Nearby Nature for Human Health & Wellness - What Do We Know?

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29 March 2017
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 + Pacific NW Research)
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.
Outside Our Doors

The benefits of cities where people and nature thrive.

Design: milepost

Co-author

Co-author & printing: The Nature Conservancy
Evidence-based ‘Story’

Health across the Human Life Cycle
‘Cradle to Grave’
Discovery: Human Health Benefits Across the Life Cycle
Urban Forests and Newborns

the natural environment may affect pregnancy outcomes . . .

10% increase in tree-canopy cover within 50m of a house = lower number of low weight births (1.42 per 1000 births)

*Donovan et al., Health & Place 2011; Hystad et al., Env Health Perspectives 2014*
Hygiene Hypothesis

- presence of soil bacteria in body, *Mycobacterium vaccae* = increased serotonin
- boost immune function
- may alleviate depression (dirt or Prozac?)

Lowry et al. 2007. Neuroscience
Eat Dirt!
ADHD Treatments
Change in % Population
2001 - 2010

America’s State of Mind, Medco Health Solutions, Inc
ADHD Meds
% of Americans Ages 20-44
2001 - 2010
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*
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
CDC moderate activity recommendations

parks, active living, active transit
Shinrin yoku (forest bathing)

- extensive research
- restorative experiences
- workers retirees
- networked system, 52 bases in Japan
So What?

*nature-based programs for people of all ages!*
Fiddleneck Forest School
Washington Park Arboretum (Seattle)

cognitive
social & physical learning
Walking Programs

children
elders
families
Parks Prescription

DATE: __________________________

DR: __________________________

NAME: _________________________

I recommend:

☐ Walking
☐ Other: _______________________

______________ minutes a day

______________ days per week

* Health Canada suggests moderate activity of 30 minutes per day | 5 days a week

Benefits of daily activity
• Improve overall physical and mental health
• Maintain a healthy weight
• Reduce the risk of diabetes and other chronic conditions
• Lower cholesterol levels
• Manage stress and anxiety

Signature: ______________________

DOCTORS OF BC
Parks Prescription

1. Get a prescription for ParksRx from your healthcare provider.
2. Visit www.REACHforbetterhealth.com
3. Enter your zip code
4. Click

Pick your park

Exercise in the park and share outcomes with your healthcare provider.

PARKS Rx
Your Prescription For Better Health

This information is provided for educational purposes and is not to be considered medical advice.

www.REACHforbetterhealth.com/ParksRx
Made possible with funding from the Centers for Disease Control and Prevention.
Biophilic Design

integrated nature & architecture

credit: Progressive Times
Other Studies

continuing . . . .

the relationship of

nearby nature & wellness

across the human life cycle
Lifecycle :: disease & illness

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

Disability Adjusted Life Year
Physical Activity & Depression Reduction

Review of 13 high quality studies

- exercise recommended for mild to moderate depression
- people who are willing & motivated
- associated meditation and mindfulness are important

Physical Exercise Intervention in Depressive Disorders.
Scandinavian Journal of Medicine & Science in Sports
Improving Depression

20 adults with major depression walk in a park setting and a built setting

- 50-minute walks one week apart

before-after testing:

- Mood: Positive and Negative Affect (PANAS)
- Cognition: Backward Digit Span (BDS)

Berman et al. 2012. Journal of Affective Disorders

cognitive and affective improvements after walking in a nature setting
Experience the restorative powers of nature and join us for Strolls for Well-Being, a free 10-week program offered at Bloedel Reserve. If not already a member, participants are given a temporary membership to

**DAY-USE STROLLS:**
Since introducing the Strolls for Well-Being program in 2014, hundreds of people have benefited from the healing effects of nature.
Nature and Creativity

http://www.jimkukral.com/
role of nature in creativity development

http://daycare.sulekha.com
Nature & Creative Professionals

focused interviews, Denmark
makes us more curious
supports flexible thinking
recharges directed-attention

aids 2 phases of the creative process: Preparation phase and Incubation phase
sensory dimensions: space & serene

Plambech & Konijnendijk van den Bosch. 2015.
Urban Forestry & Urban Greening

www.concur.com
Walking Meetings

creativity, energy, communication, health
Mind Full, or Mindful?
constant busyness

attempted multi-tasking

‘out of balance’

Anna and Elena Balbusso, NY Times
Mindfulness/Meditation Training

• healthy workplace employees
• 8 week mindfulness training

Results

• brain electrical activity – positive affect
• brain activation – reduced stress event response
• more antibodies after influenza vaccine = better immune function

Davidson et al. 2003. Alterations in Brain and Immune Function Produced by Mindfulness Meditation. Psychosomatic Medicine
Nature and Mindfulness

focus
soft fascination
undirected attention

Attention Restoration Theory, Kapan & Kaplan

credit: Michael Hellgren
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
Summary:
Knowledge to Practice

• nearly 40 years of research re: nearby nature & human health
• critical mass of evidence – then what?
• greening or health programming
• opportunities for expanded partnerships & collaborations
New Work

the ‘so what?’
as a scientist
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!
Nearby nature experiences are important across the entire life cycle, from cradle to grave.

