Active Cities Meet Many Needs of Older Adults: Research Directions

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For University of Utah. April 2017
Outline

• How important is physical activity?
• Aging and livable, activity-friendly neighborhood
• Built environment and physical activity
• MACRO level
  • Community design
• MICRO level
  • Streetscape design
• Co-benefits of active design
• Some research priorities
Deaths (thousands) attributable to individual risk factors in both sexes

- Tobacco smoking
- High blood pressure
- Overweight-obesity (high BMI)
- Physical inactivity
- High blood glucose
- High LDL cholesterol
- High dietary salt
- Low dietary omega-3 fatty acids
- High dietary trans fatty acids
- Alcohol use
- Low intake of fruits and vegetables
- Low dietary polyunsaturated fatty acids

Danaei G et al, PLoS Medicine, 2009
Costs of Inactivity

• New report from CDC estimates 9-11% of US health care expenditures are due to adults not meeting guideline of 150 minutes of PA per week.

– Carlson, Progress in CVD, 2014
% of adults in state who commute by walking & cycling correlated with:

| % meeting physical activity recommendations | .72** |
| % obese | -.45** |
| % diabetic | -.66** |

John Pucher & colleagues documented how active commuting related to health outcomes across all 50 US states. Similar results with biggest 47 cities.
1. **Walkable**
   - Sidewalks, crosswalks, intersections, few dead-end streets or cul-de-sacs.

   **Potential Benefits:**
   - Lower obesity rates.\(^1\)
   - Better self-rated health.\(^2\)
   - Lower rates of self-reported disabilities.\(^3\)

2. **Accessible**
   - Extensive, street-level public transportation and well-maintained streets and sidewalks.

   **Potential Benefits:**
   - More walking outdoors.\(^4\)
   - Fewer mobility problems among those with difficulty walking.\(^5\)

3. **Compact**
   - Diverse mix of residences and businesses in close proximity.

   **Potential Benefits:**
   - Less mobility disability.\(^6\)
   - More walking outside by those with disabilities.\(^7\)
   - Longer walks by older men.\(^8\)
   - Lower heart disease risk.\(^9\)

4. **Safe**
   - Residents consider their neighborhoods safe.

   **Potential Benefits:**
   - Greater likelihood of recovering from mobility limitations.\(^10\)
   - More outdoor physical activity.\(^11\)
   - More frequent and longer walks.\(^12\)

5. **Plentiful Resources**
   - Parks, libraries, community centers, well-kept public spaces.

   **Potential Benefits:**
   - Slower cognitive decline.\(^13\)

6. **Healthy Air**
   - Low levels of fine particulate matter pollution.

   **Potential Benefits:**
   - Higher cognitive function.\(^14\)
THE LIVABILITY INDEX: GREAT NEIGHBORHOODS FOR ALL AGES
WWW.AARP.ORG/LIVABILITYINDEX
# The Livability Index: Great Neighborhoods for All Ages

<table>
<thead>
<tr>
<th>Livability Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing</td>
</tr>
<tr>
<td>Neighborhood</td>
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<tr>
<td>Transportation</td>
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<tr>
<td>Environment</td>
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<tr>
<td>Health</td>
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<tr>
<td>Engagement</td>
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<tr>
<td>Opportunity</td>
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</tbody>
</table>
The Design of Cities—Macro Level
Elements of An Active Living Community

Community Design Destinations

School & Worksite

Transportation System

Home

Park & Rec
Public Health Needs to Partner

Setting for PA

- Neighborhood
- Transportation facilities (sidewalks)
- Recreation facilities
- Schools & workplaces

Expertise for Policy, Practice

- Planners
- Transport engineers & planners
- Park & rec, landscape architects
- Educators, architects
Neighborhood Environments, Physical Activity, and Function Among US Older Adults: Findings from the Senior Neighborhood Quality of Life Study (SNQLS)

Participants: > 65 years & ambulatory, from hi/lo walkability and hi/lo income neighborhoods in Seattle & Baltimore regions

Funding from National Heart, Lung, & Blood Institute
“High Walkable”

High density, street connectivity, and mixed land use
“Lower Walkable”
Low density, low street connectivity, and residential only
Accelerometry-based MVPA (Min/week)

(Adjusted for Time, Region, Demographics)

SNQLS

Walkability: \( p < .056 \)
Income: \( p = .05 \)

