Urban Sprawl and Chronic Medical Problems

Deborah Cohen, MD, MPH

Roland Sturm, PhD

Theoretical Background
Ecological Influences on Health

- Housing
- Street design
- Mass transit
- Land use
- Parks
- Media
- Marketing

- Diet
- Physical activity
- Substance use
- Sexual activity
- Violence

- Obesity
- Diabetes
- Heart disease
- Cancer
- STD/HIV
- Injury

Sprawl Is an Increasingly Popular Form of the Built Environment

Sprawl = Urbanized areas with:

- **Separated residential, shopping, and business areas**
- **Limited street connections**
- **Lower population density**
- **Dependence on automobiles**

Objective

To determine whether sprawl is associated with:

- **Health-related quality of life,**
- **Chronic medical problems,**
- **Mental health problems**

Methods

Secondary data analysis using:

- **A national health survey (funded by RWJ), where respondents had geographic identifiers**
- **Used predetermined sprawl measures to categorize the urban environment of respondents**

Sprawl Measures (Ewing et al, 2003)

Dimension	Sample Metrics
Streets factor	• Average block length • Block size in square miles • % small blocks
Land use mix factor	• % population within 1 mile of shopping, schools, business • Job/resident balance
Concentration of people and jobs (Centers factor)	• Variation of density across census tracts • Density gradient • % of population less than 3 and % more than 10 miles from business center
Population density factor	• People per square mile • % in low density areas • % in high density areas • Average lot size

83 Cities Ranked by Sprawl

From Least to Most Sprawl

New York 178

Los Angeles 102

San Diego

Riverside 14

RAND

http://www.smartgrowthamerica.com/sprawlindex/sprawlindex.html January, 2004

Data

- Healthcare for Communities (HCC), national household phone survey fielded in 1998-2001
- Clustered in 60 MSAs and suburban sprawl indicators available for 38 of those
- N = 8,686

We Evaluated the Relationship Between Health and Sprawl

- We used Ewing's measure of sprawl
- Survey data included:
  - Self-reported chronic health problems
  - Mental health screening
- We controlled for a variety of factors that might explain differences

Outcome Measures

- **Physical health: 16 chronic health conditions or symptom clusters**
- **Mental health: validated scales (CIDI-SF) for depressive and anxiety disorders**
- **Health-related quality of life: validated scales for physical health (PCS-12), for psychological well-being (MHI-5). Higher values indicate better health**
- **Linear and logit regression with sprawl as main explanatory variable and adjusting for individual and site factors**

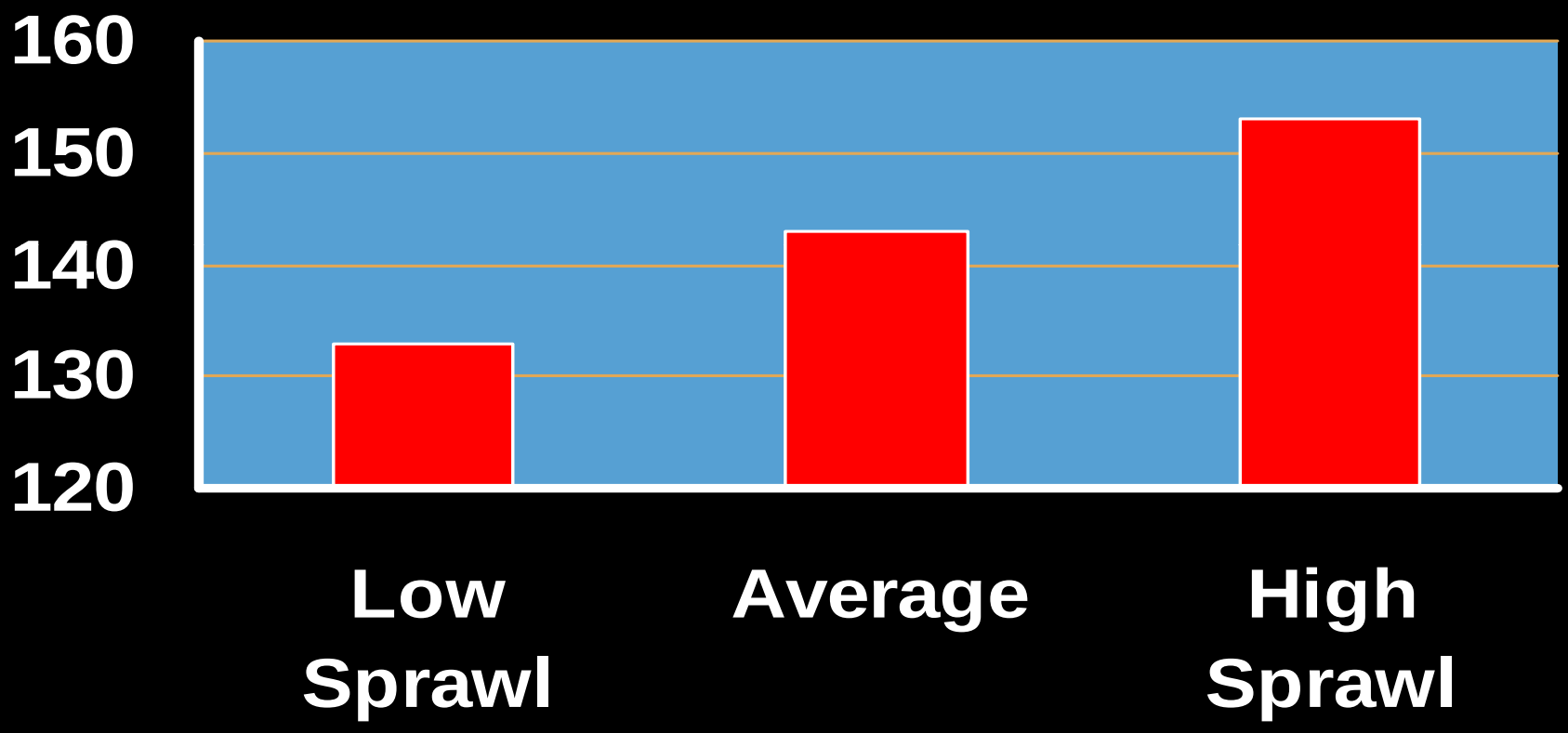
People Were Asked to Self-Report on A Variety of Chronic Health Problems

