



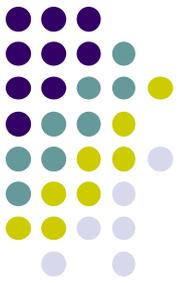
# **Urban Forests for Human Health & Wellness**

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**USDA Forest Service :: Urban Forest Connections**  
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# Research Review and Summaries



**Sponsors:**

**University of Washington**

**USDA Forest Service, U&CF Program**

**NGO partners**

**thanks!**

**to U of WA students:**

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**Sarah Krueger**

Urban Forestry/Urban Greening Research

## Green Cities: Good Health

UNIVERSITY OF WASHINGTON

INTRODUCTION RESOURCES FUTURE RESEARCH REFERENCES

Metro nature - including trees, parks, gardens, and natural areas - enhance quality of life in cities and towns. The experience of nature improves human health and well-being in many ways. Nearly 40 years of scientific studies tell us how. Here's the research ...

**RESEARCH THEMES**

- Livable Cities
- Place Attachment & Meaning
- Community Building
- Community Economics
- Social Ties
- Crime & Fear
- Reduced Risk
- Wellness & Physiology
- Active Living
- Healing & Therapy
- Mental Health & Functioning

**[www.greenhealth.washington.edu](http://www.greenhealth.washington.edu)**


[Community Building](#)
[Local Economics](#) ▶

[Place Attachment & Meaning](#)
[Crime & Fear](#) ▶

[Safe Streets](#) ▶

[Active Living](#) ▶

[Reduced Risk](#)
[Wellness & Physiology](#)
[Healing & Therapy](#)
[Mental Health & Function](#) ▶

[Work & Learning](#)
[Culture & Equity](#)
[Lifecycle & Gender](#)

## 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.<sup>1,2</sup> 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.<sup>9</sup>
- A study found 7% higher rental rates for commercial offices having high quality landscapes.<sup>14</sup>
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.<sup>34</sup>
- 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.<sup>34</sup>

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*street trees boost market value of houses, providing tax revenue for communities*