King, Sallis, Frank, Saelens et al., 2011, Soc Sci Med
Walk/Bike for *Errands/Transport* (Min/wk)

(Adjusted for Time, Region, Demographics)

Walkability: $p < .0001$

Income: $p = \text{NS}$

Outside Activities (except gardening) (min/wk)
(Adjusted for Time, Region, Demographics)

Walkability: p < .008
Income: p = .04

King, Sallis, Frank, Saelens et al., 2011, Soc Sci Med, 73, 1525-1533
Body Mass Index (BMI)

(Affixed for Time, Region, Demographics)

Walkability: $p = 0.02$
Income: $p < 0.03$

An Additional Question of Interest:

Is the Walkability-PA Relationship Impacted by self-reported Mobility Impairment level?
## Results

- Significant Mobility x Walkability Interaction for *Transport Activity* \((p = .001)\)

<table>
<thead>
<tr>
<th>(Tertiles)</th>
<th>Non-Walkable</th>
<th>Walkable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Mobility</td>
<td>10</td>
<td>35 min/wk</td>
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<tr>
<td>Medium Mobility</td>
<td>28</td>
<td>54 min/wk</td>
</tr>
<tr>
<td>High Mobility</td>
<td>26</td>
<td>75 min/wk</td>
</tr>
</tbody>
</table>

Summary

• *Neighborhood design* appears to matter for Seniors, particularly for *certain types of PA* (e.g., transport PA, outdoor activities) & for *Weight*

• This appears to be the case *across levels of mobility impairment & neighborhood affluence*
Adjusted Prevalence of Overweight and Obesity Among Adults Aged 30 to 64 Years and Living in Urban Areas, by Walkability Quintile, 2001-2012
MICRO view: Design of streetscapes matters
What is the role of streetscape design?

MAPS Mini

• 15-item MAPS-Mini was designed for practitioners and advocates
  – Reduced from 120 items

• Items were selected based on
  – Correlations with physical activity
  – Guidelines and recommendations
  – Modifiability

• Evaluated for validity in 3677 children, teens, adults, older adults
  – 3 regions
### How do MAPS-Mini scores relate to active transportation? ADJUSTED

<table>
<thead>
<tr>
<th>MAPS Mini Score</th>
<th>Children</th>
<th>Adolescents</th>
<th>Adults</th>
<th>Seniors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Segments</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
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<tr>
<td>Public Parks</td>
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<tr>
<td>Transit Stops</td>
<td></td>
<td></td>
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<tr>
<td>Street Lights</td>
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</tr>
<tr>
<td>Benches</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Building Maintenance</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Absence of Graffiti</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Sidewalk</td>
<td></td>
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<tr>
<td>Buffer</td>
<td></td>
<td></td>
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<tr>
<td>Tree, Awning Coverage</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Absence of Trip Hazards</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Marked Crosswalk</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Curb Cuts</td>
<td></td>
<td></td>
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<tr>
<td>Crossing Signal</td>
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<td></td>
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<tr>
<td>GRAND SCORE</td>
<td></td>
<td></td>
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<tr>
<td>GRAND SCORE (for Active Transport)</td>
<td></td>
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</tbody>
</table>
Dose-response of MAPS-Mini total scores and active transport frequency for 4 age groups.
Lessons

• Both the design of cities and design of streetscapes are important for physical activity, across the lifespan

• “More is better”: Linear relations suggest that all environments can be improved

• Implications for zoning laws, transportation goals and funding, road design guidelines, measurement of active travel
Co-Benefits of Designing Activity-Friendly Environments

<table>
<thead>
<tr>
<th></th>
<th>Physical Health</th>
<th>Mental Health</th>
<th>Social Benefits</th>
<th>Environmental Sustainability</th>
<th>Safety / Injury Prevention</th>
<th>Economic Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Open spaces / Parks / Trails</strong></td>
<td>57.5+ 3.5(0)</td>
<td>93+</td>
<td>42.5+ 4(0)</td>
<td>20+ 4(0)</td>
<td>23+</td>
<td>19+ 4(0)</td>
</tr>
<tr>
<td><strong>Urban Design</strong></td>
<td>105+ 54(0)</td>
<td>31+ 4-</td>
<td>80.5+ 29(0)</td>
<td>265.5+ 45.5(0)</td>
<td>13.5(0)</td>
<td>69+ 10.5(0)</td>
</tr>
<tr>
<td><strong>Transport Systems</strong></td>
<td>7+ 3.5-</td>
<td>3+ 3.5(0)</td>
<td>23+</td>
<td>70+ 21(0)</td>
<td>67+ 14(0)</td>
<td>56+ 3.5(0)</td>
</tr>
<tr>
<td><strong>Schools</strong></td>
<td>19.5+ 3.5(0)</td>
<td>21+</td>
<td>11+</td>
<td>21.5+</td>
<td>4+ 3-</td>
<td>15+</td>
</tr>
<tr>
<td><strong>Workplaces / Buildings</strong></td>
<td>55+ 3.5(0)</td>
<td>18.5+ 4-</td>
<td>20.5+</td>
<td></td>
<td></td>
<td>48+ 3.5(0)</td>
</tr>
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Designed to Move: Active Cities

