# Health and Urban Life: A Sociological Framing

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SFI
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*The city, in short, shows the good and evil in human nature in excess. It is this fact, perhaps, more than any other which justifies the view that makes the city a laboratory or clinic in which human nature and social processes may be most conveniently and profitably studied (Park, 1915, p. 162).*

# Overview

- What do sociologists bring to the study of urban life, the structure of cities?

- Why is health an important lens for understanding social life?

- Why study health in urban space?  How does the study of health inform approaches to increasingly urbanized contexts?

# Urban Health

- What is urban health?
  - "the explicit investigation of the relation between the urban context and population distribution of health and disease" (Galea & Vlahov, 2005)
  - Attention to the environment of cities

# Frame

- Research in urban health, historically, has focused on the health-compromising aspects of living in close social space (e.g., infectious disease, pollution)

- Contemporary pursuits examine the range of exposures—both health-compromising and health enhancing—that characterize more densely populated communities

# History
## (courtesy of the CDC)

- Urban planning and public health intertwined
  - 1854: British physician John Snow used geographic mapping of cholera outbreak in London to identify a public water pump as source
  - 1800s: Geographic analysis a key planning tool shared by urban planning and public health –planners such as Frederick Law Olmsted bridged gap between fields by advancing concept that community design contributes to physical/mental health
    - served as President Lincoln's U.S. Sanitary Commission Secretary
    - designed hundreds of places, including New York's Central Park and Chicago's Washington Park, Jackson Park, Midway Plaisance
  - 1872: disciplines so aligned that two of seven APHA founders were urban designers (architect, housing specialist)
  - 1926: US Supreme Court, in validating zoning and land-use law as legal government authority in *Village of Euclid v. Ambler Realty,* cited protection of public health as part of justification
  - 1960s: urbanist Jane Jacobs called for community design that offered safe/ convenient options for walking, biking, and impromptu social interaction
  - 1980s: Healthy Cities movement began in Europe/US, now including projects in approximately 1,000 cities; highlights role of health as much more than presence of medical care

# History
## (courtesy of the AIA)

- Health, urbanism and architecture
  - Two "parent disciplines" of city planning: medicine and architecture (Hebbert, 1999)
  - Sanitary reformers as first city planners
  - 1930s: disease control and effective sanitary systems
  - Postwar period change to urban space
    - Middle-class Americans began buying more cars and moving to newly formed suburbs
    - Urban cores around country depopulating and cities losing their tax bases, leaving behind abandoned buildings and blighted neighborhoods
    - 1949 Housing Act, Title I, provided federal funding for slum clearance, making way for superblocks and expressways through neighborhoods
    - Results of urban renewal (particularly large scale highways located in dense residential neighborhoods) are now recognized as some of most detrimental aspects of urban environment in terms of health, with direct association between asthma, air particulates, and highway congestion

# Chicago School

- Concept of neighborhood *social disorganization* perhaps most enduring intellectual legacy of the Early Chicago School (1894-1940)
- Social disorganization – inability of community to realize common values and maintain effective social controls
- Thomas and Znaniecki
  - First to apply notion of social disorganization in their study of immigrants adapting to rapidly changing 20th century urban context (*The Polish Peasant, 1918-28*)
  - Attenuated normative structures, heterogeneous cultural contexts
- Park and Burgess
  - Pioneered human ecology perspective – spatial approach to understanding why some areas had higher levels of social disorganization (*The City, 1925*)
  - Residential mobility/change in land use patterns lead to equilibrium imbalance
- Shaw and McKay
  - Refined social disorganization approach for purposes of understanding neighborhood-level variation in crime (*Juvenile Delinquency in Urban Areas, 1942*)
    - Neighborhood poverty, residential instability, and racial/ethnic heterogeneity compromised ability of residents to realize shared values, including control of crime in public space

