Trees are Good
translating the science to practice

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Tree School – 20 Year Anniversary
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The tree which moves some to tears of joy is in the eyes of others only a green thing that stands in the way.

Some see nature all ridicule and deformity . . . and some scarce see nature at all.

But to the eyes of the man of imagination, nature is imagination itself.

William Blake
Trees are Good!

What do we know? Research Evidence

What do we do? Programs!

What do we know? Research Evidence
How are city trees associated with human health?
Health is...

A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity

(World Health Organization, 1946)
Urban Trees & Human Health: A Scoping Review

Purpose:
To carefully collect and synthesize the peer-reviewed evidence concerning urban trees and human health
Project Team

- Kathleen Wolf, Ph.D., University of Washington
- Sharon Lam, MSc, Ontario Climate Consortium
- Jennifer McKeen, MPH, Simon Fraser University
- Gregory Richardson, MUP, Health Canada
- Matilda Van Den Bosch, M.D, University of British Columbia
- Adrina Bardekjian, Ph.D., Tree Canada
Method

Keyword search (n = 2563) → Abstract review (n = 436) → Quality assessment (n = 215) → Final article set (n = 199) (201 studies)

Synthesize and present findings
What did we learn?

Publication Dates by Decade

- 1980-1989
- 1990-1999
- 2000-2009
- 2010-2018
What did we learn?

- single & park trees
- pollen
- image/simulation
- tree canopy/NDVI

credit: Univ of Utah
What did we learn?

Health Outcomes Themes:

- Tree Pollen and VOCs
- Active Living/Weight Status
- Psychophysiological Stress
- Excess Heat and Thermal Comfort
- Cardiovascular Function
- Mental Health, Anxiety and Mood
- Air Pollutants and Respiratory Condition
- Other Restoring Capacities (e.g., Birth...)
- Cognition and Attention Restoration
- Other Reducing Harm (Crime, UVR)
- Clinical Outcomes
Urban Forests & 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., 2011. Health & Place 2011; Hystad et al., 2014. Env Health Perspectives
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
ADHD and nature contact

- 17 children aged 7-12 with diagnosed ADHD
- 20-minute guided walks
  - Park
  - Neighborhood
  - Downtown
- Pre-walk puzzles
- Post-walk cognitive test

Faber Taylor & Kuo. 2009. *Journal of Attention Disorders*
Green High School Campuses

- cafeteria & classroom window views with greater quantities of trees and shrubs
- positively associated with:
  - standardized test scores,
  - graduation rates
  - %s of students planning to attend a four-year college
  - fewer occurrences of criminal behavior

Matsuoka. 2010. *Landscape & Urban Planning*

credit: NBC News
Encouraging Physical Activity

Review of studies of adults, natural environments vs indoors

Results of activity in natural environments:

- greater feelings of revitalization and positive engagement, increased energy
- decreases in tension, confusion, anger, and depression
- greater enjoyment and satisfaction, declared a greater intent to repeat the activity at a later date

Coon et al. 2011. *Environmental Science & Technology*
public health officials
moderate activity
recommendations

parks, active living, active transit
Pennsylvania Horticultural Society Clean & Green Program

reduced heart rate = less stress
South et al. 2015. American Journal of Public Health

reduced reports of depression & worthlessness
South et al. 2018. JAMA Network
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: Trees for Human Health Benefits Across the Life Cycle
healthy trees.
happy people.
Trees are Good!

What do we do? Programs!

What do we know? Research Evidence
Create Forests!
Fiddleheads Forest School
Washington Park Arboretum (Seattle)

cognitive
social &
physical
learning
Children & Nature Network

**Green Schoolyards Help Kids Feel:**
- Calmer & Less Stressed
  - Views of green landscapes from classroom windows helped high school students recover more quickly from stressful events.
- Positive & Restored
  - Forest schools enhanced positive and decreased negative emotions.
- Resilient
  - Natural areas enhanced feelings of competence and increased supportive social relationships that help build resilience.

**Green Schoolyards Promote Social-Emotional Skills**
- Practice Relationship Skills
  - Children demonstrated more cooperative play, civil behavior and positive social relationships in green schoolyards.
- Develop Self-Awareness & Self-Management
  - Green schoolyards can reduce aggression and discipline problems.
  - Gardening at school helped students feel proud, responsible & confident.

**The Statistics on Children & Nature**
physically disabled & tree climbing!
Waukesha, Wisconsin
Walking Programs

children
elders
families
Walking Meetings

creativity, energy, communication, health
Parks Prescription

RX

for Health

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: ________________

doctors of BC
Forest Bathing & Therapy  *Shinrin yoku*

more than a decade of research – Japan, South Korea, northern Europe
Forest Bathing & Therapy
multiple wellness benefits

results for forest vs built environments:
- reduced stress & diabetes symptoms
- improved pulse rate, blood pressure, mood
- improved nervous system activity – less fight or flight
- one influence? phytoncides (wood essential oils)

Park et al., 2010. *Environmental Health and Preventive Medicine*
Li et al. 2006. *Immunopharmacology and Immunotoxicology*
SAINT ROSA, CALIFORNIA

The medicine of being in the forest

We are the leading global voice for forest bathing and forest therapy
Trees are Good!

What do we know? Research Evidence

What do we do? Programs!

Last thoughts . . .
Urban forest management for human health
‘Trees are Good’ but could they be better?

have evidence re: trees & health
are associated cost reductions & savings
perhaps expand policy and goals?

- canopy goals: 35-40%
- connectivity: 20 – 50 minute walks
- address pollen concerns
- enable activity (forest bathing, walking loops)
Tree Planting for Health

Views from Within

Connect Experiences

Create Refuge

Walter Reed National Military Medical Center, Bethesda, MD

- Iraq/Afghan wars: Brain injury and PTSD in 30% of force
- Military/Vet suicides: 20% of all U.S. suicides
- Drugs and surgery relatively *ineffective*

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*slides credit:* Frederick Foote, M.D.
Project Manager for the Green Road Project
The Green Road Project
A model program of the Institute for Integrative Health
Naval Support Activity Bethesda
Home of Walter Reed National Military Medical Center
woody debris :: fallen tree trunks symbolize the fallen soldiers’ legacy in conflicts
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...

Projects Director
Kathleen L. Wolf, Ph.D.

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