Blueprint for city leaders to create an active city

- Comprehensive summary of the evidence base on co-benefits
- Proven interventions
- Recommendations, checklists, practical steps/ideas, sample metrics
- Talking points for city leaders
- Case studies of ‘bright spots’

- www.designedtomove.org/resources
¿Hay Lugares Seguros Para Que TODOS los Niños Puedan Realizar Actividades Físicas?

Las comunidades de color y/o de bajos ingresos tienen tasas mayores de obesidad. Además, carecen de lugares atractivos, convenientes y seguros para actividades físicas.

<table>
<thead>
<tr>
<th>Falta de instalaciones recreativas</th>
<th>70%</th>
<th>81%</th>
</tr>
</thead>
<tbody>
<tr>
<td>de los vecindarios afroamericanos</td>
<td></td>
<td></td>
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<tr>
<td>de los vecindarios hispanos</td>
<td></td>
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<tr>
<td>carecen de instalaciones recreativas.</td>
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</table>

<table>
<thead>
<tr>
<th>Menos recreo</th>
<th>159% más probable</th>
</tr>
</thead>
<tbody>
<tr>
<td>que los niños que viven por debajo del nivel de pobreza se vean privados del recreo.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Aceras de baja calidad</th>
<th>38 veces más probable</th>
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<tbody>
<tr>
<td>que las aceras en los vecindarios afroamericanos sean de baja calidad.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condiciones peligrosas</th>
<th>3.6 más accidentes por milla de calle</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>45.5 más delitos por acre</td>
</tr>
<tr>
<td>comparadas con las comunidades blancas.</td>
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</tr>
</tbody>
</table>

Para mayor información, vea nuestra síntesis de investigación [www.activelivingresearch.org/disparities](http://www.activelivingresearch.org/disparities)

**Active Living Research**
[www.activelivingresearch.org](http://www.activelivingresearch.org)

**THE ROLE OF Transportation IN PROMOTING PHYSICAL ACTIVITY**

**Medians, speed bumps and other traffic-calming efforts can reduce the number of automobile crashes with pedestrian injuries by up to 15%**

**Public Transportation**

30% more steps per day than people who rely on cars.

**Sidewalks**

47% more likely to be active at least 30 minutes a day.

**Bike facilities**

49% of their miles on roads with bike facilities, even though these are only 8% of road miles.

**Active Living Research**
[www.activelivingresearch.org](http://www.activelivingresearch.org)

**Salud America!**
[www.salud-america.org](http://www.salud-america.org)

**References:**


**Active Living Research**
[www.activelivingresearch.org](http://www.activelivingresearch.org)

**In Portland, Ore., bicycle commuters ride**

49% of their miles on roads with bike facilities, even though these are only 8% of road miles.
Research Priorities

- Preferences of older adults about neighborhood attributes that help them feel comfortable and confident to live and move around independently
- Effects of built environments on health outcomes and health care costs
- Role of activity and engagement programming
- How can transit service be optimized for seniors?
- Impact of engaging seniors in advocacy
  - Using MAPS and park audits
Research Priorities

• How to address fear of crime (role of CPTED?)
• Evaluate policies to improve activity-friendliness
  – Complete streets, form-based codes
• Evaluate policies to support affordable housing
• Evaluate environmental changes
  – Sidewalk improvements, park renovations, transit expansions
• Designing streets for people with disabilities and users of assistive devices.
• Cost-effectiveness of streetscape improvements
• Research translation: improving communication of evidence to decision makers
Urban design, transport, and health

“Systematic designing of cities to enhance health through active transport promises to be a powerful strategy for improvements in population health on a permanent basis.”