Urban Greening & Livable Communities
aka Ergonomics of the City

Kathleen Wolf, Ph.D.
Research Social Scientist

University of Washington
College of the Environment

Think Trees NM
Urban Tree Care Conference
January 2014
Ergonomics?

- human factors
- physics, mechanics & human anatomy
- designing things so that a person can use them easily & safely
- original design & retrofit
- improving productivity
- evidence-based
basic things in life . . . .

happy or miserable?
gardening tools!

GOOD
hand and wrist in neutral, stress-free position

POOR
stressed tendons on upper wrist;
compressed tissues on lower wrist;
callouses on palm

soft grip ergonomic handle

stressful less force
desk jobs
motorcycle ‘posture’
environmental functions
urban forest benefits
STRUCTURE

FUNCTION

VALUE

MANAGEMENT

Eco (UFORE)
Streets (STRATUM)
Hydro
Vue

photo credits: Seattle i-Tree Training by Al Zelaya
Improving Air Quality

Shade on Paved Surfaces and Parked Cars
Reduces Evaporative Hydrocarbon Emissions and Ozone Formation

Oxygen and Volatile Organic Compounds Released Through the Leaves

Gaseous Pollutants Absorbed Through Leaf Stomates and Lenticels

Small Particles Adhere to Surfaces

Trees Save Energy for Cooling and Heating, Thereby Reducing Pollutant Emissions from Power Plants

Image courtesy of the Center for Urban Forest Research
Reducing Stormwater Runoff

Image courtesy of the Center for Urban Forest Research
Stormwater Management
Pierce County WA, Chambers Creek Properties - 4 year growth
stormwater management

Parks & People Foundation, Baltimore
linked to active living network
neighborhood social cohesion

environmental education & social learning
Urban Heat Island Effect

studies by NASA & EPA

urban trees = mitigation
Hilton Head, South Carolina
what about existing parking lots?
Stall and Aisle Dimensions

- standard 25 feet aisle
- compact vs. full size parking space ratios
- use one way aisles
- angle parking
- lot design “pick-up” space - recover impervious with vegetation
Minimum Stall and Aisle Dimensions

- Angle parking reduces aisle width
- 90° suitable for high volume, constant use
- 45° or 60° suitable for low volume, light use
human health & well-being

nearby nature & physical activity
City Trees and Public Health

- risks and toxics in the environment – one side of the story
- another perspective . . . .
  Howard Frumkin
  Centers for Disease Control
  nature as health asset
- community and nature planning for health
Physical Inactivity & Obesity

majority of Americans not active enough
goal-30 minutes per day of moderate activity
to reduce risk factors for chronic diseases
(heart, stroke, cancer, diabetes)
significant costs to national health services

$168 billion medical costs
17% of all U.S. medical costs
+ $1,429 per person per year for obese vs not

CDC 2010
Obesity Trends* Among U.S. Adults

1985

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” person)

Source: Behavioral Risk Factor Surveillance System, CDC.
Obesity Trends* Among U.S. Adults
2010

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)

<table>
<thead>
<tr>
<th>Percentage</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Data</td>
<td></td>
</tr>
<tr>
<td>&lt;10%</td>
<td></td>
</tr>
<tr>
<td>10%–14%</td>
<td></td>
</tr>
<tr>
<td>15%–19%</td>
<td></td>
</tr>
<tr>
<td>20%–24%</td>
<td></td>
</tr>
<tr>
<td>25%–29%</td>
<td></td>
</tr>
<tr>
<td>≥30%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Behavioral Risk Factor Surveillance System, CDC.
Age-adjusted % of adults aged ≥20 years who are obese, 2007

2007
Age-adjusted percent of adults ≥20 years old who are obese

- 0 - 26.2
- 26.3 - 27.7
- 27.8 - 29.1
- 29.2 - 30.8
- ≥ 30.9

Obesity Trends* Among U.S. Adults

BRFSS, 1990, 2000, 2010

(*BMI ≥30, or about 30 lbs. overweight for 5’ 4” person)

