Streets & Green Infrastructure: urban co-design for health co-benefits

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Outline

1. Nearby Nature & Health: the evidence
2. Evidence to Action
3. Case Studies
SYSTEMS THINKING

- AIR QUALITY
- STORMWATER
- ENERGY
- COMMUNITY IDENTITY
- SOCIAL CAPITAL
- ACTIVE MOBILITY
- NOISE
- EXERCISE & FITNESS
- BIOTA
- carbOn
- BMP'S
- PUBLIC ART
- COMmunity IDENtITY
- solid waste
- waste water
- connectvity
- culturaL heritAge
- heat island
- allergens
- credit: American Planning Association
A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (1946)
Social Determinants
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
USDA Forest Service,
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University of Washington
NGO partners

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to U of WA students:
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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{54}

- 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}
Green Cities: Good Health
database of >4,500 peer reviewed publications
strength of evidence; causal mechanisms?

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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
Healthy Microbiome

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

need contact with ‘Old Friends’

put aside the Hygiene Hypothesis

Bloomfield et al. 2016 Perspectives in Public Health
~10 to 100 trillion microbes in healthy gastrointestinal (GI) tract

intestinal microbiome development

Arrieta et al. 2014. Frontiers in Immunology
Create Forests!
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

health agencies recommend moderate activity for health promotion & disease prevention

parks, active living, active transit
Walking Programs

children
elders
families
Walking Meetings

creativity, energy, communication, health
Green Streets for Walkability

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

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 and affective improvements after walking in a nature setting
Shinrin yoku (forest bathing)

- extensive research
- restorative experiences
- workers retirees
- networked system, 52 bases in Japan
Parks Prescription

1. Get a prescription for ParksRx from your healthcare provider.
2. Visit www.REACHforbetterhealth.com
3. Enter your zip code and click
4. Pick your park and exercise in the park

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.
Evidence to Action

40 years of research
nearby nature for health benefits
> 4,000 published articles
research to application
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the Chenoggye freeway
Seoul, South Korea
~ 1970-2005
Cheonogyecheon Stream Restoration
8.4 km, $900 M
Stormwater Management
Seattle USA

Thornton Creek Water Quality Channel (SvR Design)
1 hectare, treats runoff from 275 hectares (1 hectare = 2.47 acres)
Malmo, Sweden – SUDS for cloudburst management
Malmo, Sweden – SUDS for cloudburst management
Intentional green infrastructure design for human health outcomes

Cascading Benefits: Designing Green Stormwater Infrastructure for Human Wellness

co-author:

co-author & printing:

The Nature Conservancy
University of Texas Medical School, Austin
SITES Landscape Architect, Heather Venhaus
stormwater management
human health & well being
patient & medical staff interactions
patient & medical staff interactions
St. Francis Court Apartments Bioretention Features
Before & After

2009: Two levels of unused parking lots

2012: Two bioinfiltration basins with walking path
Spring 2011, Ponding after rain event
Summer 2011, One year after installation
Summary

from site to systems level solutions
evidence of nature for health
green infrastructure opportunities
solutions :: complexity & diversity
co-design for co-benefits
www.naturewithin.info