Nature for Human Health: 
public gardens opportunities & programs

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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:
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NGO partners

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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.\(^1\),\(^2\) 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.\(^9\)
- A study found 7% higher rental rates for commercial offices having high quality landscapes.\(^3\)\(^4\)
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.\(^3\)\(^4\)
- 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.\(^3\)\(^4\)
design: milepost

co-author

co-author & printing: The Nature Conservancy
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
Civic Stewardship for Resilience

E. Svendsen, L. Campbell; USFS
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*

[Link to website](www.rph.org/eden.html)


* 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). Also the USFS Pacific Northwest Research Station.
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.**

### INFANTS

**Birth Weight**

- Potential economic value: $5,159 savings on annual health care costs.
- 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.

**Immune Function**

- Enhanced immune response: Stronger immune system leads to reduced illness and chronic diseases across a lifetime.
- We are most vulnerable in the early months of our lives, when the body and mind are growing and developing at an astounding rate. The "fragile hypothesis" suggests that early contact with outdoor microorganisms stimulates the development of a healthy immune response.

**Family Dynamics**

- Improved family dynamics: Perhaps reducing mental health treatment and counseling services.
- An infant's parents and siblings adjust their lives after a baby arrives, and the changes can bring on stress and anxiety. Nature walks and led nature tours help reduce these stresses and improve interactions between people within the household.

### CHILDREN & TEENS

**Overall Health and Well-being**

- Potential economic value: Increased physical activity, reduced asthma, or leading cause of emergency department visits, hospitalizations and missed school days.
- Reduced risk of adult skin conditions.

**ADHD**

- Potential economic value: $6.88 to $12.36 savings on medication savings per year.
- Millions of children ages 4-17 are treated for Attention Deficit Hyperactivity Disorder (ADHD) in the U.S. Nature exposure in 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.

**Future Financial Success**

- Potential economic value: $1.28 increase in high school graduates' lifetime annual income.
- School performance affects not only how well students and how long they succeed. Raising green views from classrooms and common spaces in schools can improve students' capacity to direct attention and feel less stressed. Green high school campus landscaping is linked to higher graduation rates.

### ADULTS

**Depression and Stress**

- Potential economic value: Reduces frustration, mental distress, and depression disorders, and improves body image, self-esteem, and life satisfaction.

**Cardiovascular Disease**

- Potential economic value: $13.5-28.49 annual savings, based on a 1-2% reduction in medic opposition expenditures.
- Cardiovascular disease is the leading cause of premature deaths in the U.S. People show relatively reduced risk of CVD if their neighborhoods have greater nature coverage (particularly tree canopy), however it is worth noting the majority of studies have focused on trees.

### OLDER ADULTS

**Mobility & Quality of Life**

- Potential economic value: $1.71-4.48 savings on health care costs from falls per year.
- One in three older adults falls each year, giving rise to fatal and nonfatal injuries. Residential facilities 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 actively tend to be more likely to be out and noticing nature and walking activities that promote social interactions support positive lifestyles and quality of life.

**Hypertension**

- Potential economic value: $7.94-13.28 savings on treatment costs annually.
- Hypertension, or high blood pressure, is one of the five most common conditions impairing older adults. Views of nature, particularly forests, and "green building" (buildings walk in natural forest settings) decreases diastolic rates.

**Cognitive Disorders**

- Potential economic value: $5.46 annual savings on medical services, not counting the value of home caregiver services.
- About one in five older adults experience mental and cognitive disorders, with age being the greatest risk factor. In 2016, about 1.2% of people aged 65 or older were affected with Alzheimer's Disease. Those with dementia have three times as many hospital stays per year than other older adults. Encounters with nature impacts symptoms related to cognitive disorders, such as agitation, depression, and reduced mobility.

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**Contributing Analysts:**

Dr. Stephen Grado & Marcus Measells, MSU; Dr. Alicia Robbins, Weyerhaeuser
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 Restoration Theory
Rachel & Stephen Kaplan, U of MI
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

credit: Michael Hellgren
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

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 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
Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)

- Shorter stays
- Less pain
- Fewer minor complications
- Better emotional well-being
Legacy Good Samaritan Medical Center
Stenzel Healing Garden 1997
Rehabilitation Institute of Oregon
Hospital Staff – Respite and Support
Nature: A stress coping resource for employees 24-7

image credit: Teresia Hazen
Summary

• evidence-based human health & wellness benefits
• story: life course, cradle to grave
• 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?
CDC moderate activity recommendations

parks, active living, active transit
Walking Programs

children
elders
families
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.
Walking Meetings

creativity, energy, communication, health
Fiddleneck Forest School
Washington Park Arboretum (Seattle)

cognitive
social &
physical
learning
Elders: horticulture for mobility & social connections
Shinrin yoku (forest bathing)

- walking
- relaxing
- workers
- retirees
- networked system
- 52 bases in Japan
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: ____________________
Parks Prescription

1. Get a prescription for ParksRx from your healthcare provider.
2. Visit www.REACHforbetterhealth.com
3. Enter your zip code
4. Click
5. Pick your park
6. Exercise in the park
7. 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.
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

local food
food security
child education
nutrition
food donations
www.treeclimbing.jp/
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

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.

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

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

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www.naturewithin.info