<table>
<thead>
<tr>
<th>Year</th>
<th>&lt;10%</th>
<th>10%–14%</th>
<th>15%–19%</th>
<th>20%–24%</th>
<th>25%–29%</th>
<th>≥30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

doubling of U.S. obesity rate since 1980s

Source: Behavioral Risk Factor Surveillance System, CDC.
overweight kids . . . obese adults

Obesity Is Found to Gain Its Hold in Earliest Years
By GINA KOLATA

Experts say the results of a major new study may reshape approaches to combating the nation's obesity epidemic, suggesting that efforts must start much earlier and focus more on the children at greatest risk.
City Trees & Nature
Active Living

<table>
<thead>
<tr>
<th>Positive Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Environment</strong></td>
</tr>
<tr>
<td>higher population density (city core rather than suburbs)</td>
</tr>
<tr>
<td>higher housing density</td>
</tr>
<tr>
<td>mix of land uses (such as residential and retail)</td>
</tr>
<tr>
<td>street design with more connectivity (rather than cul-de-sacs)</td>
</tr>
<tr>
<td>availability of public transit</td>
</tr>
<tr>
<td>walking and biking infrastructure (such as sidewalks and bike lanes)</td>
</tr>
<tr>
<td><strong>Psycho-Social Environment</strong></td>
</tr>
<tr>
<td>safety from crime</td>
</tr>
<tr>
<td>safety from traffic</td>
</tr>
<tr>
<td>absence of social disorder</td>
</tr>
<tr>
<td>aesthetics (including trees and landscape)</td>
</tr>
<tr>
<td>educational campaigns (such as Walk-to-School)</td>
</tr>
<tr>
<td>incentive programs (such as work place reimbursement for transit use)</td>
</tr>
</tbody>
</table>

*Table 1: Determinants of City Walkability*
parks, open spaces & trails
Percentage of Americans Living Within ½ Mile of a Park, by State

National average: 39%
Findings by State:

Lowest:
   West Virginia  9%

Highest:
   Minnesota    60%
   Hawaii       67%
   District of Columbia  88%

*10 States exceed 50%
make room for pedestrians
Parks Prescription
San Francisco
Albuquerque

From Fitness Zones to the Medical Mile:
How Urban Park Systems Can Best Promote Health and Wellness

THE TRUST for PUBLIC LAND
CONSERVING LAND FOR PEOPLE
- Annapolis MD Parks and Recreation
- South Carolina State Parks
- Sitka AK Nat’l Historic Park
- Indiana Dunes Nat’l Lakeshore

---

**Rx for Health:**

Get Up and Get Moving!

Congratulations on deciding to increase your physical activity!

Here is the plan we discussed to start you on your way.

**Date:**

**Start with:** minutes ____ days per week

**Gradually increase to:** minutes ____ days per week

**Where:**

We will review this plan at your next visit.

________________________

Health Care Provider Signature

---

**Increase Energy - Lower Stress**

**Enjoy the Outdoors**

Copyright © 2010 New Mexico Health Care Takes On Diabetes.
human health & well-being

workplace productivity
our evolution?!
Attention Restoration Theory
Rachel & Stephen Kaplan U of MI
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
the better office cubicle!

bottom line = $$ benefits of trees & nature
new efforts & messages
TKF Foundation Annapolis MD

public green spaces that please the eye, nourish the soul, and help renew communities
Design Elements

- Portal
- Path
- Destination
- Surround
portal :: path :: surround :: destination
portal :: path :: surround :: destination
Open Spaces Sacred Spaces

grants program – integrated design & research
Portland OR Legacy Hospitals
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
Human Dimensions of Urban Forestry and Urban Greening

featuring research on peoples' perceptions and behaviors regarding nature in cities

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...