

Neighborhood Effects on Physical Activity

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Outline

- **Research background**
- **Study 1: “Walking for transportation or leisure: What difference does the neighborhood make?”**
- **Study 2: “Contextual effects of built and social environments of urban neighborhoods on physical activity: A multilevel study in Chicago”**
- **Policy implications**



Neighborhood Effects on Health

- **Spatial variations in health outcomes have been well documented**
- **Over the past few decades, the assumed explanation usually focused on individuals.**
- **In recent years, interest in neighborhood effects on health has increased sharply.**
- **Most findings point to independent neighborhood effects on health.**



Physical Activity (PA)

- **Health benefits of physical activity well established.**
- **Only about 25% of Americans engage in the recommended amount of PA.**
- **Temporal trend showed little improvement over the past decade.**
- **Few interventions have been effective at increasing PA level long term.**
- **In recent years, recognition of the impact of environmental factors on active living has grown.**



Neighborhood effects on PA

- Neighborhood *social* environment-living conditions and social-cultural contexts
 - Socioeconomic status (SES)
 - Social cohesion and social capital
 - Safety
- Neighborhood *built* environment-human formed, developed, or structured areas
 - Land use pattern
 - Access to PA promoting resources such as open space, parks, facilities
 - Traffic
 - Walkability



Study 1: State of California

“Walking for transportation or leisure: What difference does the neighborhood make?”

*(Wen, Kandula & Lauderdale. 2007.
Journal of General Internal Medicine 22 (12): 1674-1680)*



Objectives

- **To examine the associations between total walking and neighborhood factors in a multiethnic population-based sample in California**
- **To examine the roles race/ethnicity plays in these associations.**



Data Sources

- The 2000 Census data are used to construct structural variables measuring neighborhood socioeconomic status.
- The 2003 California Health Interview Survey (CHIS). The sample size was 41,545 in this study. The response rate of this telephone survey was 60%.



Measures

- **Dependent measure:** *Walking at recommended levels (5 or more sessions of walking for transportation or leisure) in the previous week totaling at least 150 minutes)*
- **Neighborhood SES (alpha = 0.83):**
 - *Affluence (% households with \$75,000 annual income or over)*
 - *Poverty (% households at or below the Federal Poverty Line)*
 - *Education (% college educated residents)*
 - *Home ownership*



Measures

- **Neighborhood social cohesion (alpha = 0.70):**
 - . *“People in my neighborhood are willing to help each other”*
 - . *“People in this neighborhood generally do not get along with each other”*
 - . *“People in this neighborhood do not share the same values”*
 - . *“Most people in this neighborhood know each other.”*
- **Neighborhood safety (alpha = 0.66):**
 - . *“Many people in this neighborhood are afraid to go out at night”*
 - . *“Many people in this neighborhood are afraid to go out during the day”*
 - . *“The park or playground closest to where I live is safe at night”*



Measures

- **Neighborhood physical environment:**

- . *“Does your neighborhood have a park, playground, or open space within walking distance of home?”*

- **Individual control variables:**

- . *Age*
 - . *Gender*
 - . *Race/ethnicity*
 - . *BMI*
 - . *Marital status*
 - . *Poverty income ratio*
 - . *Education*
 - . *Employment status*
 - . *Percent of life spent in the U.S.*



Statistical Analysis

- All estimates and analyses were weighted using replicate weights, provided by CHIS to adjust for non-response and the complex survey design.
- A series of logistic regression models with robust standard errors were performed, where the outcome was walking at recommended levels.



Main Findings

	1	2	3	4	5
Neighborhood SES	1.0				0.98
Social cohesion		1.10^{***}			1.09^{***}
Access to open space			1.27^{***}		1.26^{***}
Safety				1.05^{**}	1.01

- **N=41,545**
- *** $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$ (two-tailed test)**
- **Controlling for age, gender, race/ethnicity, BMI, marital status, income, education, employment status, percent life spent in the U.S at the individual level.**



Summary

- **Neighborhood social cohesion and access to a park, playground, or open space were significant environmental correlates of walking at recommended levels, independent of individual socio-demographics.**
- **Neighborhood factors do not contribute to racial/ethnic disparities in physical activity.**
- **Neighborhood effects vary according to racial/ethnic background.**



Funding

- **Research Scholars Grant GPHPS 107922
(American Cancer Society)**
- **NICHD R03HD0525370-01**



Study 2: City of Chicago

“Contextual effects of built and social environments of urban neighborhoods on physical activity: A multilevel study in Chicago”

(Wen & Zhang, American Journal of Health Promotion, In Press)



Objective

- **To examine the associations between neighborhood built and social environments and regular exercise in the City of Chicago**



Data Sources

- The 1996 Census data are used to construct structural variables measuring neighborhood socioeconomic status.
- The 1995 Project on Human Development in Chicago Neighborhoods-Community Survey (PHDCN-CS)
- The Metropolitan Chicago Information Center-Metro Survey (MCIC-MS)
- Multiple administrative sources



Measures

- **Dependent measure:** *“In the past year to stay healthy or improve your fitness did you exercise regularly?” (Yes/No)*
- **Neighborhood social environment (alpha = 0.92)**
 - *Affluence (% households with \$50,000 annual income or over)*
 - *Poverty (% households at or below the Federal Poverty Line)*
 - *Education (% college educated residents)*
 - *Percent female-headed households*
 - *Percent households on public assistance*
 - *Neighborly trust*
 - *Norms of reciprocity*
 - *Perceived violence*



Measures

- Neighborhood built environment:

- **Block density:** The number of blocks per square miles within a neighborhood cluster.

- **Distance to parks:** The flying distance (miles) from a neighborhood centroid to the nearest public park.

- **Land use pattern:** The land use mix (residential, commercial, office)

- **Pedestrian injury rate:** Number of pedestrian injury accidents per square miles

- Access to restaurants and bars (1 mile buffer)

- Access to art, culture, leisure, and entertainment facilities (3-mile buffer)

- Access to social institutions (3-mile buffer)

- Access to health and human services (2-mile buffer)



Statistical Analysis

- **A series of two-level random logistic regression models were performed, where the outcome was regular exercise in the past year.**



Main Findings

	1	2	3
Access to restaurants and bars	1.35 ^{***}	1.24 ^{***}	1.24 ^{***}
Neighborhood social environment		1.21 ^{***}	1.37 ^{***}
Access to restaurants and bars*Male			0.66 ^{***}

- **N=907** individuals living in **242** neighborhood clusters.
- * $p \leq 0.05$ ** $p \leq 0.01$ *** $p \leq 0.001$ (two-tailed test)
- **Controlling for age, gender, race/ethnicity, income, education at the individual level.**



Summary

- **Neighborhood social and built environments are both important for individual leisure-time physical activity.**
- **Some hypothesized built environmental factors were not significant.**
- **Neighborhood effects seem to be stronger for women.**



Funding

- **R03HD052537-02 from the NICHD**



Limitations

- **Cross-sectional design**
- **Generalizability**
- **Self-reported physical activity measures**



Policy Implications

- **Need to address behaviors at multiple levels**
- **Both the social environment and the built environment are important.**
- **Neighborhood effects may vary according to individual characteristics and locations**