Trees for Better Hearts & Minds: nature for human health & wellness

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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
Finding that study . . . . . .
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.
Green Cities: Good Health
database of >4,000 peer reviewed publications
Diversity in Metro Nature

NEARBY NATURE INCLUDES A VARIETY OF SPACES AND PLACES

- **Urban Forest Canopy**
- **Biophilic Design**
- **Parks and Gardens**
- **Green Stormwater Infrastructure**
Outside Our Doors
The benefits of cities where people and nature thrive.
Evidence-based ‘Story’

Health across the Human Life Cyle
‘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!
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
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*

[Source: www.rph.org/eden.html]
Evidence-based ‘Story’

Economics!

City Trees & Nature

Save Money
Analysis Process

- scale of individual to community
- screen for benefits
- urban forestry, parks, gardens, etc.
- green condition
- market & non-market valuation strategy
Nearby nature experiences are important across the entire life cycle, from cradle to grave.

**INFANTS**

**BIRTH WEIGHT**

**ECONOMIC IMPLICATIONS**

Increased physical activity, reduced asthma or allergic reactions, fewer emergency room visits, and reduced risk of adult skin conditions.

**IMMUNE FUNCTION**

Stress and inflammation during pregnancy and early life can have long-term effects on health and well-being.

**FAMILY DYNAMICS**

Improved family dynamics, including better sleep and reduced stress levels.

**FUTURE FINANCIAL SUCCESS**

Increased lifetime earnings for early exposure to nature.

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**CHILDREN & TEENS**

**OVERALL HEALTH AND WELL-BEING**

Increased physical activity, reduced asthma or allergic reactions, fewer emergency room visits, and reduced risk of adult skin conditions.

**ADHD**

Economic implications: Reduced cost of medication savings per year.

**CARDIOVASCULAR DISEASE**

Children exposed to nature have lower blood pressure and improved cardiovascular health.

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**ADULTS**

**DEPRESSION AND STRESS**

Economic implications: Reduced costs of medication savings per year.

**MOBILITY & QUALITY OF LIFE**

Economic implications: Reduced costs of medication savings per year.

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**OLDER ADULTS**

**HYPERTENSION**

Economic implications: Reduced costs of medication savings per year.

**COGNITIVE DISORDERS**

Economic implications: Reduced costs of medication savings per year.

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

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.

INFANTS

BIRTH WEIGHT

OVERALL HEALTH AND WELL-BEING

IMMUNE FUNCTION

FAMILY DYNAMICS

FUTURE FINANCIAL SUCCESS

Note: All economic values are in 2019 U.S. dollars, and are annual savings across the entire U.S.

CHILDREN & TEENS

OVERALL HEALTH AND WELL-BEING

NEUROLOGIC FUNCTION

FAMILY DYNAMICS

DEPRESSION AND STRESS

CARDIOVASCULAR DISEASE

CRIME & SAFETY

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ADULTS

OVERALL HEALTH AND WELL-BEING

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Avoided Costs Potential?


- $3 trillion
- $222 billion
- $134 billion
- $57 billion
Evidence-based ‘Story’

Experiences of Nature

Improve

Mental Health & Function
Classroom Views & Stress

Classroom Views & Stress
high school student response

Fig. 2. Attention scores at the end of class activity and break (Means and SE).

Fig. 3. Physiological stress at the end of class activity and break (Mean and SE).

attention scores
stress scores
our evolution?!
Attention Restoration Theory
Rachel & Stephen Kaplan, U of MI
directed attention
fatigue . . . .
Workplace Nature & Attention Recovery

**Well-being**
- Desk workers without view of nature reported 23% more ailments in prior 6 months

**Job Satisfaction**
- Less frustrated and more patient
- Higher overall job satisfaction and enthusiasm

ART Design Elements

- being away
- ‘soft’ fascination
- extent
- compatibility
Nature and Creativity

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

http://daycare.sulekha.com
Give Your Ideas Some Legs

creative test – analogy generation
conditions: sit inside, treadmill walk, walk outside, wheelchair outside

walking outside produced most novel & highest quality analogies – walking opens up free flow of ideas

Oppezzo & Schwartz. 2014. Journal of Experimental Psychology
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
Mind Full, or Mindful?
constant busyness

attempted multi-tasking

‘out of balance’

Anna and Elena Balbusso, NY Times
Nature and Mindfulness

focus
soft fascination
undirected attention

Attention Restoration Theory, Kapan & Kaplan
Mindfulness/Meditation Training

- meta analysis; clinical/non situations
- focus on moment-to-moment experience and mental awareness

Results

- more veridical perception (reality check)
- reduce negative affect
- improve vitality and coping
- medical symptoms & sensory pain

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
% of U.S. Population Using Mental Health Medications

2001 vs 2010

America’s State of Mind, Medco Health Solutions, Inc
Prevalence of Adult Antidepressant Use
2001 vs 2010

America's State of Mind, Medco Health Solutions, Inc
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

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)

Berman et al. 2012. *Journal of Affective Disorders*

Cognitive and affective improvements after walking in a nature setting
Summary

• evidence-based human health & wellness benefits
• story: life course, cradle to grave
• story: economic benefits
• story: mental health & function
• what do we know? what do we do?
Knowledge to Practice

- nearly 40 years of research
- critical mass of evidence – now what?
- greening or health programming
- donors, grants & funding?
Fiddlenheads Forest School
Washington Park Arboretum (Seattle)
cognitive
social &
physical
learning
CDC moderate activity recommendations

parks, active living, active transit
Parks Prescription

1. Get a prescription for ParksRx from your healthcare provider.
2. Visit www.REACHforbetterhealth.com
3. Enter your zip code, click.
4. Pick your park.
5. Exercise in the park and share outcomes with your healthcare provider.

ParksRx
Your Prescription For Better Health

www.REACHforbetterhealth.com/ParksRx

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

Made possible with funding from the Centers for Disease Control and Prevention.
HIKE IT BABY

www.hikeitbaby.com
Walking Programs

children
elders
families
Walking Meetings

creativity, energy, communication, health
Shinrin yoku (forest bathing)

- walking
- relaxing
- workers
- retirees
- networked system
- 52 bases in Japan
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.
Elders: horticulture for mobility & social connections
Veterans Outdoor Therapy

Les Winkeler/The Southern Illinoisan

World-Herald News Service

Hope for the Warriors

Outward Bound
community tree plantings

American Forests
Tree People, Los Angeles

parks
public gardens
street trees
neighborhood
community gardens

The Heights Community Garden, Dayton OH

Keep Oakland Beautiful

local food
food security
child education
nutrition
food donations
physically disabled & tree climbing!
recreational tree climbing – youth therapy
Knowledge to Practice

• nearly 40 years of research
• critical mass of evidence – now what?
• greening or health programming
• project – toolkit & technical assistance
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...

Projects Director
Kathleen L. Wolf, Ph.D.

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