# Metro Nature & Health Evidence Framework



# evidence about the importance of 'nearby nature'



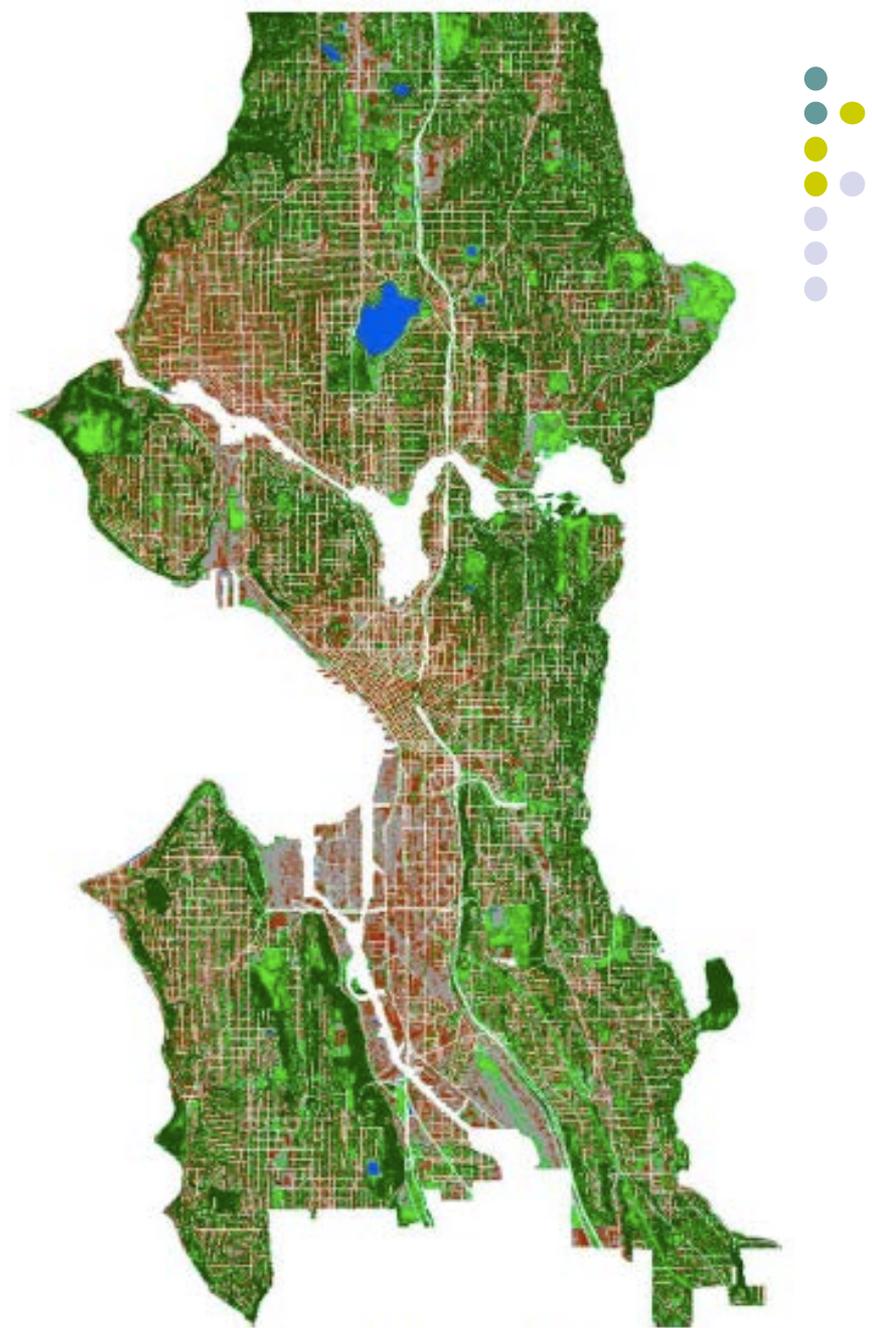


**a caution . . . nature & health evidence**

# Urban Tree Canopy Assessment

## i-Tree analysis

City of Seattle



vegetation and land use map for Seattle

image credit: UW Remote Sensing and Geospatial Lab

**Top Down  
Mapping**

**plus**

**understory  
vegetation**

**for human  
habitat**



*Figure 2: Vegetation is associated with positive response on school campuses. Depicting school sites, these images are an example of the diverse vegetation conditions of metro nature that are associated with potential human health and well-being benefits.*

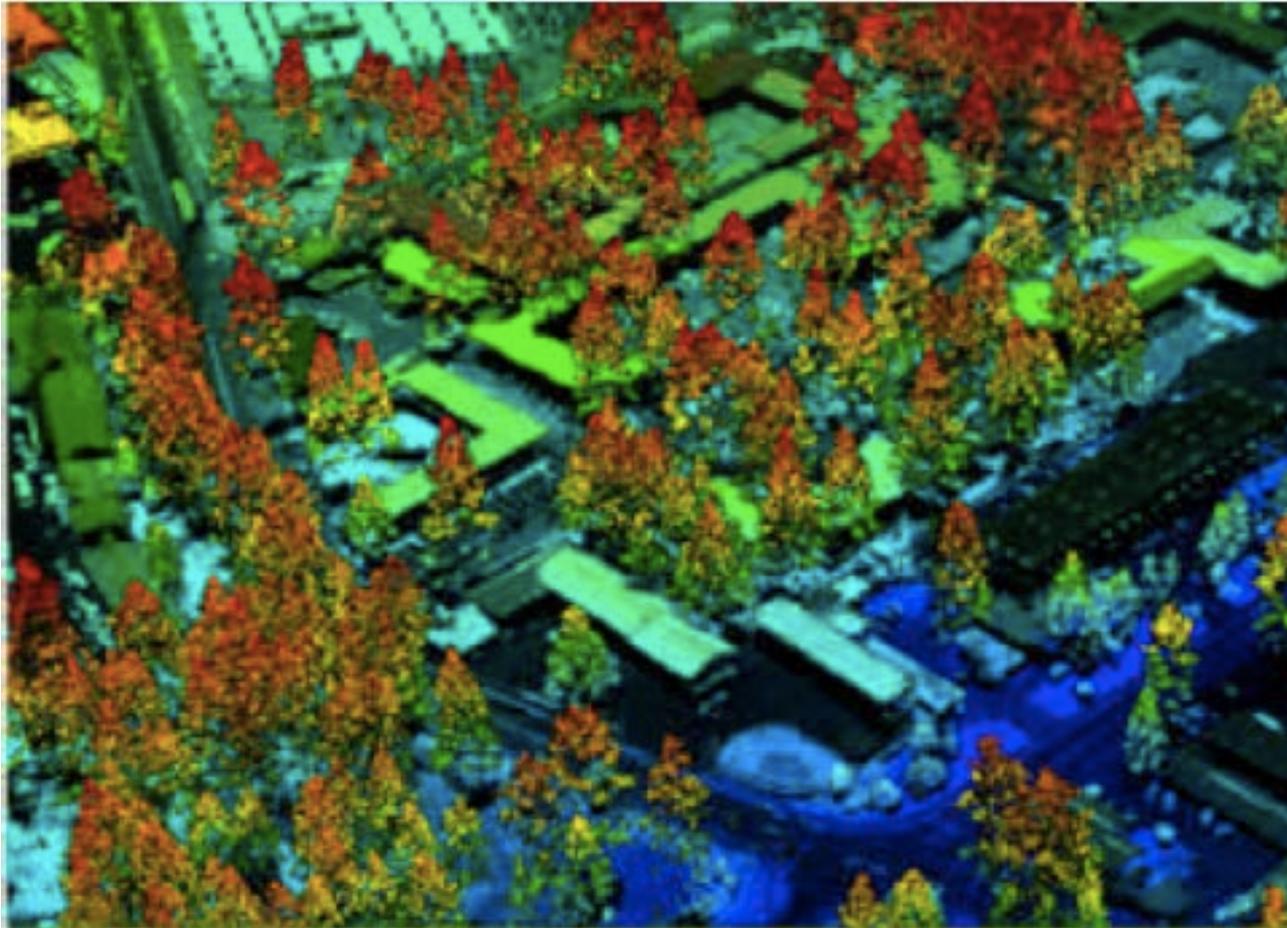
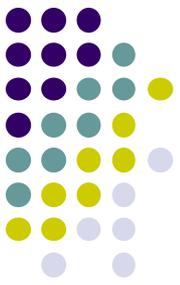
A photograph of a forest with snow on the ground and several trees marked with colored bands (yellow, orange, red) for silvicultural study. The text "forest = silviculture" is overlaid in white on the lower left portion of the image.

