stormwater management
Thornton Creek Water Quality Channel (Seattle, SvR Design)
1 hectare, treats runoff from 275 hectares (1 hectare = 2.47 acres)
economic & health co-benefits
Tanner Springs Park
Portland OR
linked to active living network
process #3: apply valuation strategy
Valuation Sources

Benefit x Nature x Health Outcome

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Metro Nature</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn Birth Weight</td>
<td>increased tree canopy cover near mothers' homes</td>
<td>fewer small for gestational age babies</td>
</tr>
<tr>
<td>Attention Deficit Hyperactivity Disorder</td>
<td>greener play areas vs built outdoor or indoor settings</td>
<td>reduced symptoms potentially reducing medication</td>
</tr>
<tr>
<td>School Performance</td>
<td>green views from classrooms and cafeteria</td>
<td>reduced dropout rate - average annual income</td>
</tr>
<tr>
<td>Crime Reduction</td>
<td>trees and lawn in outdoor common areas</td>
<td>reduced violent and non-violent incidence and costs</td>
</tr>
<tr>
<td>Cardiovascular Disease</td>
<td>presence of residential tree canopy</td>
<td>reduced incidence or severity of cardiovascular disease</td>
</tr>
<tr>
<td>Alzheimer’s Disease</td>
<td>wander garden in care facility</td>
<td>reduced medications for patients</td>
</tr>
</tbody>
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Valuation Strategies
Benefits Transfer approaches

- factor income
- avoided or replacement cost
- burden of illness
- hedonic pricing
- stated preference/contingent valuation
- revealed preference (e.g., travel cost)
- quality adjusted life years
- benefit/cost
What is the Value?
Analysis Process

- scale of individual to community
  - screen for benefits

- green condition
  - urban forestry, parks, gardens, etc.

- market & non-market valuation strategy

<table>
<thead>
<tr>
<th>Benefit (geographic scope)</th>
<th>Minimum ($)</th>
<th>Maximum ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn Health (U.S.)</td>
<td>5.3</td>
<td>5.3</td>
</tr>
<tr>
<td>Attention Deficit Hyperactivity Disorder (U.S.)</td>
<td>383.5</td>
<td>1,917.7</td>
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<tr>
<td>Schools (U.S.)</td>
<td>20.4</td>
<td>1,262.9</td>
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<tr>
<td>Crime (U.S.)</td>
<td>340.6</td>
<td>899.4</td>
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<tr>
<td>Cardiovascular Disease (U.K., U.S.)</td>
<td>1,220.0</td>
<td>1,220.0</td>
</tr>
<tr>
<td>Alzheimer's Disease (U.S.)</td>
<td>724.6</td>
<td>1,449.2</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>2,694.4</strong></td>
<td><strong>6,754.5</strong></td>
</tr>
</tbody>
</table>
Change in % Population on ADHD Treatments
2001 - 2010

America’s State of Mind, Medco Health Solutions, Inc
% of Americans Ages 20-44 on ADHD Meds  
2001 - 2010

America’s State of Mind, Medco Health Solutions, Inc
ADHD and nature contact

- 17 children aged 7-12 with diagnosed ADHD
- 20-minute guided walks
  - Park
  - Neighborhood
  - Downtown
- Pre-walk puzzles
- Post-walk cognitive test

Faber Taylor & Kuo. 2009. *Journal of Attention Disorders*
ADHD and nature contact

- 96 children aged 7-12 diagnosed ADD or ADHD
- Parents gave postactivity attentional functioning ratings (PAAF) – 4 measures:
  - Can’t stay focused on unappealing tasks (homework or chores)
  - Can’t complete tasks
  - Can’t listen and follow directions
  - Easily distracted

Faber Taylor. 2001. Environment & Behavior
% of U.S. Population Using Mental Health Medications

2001 vs 2010

America’s State of Mind, Medco Health Solutions, Inc
Green Streets for Walkability

evidence of lower frustration and higher meditation when moving into the greener streets

Aspinall et al. 2013. The Urban Brain: Analysing Outdoor Physical Activity with Mobile EEG. British Journal of Sports Medicine
Improving Depression

20 adults with major depression walk in a park setting and an urban setting

- 50-minute walks one week apart
- before-after testing:
  - Mood: Positive and Negative Affect (PANAS)
  - Cognition: Backward Digit Span (BDS)

cognitive and affective improvements after walking in a nature setting

Berman et al. 2012. *Journal of Affective Disorders*
Alzheimer’s Disease & Dementia
Provide wander gardens & horticulture therapy

- 10.5% reduction in amount of medications used in dementia facility
- 30% fewer falls, accompanied by a reduction in fall severity

Detweiler et al. 2009. American Journal of Alzheimer’s Disease and Other Dementias

www.rph.org/eden.html
Kathleen L. Wolf, Ph.D.

design:

printing:

The Nature Conservancy

milepost
Nearby nature experiences are important across the entire life cycle, from cradle to grave.

Contributing analysts: Dr. Stephen Grado & Marcus Measells, MSU; Dr. Alicia Robbins, Weyerhaueser
annual value of $11.7 billion U.S. (2015 dollars)

• cradle to grave human life cycle
• varied expressions of urban greening (metro nature)
• evidence based human health and wellness benefits
• just beginning the analysis!
Publications

- Green Cities, Good Health web site. A resource to learn more about nearby nature in cities and human health.

* Research and publications were funded in part by the U.S.D.A. Forest Service, National Urban and Community Forestry program, as recommended by the National Urban and Community Forestry Advisory Council (NUCFAC).
Summary

• evidence-based human health & wellness benefits
• economic consequences!
• market & non-market valuations
• first efforts – promising!
• sector messaging about nature & health
Lifecycle :: disease & illness

Cumulative U.S. DALYs for the Leading Disease/Disorder Categories by Age (2010)

Disability Adjusted Life Year

Data courtesy of WHO
**Avoided Costs Potential?**

Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples' perceptions and behaviors regarding nature in cities

What's New?

Nature and Consumer Environments
Research about how the urban forest influences business district visitors.

Trees and Transportation
Studies on the value of having quality landscapes in urban roadsides.

Civic Ecology
Studies of human behaviors and benefits when people are active in the environment.

Policy and Planning
Integrating urban greening science with community change.

Urban Forestry and Human Benefits
More resources, studies and links...

Green Cities: Good Health
human health & well-being research

Projects Director
Kathleen L. Wolf, Ph.D.