- Asthma
- Diabetes
- Hypertension
- Arthritis
- Physical disability
- Trouble breathing
- Cancer
- Neurological condition
- Stroke
- Angina/heart disease
- Back pain
- Abdominal/digestive problems
- Liver disease
- Migraine/headache
- Urinary tract problems
- Other chronic pain

We Controlled for Other Factors that Might Explain Health Status

- Age
- Race
- Gender
- Education
- Income
- Marital status
- Family size
- Employment status
- Climate (Annual rain days, days hotter 90 degrees, days colder 32 degrees)
- Population size

Sprawl Is Associated with More Health Problems



RAND

January, 2004

Source: Sturm and Cohen, 2003

Sprawl Has the Most Significant Effect on . . .

- **Arthritis**
- **Trouble breathing**
- **Abdominal/digestive problems**
- **Migraine/headaches**
- **Urinary tract problems**

Looking at Streets and Mixed Use Factors Instead of the Overall Sprawl Index

- **Arthritis**
- **Trouble breathing**
- **Abdominal/digestive problems**
- **Migraine/headaches**
- **(Urinary tract problems, n.s.)**
- **Heart disease**

Demographic Factors Associated with Increased Likelihood of Chronic Conditions

	Increase in number of chronic conditions per person
Aging 4 years	1.0
Reducing household income by half	0.6
African American	0.9
High school degree	3.2

Sprawl Has a Substantial Independent Effect

	Increase in number of chronic conditions per person
Aging 4 years	**1.0**
Reducing household income by half	**0.6**
Black race	**0.9**
High school degree	**3.2**
50-point difference in Sprawl Index e.g Dallas vs. Boston, Atlanta vs. Tucson	**1.0**

Sprawl and Mental Health

No effect seen for :

- **Depression**
- **Anxiety**
- **Psychological well-being**

Subpopulation Effects: Increase in Chronic Medical Problems given a 50 point increase in Sprawl

- **No differential effect on minorities**
- **Higher for lower income individuals (1.4 more per person, but not significant)**
- **Much higher for the elderly (2.5 more conditions/person)**

Study Limitations

- We looked at only a small number of cities (n=38)
- Multi-county metropolitan areas may be too large and heterogeneous for interpretation
- Data are from a single point in time; longitudinal data would be useful
- Outcome data are self-reported symptoms and conditions, not objective diagnoses

Summary

- **Higher degree of sprawl associated with higher numbers of chronic medical problems.**
- **Disproportionate impact of sprawl on the physical health of the elderly.**
- **Streets factor, but not overall sprawl index, significantly associated with hypertension and heart disease.**
- **In contrast to prominent hypotheses, no adverse effects of sprawl on mental health.**

Conclusion

- **Provides support to hotly debated claim that suburban sprawl is bad for health.**
- **Important to determine whether our findings from the United States generalize to other developed countries, many of which face similar challenges associated with suburban sprawl.**
- **If future research confirms our initial results, policies that address the built environment can play a critical role in the prevention of a wide variety of chronic diseases.**

Next Steps

Analyze data at the census tract level

Use census tract level indicators of sprawl, including:

- **Street connectivity**
- **Job availability**
- **Mixed land use**
- **Other local factors**