**forest = silviculture**

A photograph of a dense forest with tall, slender trees and lush green foliage. Sunlight filters through the canopy, creating a dappled light effect on the forest floor. The text "forest = ecosystem" is overlaid in white, bold font in the lower-left quadrant.

**forest = ecosystem**

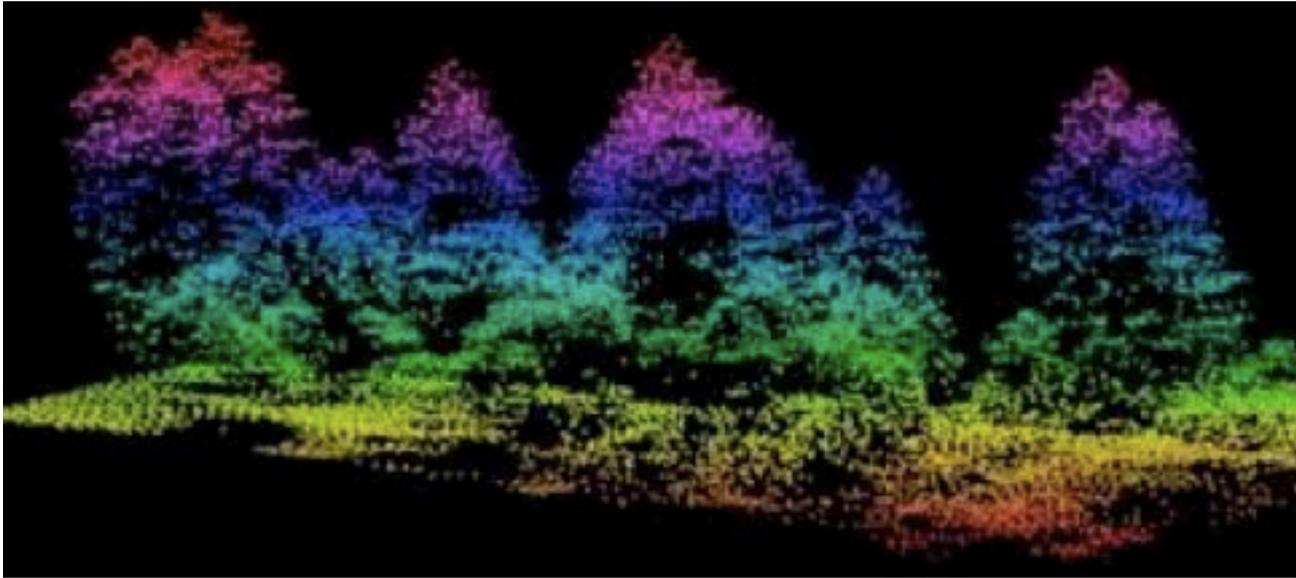
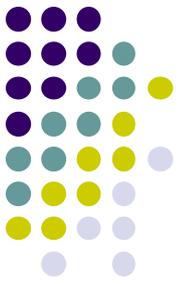
# Veg Assessment Explorations



