City Trees and Green Space are Health Determinants
a review of evidence & opportunities

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Mayo Clinic
Rochester MN :: May 17, 2016
- 3,800 physicians and scientists
  + 50,900 allied staff
- over $500 million a year on research
- ranked No. 1 on lists of "Best Hospitals"
- about 1,318,300 different patients in 2015
Outline

- sanitary city
- environmental health – the sustainable city
- review of nature-based health benefits
  
Green Cities: Good Health
- implications for Mayo Clinic and patients
Industrial Age – urban squalor

Filthy Cities documentaries
sanitary city

efficient and hygienic supply & removal of materials and services
natural systems disconnect
Baltimore: Public Works Museum
sustainable city
ecological function, green infrastructure, & ‘revealed’ processes

Pincetl, S. 2010. From the sanitary city to the sustainable city. Local Environment
measure the canopy of a city
Reducing Stormwater Runoff

green infrastructure

Image courtesy of the Center for Urban Forest Research
Stormwater Management

Thornton Creek Water Quality Channel (Seattle, SvR Design)
1 hectare, treats runoff from 275 hectares
linked to active living network
WHO health definition

*a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity* (1946)

science & evidence re: environment role of ‘metro nature’? not a panacea, but important!
Determinants of Health
Green Cities: Good Health
www.greenhealth.washington.edu

Sponsors:
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University of Washington
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thanks!
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research review & 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.
Metro Nature :: Human Health & Well Being

> 3,800 peer-reviewed publications in database

% distribution of entire database
strength of evidence; causal mechanisms?

causal mechanisms? immune function?

urban nature & health benefits across the life cycle
Urban Forests and Newborns
the urban natural environment and 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; similar studies in Lithuania, Vancouver B.C., Munich, Tel Aviv Israel, Spain
Nature & Psych Development
children’s play & imagination

Richard Louv - Last Child in the Woods
Fiddleheads Forest School
Washington Park Arboretum (Seattle)

cognitive
social &
physical
learning
combatting obesity
CDC moderate activity recommendations

parks prescription
Shinrin-yoku  Forest Bathing

- extended forest walks
  - reduced ‘fight or flight’ response
  - lower cortisol – a stress indicator
  - increased immune function
  - lower pulse rate & blood pressure

Tsunetsugu, Park, Miyazaki. 2010. Environmental Health and Preventive Medicine
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: patients; family and friends; professional staff

health care $$$ savings
Legacy Good Samaritan Medical Center
Stenzel Healing Garden 1997
Rehabilitation Institute of Oregon
Oregon Burn Center Garden
Hospital Staff – Respite and Support
Nature: A stress coping resource for employees 24-7

thanks to Teresia Hazen for slides
Elders: mobility & social connections
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*

Tim Lynch Associates

www.rph.org/eden.html
mental health & function

physiological response +
cognitive processing
attention capacity

Pincetl, S. 2010. From the sanitary city to the sustainable city. Local Environment
our evolution?!
Attention Restoration Theory
Rachel & Stephen Kaplan, U of MI
directed attention fatigue . . . .
Workplace Nature Views

- **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
Mental Health - Mindfulness

contemplation – restoration – stress reduction
Mindfulness

Mind Full, or Mindful?
constant busyness

attempted multi-tasking

‘out of balance’

Anna and Elena Balbusso, NY Times
Mindfulness/Meditation Training

- meta analysis; clinical/non situations
- focus on moment-to-moment experience and mental awareness
- more veridical perception (reality check)
- reduce negative affect
- improve vitality and coping
- medical symptoms & sensory pain

Nature and Mindfulness

focus
soft fascination
undirected attention
Attention Restoration Theory
Rachel & Stephen Kaplan
Conclusions

Sanitary to sustainable city . . . .
Salutary benefits of environment
Nearby nature in cities & towns
Evidence? Green Cities: Good Health web site
Benefits across human life cycle
Evolving to the sacred city?

applications to Mayo Clinic?
Restorative Nature
Beyond the City
"Nature Doesn't Pay My Bills:"

Well Living Lab

human-centered research
health and well-being
indoor environments
controlled research variables
simulates real-world environments
Recap: Biophilic Design at Living Future
Living things and living buildings at Living Future

TRUTH + TRANSPARENCY
CONSUMING THE BARRIERS TO FUTURE LIVING FUTURE 2016
Biophilic Design :: urban forest
Biophilic Design :: buildings

credit: GreenOverGrey
Biophilic Design :: buildings

integrated nature and architecture

credit: Progressive Times
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.

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

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- Kathleen L. Wolf, Ph.D.