Nature & Human Health
Implications for Seattle’s Urban Forest

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City of Seattle, UFC/IDT Workshop
3 October 2018
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 of Health

- General socio-economic, cultural and environmental conditions
  - Living and working conditions
  - Unemployment
- Social and community networks
  - Education
  - Work environment
  - Agriculture and food production
- Individual lifestyle factors
  - Age, sex & hereditary factors
  - Water sanitation
  - Health care services
  - Housing
Outline

1. City Trees & Health: the evidence
2. Nearby Nature & Health: the evidence
3. Program Translations
4. UF Planning/Design
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
Trees & Physical Activity

- school children in cities grades 6 to 8
- relationship of tree cover to outside-of-school physical activity
- 5% increase in treed area cover = 5% increase in free-time physical activity

Sacramento Study :: LIDAR x CHIS data
7,900 adults, 250 m buffer, covariates

more tree cover
= better overall health
= better social cohesion

EAB Tree Loss & Public Health

1990 to 2007, 1,296 counties in 15 states infected areas vs. no bugs
15,000 more deaths from cardiovascular disease
6,000 more deaths from lower respiratory disease
controlled for demographic, human mortality, and forest health data at the county level

Toledo, Ohio in 2006, pre EAB

2009, EAB in neighborhood

photo credits: Dan Herms, Ohio State U
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)

cognitive and affective improvements after walking in a nature setting

Berman et al. 2012. Journal of Affective Disorders
City Trees & Human Health

newborn & infant health
increased physical activity for kids
overall adult health
social cohesion
respiratory & cardiovascular health
reduced depression
City Trees and Human Health: A Systematic Review

**Purpose:** carefully collect and synthesize the peer-reviewed evidence concerning city trees and human health

**Sponsors:**

[Logos of sponsoring organizations]
Project Team

- Kathleen Wolf, Ph.D., University of Washington
- Sharon Lam, MSc, University of Toronto
- Jennifer McKeen, MPH, Simon Fraser University
- Gregory Richardson, MUP, Health Canada
- Matilda Van Den Bosch, M.D, University of British Columbia
- Adrina Bardekkian, Ph.D., Tree Canada
Methods

Keyword search (n=1644)

Abstract review (n=436)

Quality assessment (n=198)

Final article set (n=182)

Synthesize and present findings
Greenspace & Health Pathways

Literature Review – City Trees & Human Health

USDA Forest Service, U of WA, Health Canada, Natural Resources Canada, Tree Fund

182 peer-reviewed articles

figure credit: Sharon Lam
Limitations of Evidence

- heterogeneity of study methods, few experiments
- heterogeneity of tree or forest interventions
- lack of replication
- did not include qualitative studies
- thus, not able to conclusively state outcomes
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Metro Nature & Human Health

Nearby nature includes a variety of spaces and places.

Urban Forest Canopy

Biophilic Design

Parks and Gardens

Green Stormwater Infrastructure

Image by MIG / SVR
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.\textsuperscript{1,2} 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.\textsuperscript{9}
- A study found 7\% higher rental rates for commercial offices having high quality landscapes.\textsuperscript{14}
- Shoppers claim that they will spend 9\% to 12\% more for goods and services in central business districts having high quality tree canopy.\textsuperscript{34}
- 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.\textsuperscript{34}
Science Review

nearby nature & health evidence
> 40 years
> 5,000 publications

what are the ‘stories’?
Green Cities: Good Health
database of >4,500 peer reviewed publications

- Safe Streets
- Crime and Fear
- Work and Learning
- Place Attachment & Meaning
- Community Economics
- Community & Social Ties
- Wellness and Physiology
- Culture and Equity
- Healing and Therapy
- Reduced Risk
- Mental Health and Function
- Lifecycle and Gender
- Active Living

% peer reviewed publications of entire collection
Outside Our Doors

The benefits of cities where people and nature thrive.

design: milepost

co-author:

co-author & printing:

The Nature Conservancy
Introduction

Writers, philosophers, and naturalists have praised the benefits of nature for human health, happiness, and well-being for centuries, but only relatively recently have researchers begun studying and quantifying the complex relationship between human health and nature.

In 1984, Roger Ulrich, professor and director of the Center for Health Systems and Design at Texas A&M University, published the results of a pioneering study that looked at the recovery rates of gall bladder surgery patients in relation to the view from their rooms in a Texas hospital. Some of the patients looked out over a garden and grove of trees, while others had a view of a brick wall. Ulrich found that patients with a natural view spent fewer days in the hospital and used fewer pain medications (Ulrich 1984).

Ulrich’s study helped open the door to a new field of inquiry focused on illuminating the ways that nature influences our physical, mental, and social lives. More than three decades later, a broad and diverse body of scientific literature describes the health value of nature, confirming that trees, parks, gardens, and other natural settings are essential to livable and sustainable cities as the other critical systems that keep their residents moving and working.

Findings from the current literature indicate the wide range of effects.
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Story: Human Health Benefits Across the Life Cycle
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*
Hygiene Hypothesis

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

Lowry et al. 2007. Neuroscience
Eat Dirt!
Fiddleheads Forest School
Washington Park Arboretum (Seattle)
cognitive
social &
physical learning
CDC moderate activity recommendations

parks, active living, active transit
Parks Prescription

Rx for Health

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: ________________
Parks Prescription

1. Get a prescription for ParksRx from your healthcare provider.

2. Visit www.REACHforbetterhealth.com
   2. Enter your zip code
   3. Click

3. Pick your park

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

PARKS Rx
Your Prescription For Better Health

www.REACHforbetterhealth.com/ParksRx
Made possible with funding from the Centers for Disease Control and Prevention.
Shinrin yoku (forest bathing)

- extensive research
- restorative experiences
- workers retirees
- networked system, 52 bases in Japan
The medicine of being in the forest

We are the leading global voice for forest bathing and forest therapy

Santa Rosa, California
Green Streets for Walkability

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

A PLACE TO MEND HEARTS & HEAL MINDS

STROLLS FOR WELL-BEING

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.
Other Programs?

- study or research
- program interpretation
- other possibilities within Seattle’s urban forest?
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Walking Programs

children

elders

families
Vegetation & Mental Health

• vegetation cover and afternoon bird abundances

• lower prevalence of depression, anxiety, and stress:
  depression, more than 20% cover, anxiety, more than 30% cover, stress, more than 20% cover

“dose” at which health issue is lower

Canopy Cover & Stress

images of canopy cover varied 0-60%

Trees, Income & Health

▲ income ▲ health care ▲ health

11 more trees in a city block
decreased cardio-metabolic conditions =
increase in annual personal income
of $20,000, or
moving to a neighborhood
with $20,000 higher median income

Kardan, et al. 2015. Scientific Reports 5, 11610
Beacon Food Forest (Seattle)
mimic woodland ecosystem – edible gardening

- arboretum
- berry patch
- nut grove
- community garden
- gathering plaza
- children’s area
- living gateway

complexity - productivity
Summary: Knowledge to Practice

- nearly 40 years of research: city trees, nearby nature
- critical mass of evidence – now what?
- integrate evidence into planning & mgmt
- integrate urban forest goals with broader urban systems needs
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.

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

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

Projects Director
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