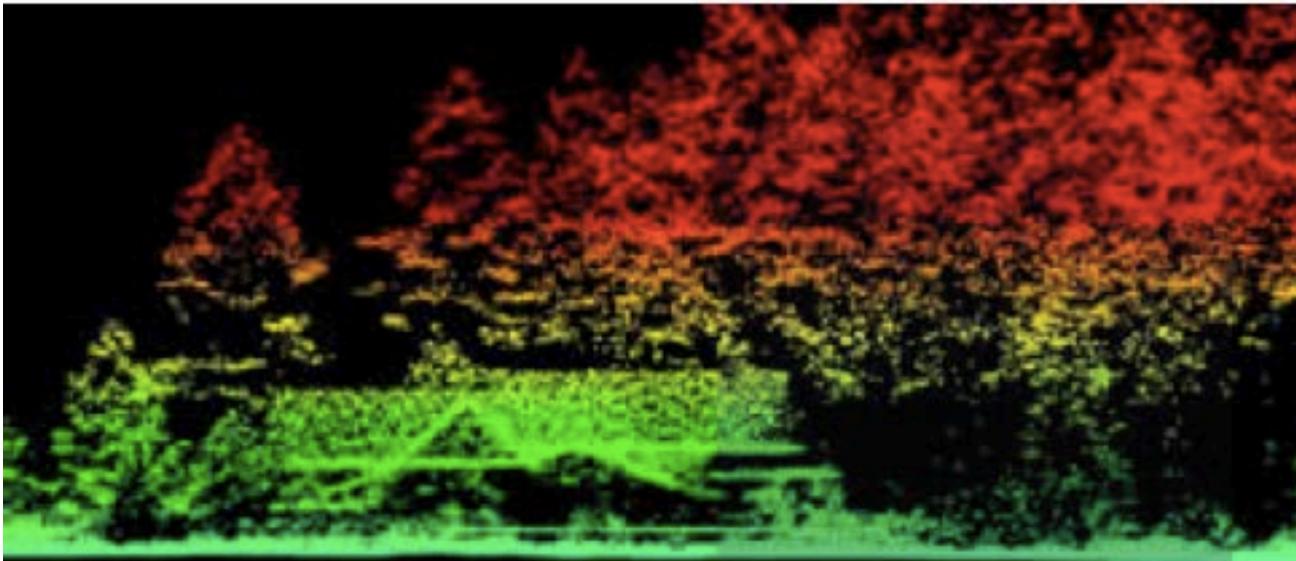
oblique  
view

LIDAR  
point  
cloud

# Veg Assessment Explorations



ground  
view



LIDAR  
point  
cloud



## **Quick Summary**

nearly 40 years of health evidence  
diverse health benefits  
associated with diverse nearby nature

consider a habitat outlook  
expand partnership & collaboration



# **City Trees, Urban Forests & Metro Nature for Health**

scientific evidence

health & well being benefits

life course concept

‘cradle to grave’



**THE LIFEAGE OF WOMAN**

**STAGES OF WOMAN'S LIFE FROM THE CRADLE TO THE GRAVE**

A smiling infant first she plays  
 In sweetest days of her future days

Her girlish pastimes  
 neat for show  
 Her eyes a look woman  
 life must know

Her ripened beauty  
 all confess  
 And wonder  
 at her loveliness

As husbands arms  
 in hour and part  
 Exclude her from  
 a lovely bride

A mother's anxious  
 love only care  
 Will faithful bore  
 the news to share

Now to the poor  
 her hand she gives  
 The blessing of  
 benevolence

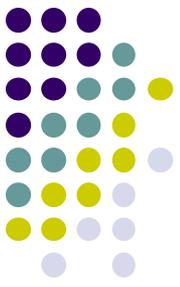
At school in household  
 duties new  
 The weight of toil  
 contracts her brow

