The Human Health Benefits of Urban Forests and Urban Greening

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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)
Human Health in Hong Kong

<table>
<thead>
<tr>
<th></th>
<th>Infant mortality (deaths before age 1 per 1,000 live births)</th>
<th>Life expectancy at birth: males (years)</th>
<th>Life expectancy at birth: females (years)</th>
<th>Avoidable Mortality (per 100 population aged 1–74 years)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo (23 wards)</td>
<td>2.8 (2001–2004)</td>
<td>77.7 (2000)</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>
Sacramento Study :: LIDAR x CHIS data

7,900 adults, 250 m buffer, covariates

more tree cover
= better overall health
= better social cohesion

Health in Hong Kong

6 non-communicable diseases = 59.7% of deaths in Hong Kong (2015):
  - cancers
  - heart disease
  - cerebrovascular diseases (stroke)
  - chronic lower respiratory diseases
  - injuries and poisoning
  - diabetes mellitus
Social Determinants of Health

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

nearby nature & health evidence
> 40 years
> 4,200 publications

what are the ‘stories’?
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.
distribution of ~4,200 studies, 1970s to 2015
Diversity in Urban Greening

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.

design: milepost

co-author: U.S. Forest Service

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

Health across the Human Life Cycle
‘Cradle to Grave’
Story: 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!
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).
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
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
Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)

- Shorter stays
- Less pain
- Fewer minor complications
- Better emotional well-being
hospital healing gardens

health care $$ savings
patient preference & return

Ulfelder Healing Garden, Massachusetts General Hospital

Scripps Encinitas Hospital
Hospital Staff – Respite and Support
Elders: horticulture for mobility & social connections
So What?

nature-based programs for people of all ages!
Walking Programs

children
elders
families
Fiddleheads Forest School
Washington Park Arboretum (Seattle)
cognitive
social &
physical
learning
Parks Prescription

<table>
<thead>
<tr>
<th>Date: ____________________</th>
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<tbody>
<tr>
<td>Dr: ____________________</td>
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<tr>
<td>Name: ____________________</td>
</tr>
<tr>
<td>I recommend:</td>
</tr>
<tr>
<td>□ Walking</td>
</tr>
<tr>
<td>□ Other: ________________</td>
</tr>
<tr>
<td>_________________________ minutes a day</td>
</tr>
<tr>
<td>_________________________ days per week</td>
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* 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 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.

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

creativity, energy, communication, health
Biophilic Design :: buildings

integrated nature & architecture or other structures

credit: Progressive Times
Summary: Knowledge to Practice

- nearly 40 years of research
- critical mass of evidence – now what?
- greening or health programming
- integrating urban forest goals with urban systems needs
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.

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

Projects Director
Kathleen L. Wolf, Ph.D.