<table>
<thead>
<tr>
<th>INFANTS</th>
<th>CHILDREN &amp; TEENS</th>
<th>ADULTS</th>
<th>OLDER ADULTS</th>
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<tbody>
<tr>
<td><strong>BIRTH WEIGHT</strong></td>
<td><strong>OVERALL HEALTH AND WELL-BEING</strong></td>
<td><strong>DEPRESSION AND STRESS</strong></td>
<td><strong>MOBILITY &amp; QUALITY OF LIFE</strong></td>
</tr>
<tr>
<td>Potential economic value: $5,875 savings on annual health care costs.</td>
<td>Increased physical activity, reduced asthma or leading cause of emergency department visits, hospitalizations and missed school days.</td>
<td>Reduced frustration, mental distress and depression disorders, and improves body image, self-esteem and life satisfaction.</td>
<td>Potential economic value: $1,430 savings on health care costs from falls per year.</td>
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<td>Birth weight influences long-term childhood health and development, and has been linked to some adult diseases. Low birth weight is associated with both short- and long-term health care costs, such as longer hospital stays and increased illness. Pregnant women who have more trees, canopy and green space near their homes generally have babies with healthier birth weights.</td>
<td>Requires conditions in a child’s surroundings can cause both immediate and ongoing health impacts. Nature is a positive influence, playing in nature helps children develop learning, social, and emotional skills that improve both health and life achievement. Green spaces close to the child’s homes and backyards give them space for outdoor activities and help them be more active.</td>
<td>Body highly scheduled lifestyles take their toll. Nature experiences reduce stress. Nearly 15% of adults experience major depression each year in the U.S., and mental, behavioral, and nonpsychiatric disorders are a leading cause of disability. Nature experiences support people and emotions for improved mental health, mood, and life functions. Improved mental health and function reduce disease treatment costs, and improve overall productivity.</td>
<td>One in three older adults falls each year, giving rise to fatal and nonfatal injuries. Residences/falls within older care facilities are particularly expensive medical situations. Being out in nature maintains personal mobility, leading to reduced falls and reduced need for medications. Further, those who are actually involved are more likely to be self-sufficient, maintaining nature walking activities that promote social interactions support positive lifestyles and quality of life.</td>
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<td><strong>IMMUNE FUNCTION</strong></td>
<td><strong>ADHD</strong></td>
<td><strong>CARdiovascular disease</strong></td>
<td><strong>HypERTENSION</strong></td>
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<tr>
<td>Environmental influences lead to reduced illness and chronic disease across a lifetime.</td>
<td>Attention deficit hyperactivity disorder (ADHD) in the U.S. Nature exposure is a potential alternative treatment, studies show that activity within nature or green spaces, such as play or just 20 minutes of walking, can reduce symptoms.</td>
<td>Cardiovascular disease is the leading cause of premature death in the U.S. People show slightly reduced risk of CVD if their neighborhoods have greater nature coverage (particularly tree canopy), however, it is worth noting that many studies have foci on urban.</td>
<td>Hypertension or high blood pressure is one of the five most common conditions impacting older adults. Views of nature, particularly forests, and &quot;forest bathing&quot; (mental walks in natural forest settings) decreases diastolic rates.</td>
</tr>
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<td><strong>FAMILY DYNAMICS</strong></td>
<td><strong>FUTURE FINANCIAL SUCCESS</strong></td>
<td><strong>CRIME &amp; SAFETY</strong></td>
<td><strong>COGNITIVE DISORDERS</strong></td>
</tr>
<tr>
<td>Improved family dynamics, perhaps reducing mental health treatment and counseling services. How an infant’s parents and siblings adjust their lives after a baby arrive, and the changes can bring on stress and anxiety. Nature walks and wilderness help reduce stress conditions and improves interactions among those in the household.</td>
<td>opener economic value: $1,840 increase in high school graduates’ lifelong annual income.</td>
<td>opener economic value: $271,040 reduced costs of crime for victims and property owners per year.</td>
<td>opener economic value: $1,250 annual savings on medical services, not counting the value of home caregiver services.</td>
</tr>
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<td><strong>Note:</strong> All economic values are in 2015 U.S. dollars, and are potential annual savings across the entire U.S.</td>
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Research about nature benefits and economic value is fairly new. Some of the quantified health benefits of nature in cities are easier to convert to economic value than others. Here are some preliminary valuations estimated for the entire U.S. on an annual basis.

**contributing analysts:**
Dr. Stephen Grado & Marcus Measells, MSU; Dr. Alicia Robbins, Weyerhaueser
urban tree canopy + understory vegetation for human habitat

school yard landscapes
Remote Sensing-LIDAR

Remote Sensing-LIDAR

LiDAR response to built versus vegetative surfaces.
credit: Qian-Yi Zhou, Stanford University
Vegetation Assessment Explorations

oblique aerial view

LIDAR point cloud
Vegetation Assessment Explorations

ground view

LIDAR point cloud
Human Dimensions of Urban Forestry and Urban Greening

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.

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

Projects Director
Kathleen L. Wolf, Ph.D.

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www.naturewithin.info