She now receives  
 all earthly care  
 And lifts her soul  
 In heaven in prayer to God

At eighty years  
 her will is confirmed  
 Impartial blessings  
 of righteous men

The hoary head  
 us all should bless  
 Who to many woes  
 of righteous men

The body sinks  
 and wastes away  
 The spirit can't  
 away deny



# Urban Forests and Newborns

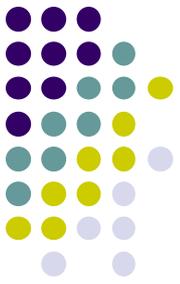
the natural environment may affect pregnancy outcomes . . .

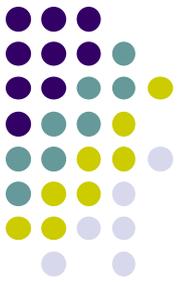
10% increase in tree-canopy cover  
within 50m of a house  
= lower number of low weight births  
(1.42 per 1000 births)

*Donovan et al., Health & Place, 2011*



# School & Learning





# 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



# 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**

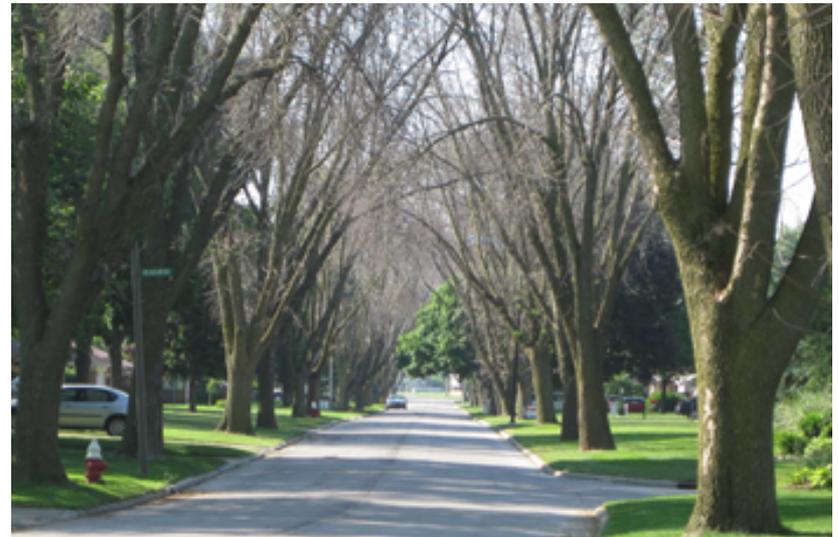
**6,000 more deaths from lower respiratory disease**

**controlled for demographic, human mortality, and forest health data at the county level**

**Toledo, Ohio in 2006, pre EAB**

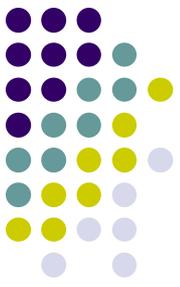


**2009, EAB in neighborhood**



**photos: Dan Herms, Ohio State University**

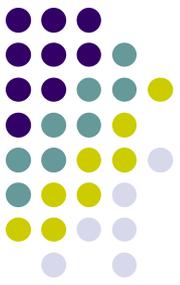
# *Shinrin-yoku* Forest Bathing



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



# Physical Activity & Depression Reduction



- Review of 13 high quality studies
  - exercise recommended for mild to moderate depression
  - people who are willing & motivated
  - associated meditation and mindfulness are important

Josefsson et al. 2013.  
Physical Exercise Intervention  
in Depressive Disorders.  
Scandinavian Journal of  
Medicine & Science in Sports



