Trees & Human Health
talk about trees with us!

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What do we know?
Evidence of Trees & Human Health

What are the evidence ‘stories’?

What is the economic value?
meaning value
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
Healthy Microbiome

- control obesity & asthma
- boost immune function
- improve mental health

Bloomfield et al. 2016 Perspectives in Public Health

put aside the Hygiene Hypothesis

need contact with ‘Old Friends’
~10 to 100 trillion microbes in healthy gastrointestinal (GI) tract

intestinal microbiome development

Arrieta et al. 2014. Frontiers in Immunology
Design for Nature Contact
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**

www.treeclimbing.jp/
physically disabled & tree climbing!
The medicine of being in the forest
We are the leading global voice for forest bathing and forest therapy

Santa Rosa, California
public health officials
moderate activity
recommendations

parks, active living, active transit
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
Sacramento Study :: LIDAR x CHIS data
7,900 adults, 250 m buffer, covariates

more tree cover = better overall health = better social cohesion

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 & affective improvements after walking in a nature setting
Canopy Cover & Stress

Images of canopy cover varied 0-60%.

City Trees & Human Health

- newborn & infant health
- increased physical activity for kids
- student therapy
- overall adult health
- social cohesion
- respiratory & cardiovascular health
- reduced depression
- elder care improvements
Story: Nature for Human Health Benefits Across the Life Cycle
Tree cover shows an inverse relationship with depressive symptoms in elderly residents living in U.S. nursing homes

Matthew H.E.M. Browning, Kangjae Lee, Kathleen L. Wolf
Key Points

**Question** What type of green space is associated with better mental health?

**Findings** In this cohort study of 46,786 adults older than 45 years, exposure to 30% or more tree canopy compared with 0% to 9% tree canopy was associated with 31% lower odds of incident psychological distress, whereas exposure to 30% or more grass was associated with 71% higher odds of prevalent psychological distress after adjusting for age, sex, income, economic status, couple status, and educational level. Similar results were found for self-rated fair to poor general health but not physician-diagnosed depression or anxiety.

**Meaning** Investments specifically in tree canopy may provide more support for mental health.
The Urban Forest, Trees, & Green Space

NEARBY NATURE INCLUDES A VARIETY OF SPACES AND PLACES

URBAN FOREST CANOPY

BIOPHILIC DESIGN

PARKS AND GARDENS

GREEN STORMWATER INFRASTRUCTURE

IMAGE BY MIG / SVR
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
USDA Forest Service,
(U&CF Program + Pacific NW Research)
University of Washington
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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.3
- A study found 7% higher rental rates for commercial offices having high quality landscapes.4
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.5
- 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.6
Green Cities: Good Health > 4,500 peer reviewed publications
Nearby nature experiences are important across the entire life cycle, from cradle to grave.

**INFANTS**

**BIRTH WEIGHT**

**OVERALL HEALTH AND WELL-BEING**

**ADHD**

**FUTURE FINANCIAL SUCCESS**

**CARDIOVASCULAR DISEASE**

**DEPRESSION AND STRESS**

**CRIME & SAFETY**

**OLDER ADULTS**

**MOBILITY & QUALITY OF LIFE**

**HYPERTENSION**

**CONCEPTUAL DISORDERS**

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
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Evidence of Trees & Human Health

What are the evidence 'stories'?

What is the economic value?

Last thoughts . . .
Access
Equity
Everyday

Last thoughts . . .
Human Dimensions of Urban Forestry and Urban Greening

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

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.

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