The Social Determinants of Health: How Neighborhoods Matter

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Neighborhoods & Health

- Evidence suggesting a link between neighborhood social and physical context and individual health
  - Asthma
  - Depression
  - Heat wave mortality
  - Impaired functional status
  - Increased cardiovascular risk

The Study of Neighborhoods & Health

- Challenges to research in neighborhoods
  - Causality and selection
  - Measurement
  - Data limitations
  - Mechanisms linking neighborhood to health

- Challenges to research in health
  - Individual-level concentration
  - Focus on demographic-based disparities
  - Disparities may exist at neighborhood level, and may extend beyond composition (e.g., Wilson)
Innovation in Neighborhood Research

- Project on Human Development in Chicago Neighborhoods (PHDCN)
- LA Family and Neighborhood Survey (LA-FANS)
- The Moving to Opportunity Study (MTO)
  - Evidence indicates that context matters (Kling et al. 2007):
    - Adults
      - Obesity
      - Mental health
    - Children
      - Mental health (girls only)
      - Health related behaviors
        - Girls get better, boys get worse

Other Approaches

- How else might we contribute to the understanding of the neighborhood-health relationship?

Collective Efficacy Theory, Neighborhood Stressors & Health

Structure
- Economic disadvantage
- Absence of affluence
- Residential instability
- Ethnic heterogeneity

Stressors
- Disorder
- Crime

Outcomes
- Health

Social Organization
- Collective efficacy
- Network density

How do these factors impact health?
Neighborhood Context and BMI

- Neighborhood structural effects:
  - Racial composition / economic disadvantage (Boardman et al. 2005; Chang et al. 2009; Ruel et al., 2010)
  - Built environment (Sallis et al. 2007; Zick et al. 2009)
- Neighborhood social process effects:
  - Disorder / psychosocial hazards (Burdette & Hill, 2008; Chang et al. 2009; Glass et al. 2006)
    - Suggestion that focus on individual-level treatment may be ineffective (Cubbin et al., 2006; Glass et al. 2006)

Crime as Neighborhood Stressor

- Cohesive social environment associated with reduced crime (Sampson, Raudenbush & Earls 1997)
- Crime may influence:
  - Health behaviors: e.g., use of outdoor space for recreation, changes in diet ("comfort food")
    - Exposure to stressors may increase caloric intake, disproportionately saturated fat and carbohydrates (Dallman et al. 2004; Tataranni, et al. 1996; Yacano, 2004; Yacano-Freeman & Gill 2004)
  - Stress response: Perceived threats trigger fight-or-flight response that can lead to higher BMI
    - Release of hormone epinephrine and neurotransmitter norepinephrine; follow-up stage results in release of cortisol—linked with slowed metabolism, weight gain (esp around middle)
    - Over time, frequent strains can lead to heighten reactivity

Crime “Spikes” and BMI

- Neighborhood research tends to neglect changes in psychosocial environments
- Health consequences of significant increases in crime within neighborhood—crime “spikes”—may independently affect BMI
  - Weight fluctuation is associated with higher risk of all-cause and cardiovascular disease mortality
Social Cohesion
Contingent Effects of Crime Spikes

- **Buffering**: Social cohesion reduces the positive effect of crime spike on weight gain
  - Fear reduction
- **Amplifying**: Social cohesion enhances the positive effect of crime spike on weight gain
  - Social ties disseminate information about local crime
- Gender??

Data

- **Dallas Heart Study (n = 1573)**
  - Area probability sample of Dallas County
  - Detailed SES, biomarker and imaging data
  - Aggregated measure of social cohesion from DHS Social Survey data (Visit 1)
- **National Neighborhood Crime Data**:
  - 1999-2001 incident-based crime data geocoded to census tract level
- **2000 Decennial Census**
- Overlapping DHS/crime data a unique opportunity

Independent Measures

Neighborhood Social Cohesion

- Social cohesion measure based on Sampson, Raudenbush, and Earls (1997)
- Neighbors …
  - close-knit
  - trustworthy
  - helpful
  - $\alpha = .68$
- Final measure is empirical Bayes residual from a three-level rating scale analysis (ordinal logit) of cohesion items
Independent Measures
Neighborhood Crime Rates

- Evidence on fear by type of crime (Skogan 1986; Sprott & Doob 1997)
- Burglary rate by year (‘99, ‘00, ‘01)
  - City of Dallas 3-year average rates per 100,000 population (NNCS data): 1603.8
- Change in burglary rate (crime “spike”):
  - Top 20% of neighborhoods on change in burglary rate in year prior to Visit 1 interview date
  - On average, crime spike characterized by 60% increase in crime rate

Analytic Strategy
Crime data/DHS Longitudinal Data Structure

- Yr prior to V1 Interview: Crime rate/crime change
- Trajectory/Period of observation: BMI change
Figure 1. Change in BMI Between DHS Visit 1 and 3 by Crime Spike Neighborhood.

Social Cohesion (Dallas Heart Study)

Three-year Average Crime Rate 1998-2001

Figure 1. Change in BMI Between DHS Visit 1 and 3 by Crime Spike Neighborhood.
Figure 2. Change in BMI Between Visit 1 and 3 for Crime Spike Neighborhoods (Mean and High Cohesion)

![Graph showing change in BMI between visits for crime spike neighborhoods.]

- Crime spike: Mean cohesion
- Crime spike: High cohesion

Potential for 15.5 lb weight gain over 10 weeks (assuming 3500 cal leads to one lb weight gain)

Conclusions
- Social cohesion reduces the rate of weight gain
- Neighborhood crime spikes associated with change in BMI (effect dissipates over time)
- More cohesive neighborhoods amplify the effect of crime spikes on BMI
Implications

- Stronger evidence of potential causal impact of neighborhood stressors on health
- Evidence that crime volatility is more important than overall crime rate for women, opposite for men
- Signal of the “downside” of neighborhood social cohesion
- Changing individual behaviors in isolation may be more difficult than modifying environmental risk factors (Diez Roux 2003)
- Important to continue to investigate role of exogenous events
  - 9/11 may have induced fear-related changes in health behaviors and physiology (may be more consequential for Latinos, consistent w/ Do et al 2007)
- Role of activity space (GPS monitoring)

Fear, Food & 9/11

Fear-inducing events

- Neighborhood (e.g., crime spike)
- National (“9/11 effect”)
  - Few analyses that examine changes in fear threshold/temperament nationally
  - May be particularly relevant to examine by race/ethnicity
    - Immigration concerns
    - Skin color

Fear-related behavior

- Do we eat more when we are scared?
- Do we gravitate toward “comfort food?”

Figure 3: Average BMI change between DHS Visits 1 and 3 by Timing of Visits (September 11)

- ** p < .01
- + p < .10

As compared to V1 and V3 before 9/11
Analyses control for gender, age, marital status, risk status, race/ethnicity, health behaviors, ed, income, neigh structural characteristics
Condition of buildings on respondent's block:
- Poorly or very poorly kept
- Well kept
- Very well kept

Hypertensive Systolic Blood Pressure (n = 2,757)
Elevated HbA1c (n = 1,645)
CRP indicative of chronic inflammation (n = 1,695)
CRP indicative of acute infection (n = 1,825)