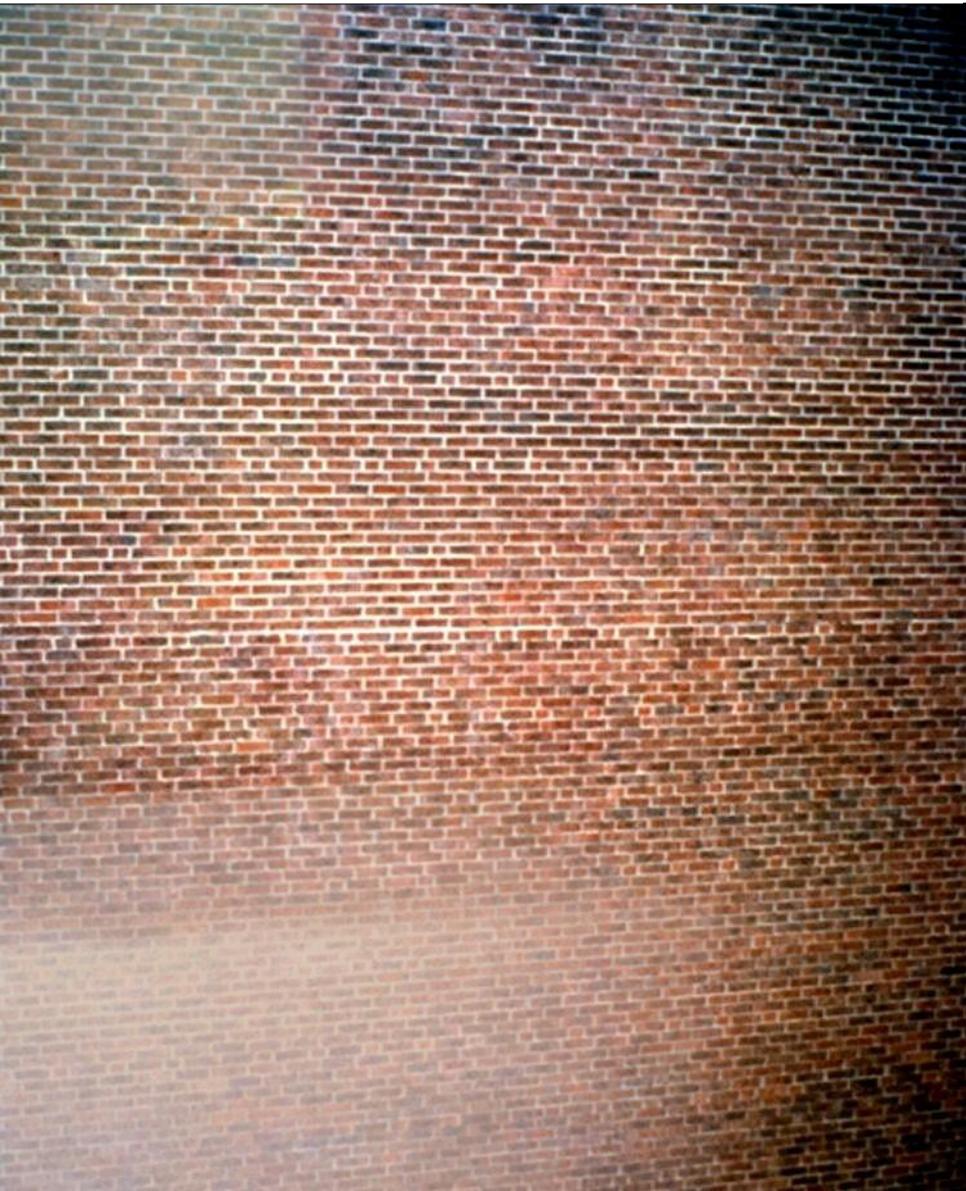


**parks, recreation, active transit**

# Elders & Horticulture Therapy

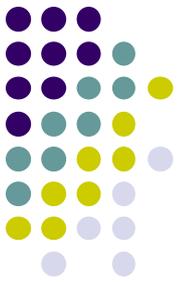


# Effects of nature window view on recovery from surgery (Roger Ulrich, 1984)



- **Shorter stays**
- **Less pain**
- **Fewer minor complications**
- **Better emotional well-being**

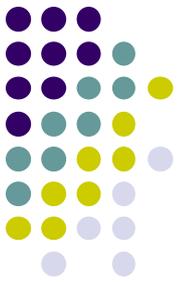
# hospital healing gardens: patients; family and friends; professional staff



**health  
care \$\$  
savings**



# Summary & Conclusions



# Summary

- urban forests & urban greening provide human habitat for health
- throughout human life course!
- evidence? Green Cities: Good Health
- additional vegetation assessment
- economic implications – preliminary