Burgess, 1925
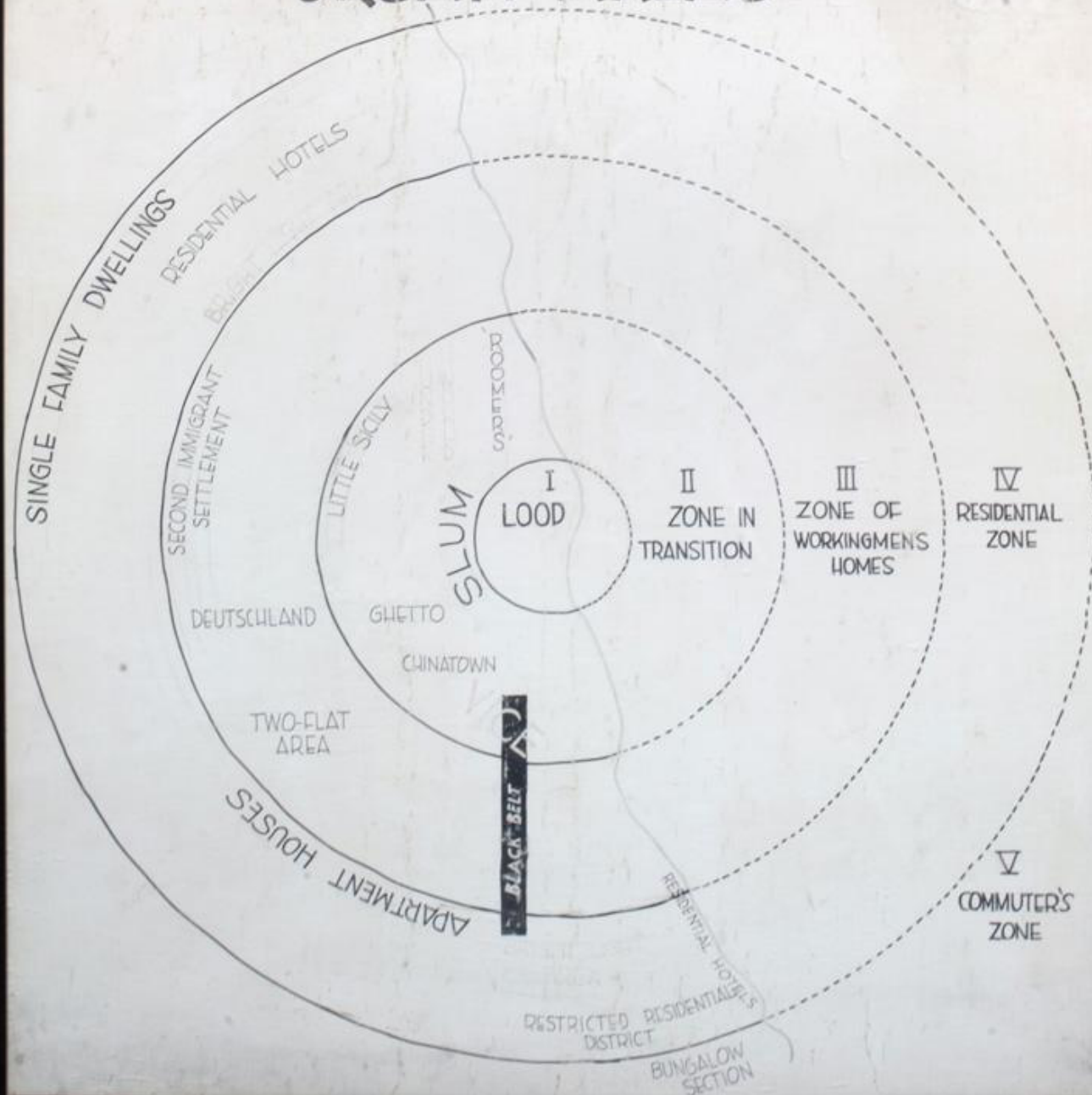
# Overview

- Limitations in characterization of space (breadth and depth)
  - Circumference of turf
  - Micro-environment
- Limitations in harbingers of health
  - Olfaction as a biomeasure

- First, a brief detour on heat…

# The Chicago Heat Wave


A SOCIAL AUTOPSY OF DISASTER IN CHICAGO
HEAT WAVE
ERIC KLINENBERG

- **Klinenberg's (2002) ethnographic account**
- **Between 485 and 739 heat-related deaths in Chicago in July 1995 heat wave—mostly elders (73%)**
- **July average death count/day: 72**
- **Saturday, July 15 death count: 365**

# The Social Consequences of Disaster

- Disaster makes visible the social distribution of vulnerability
- Differential consequences of exposure by social location
  - Who you are
  - Where you live

# Inequality in Heat-Related Deaths (Klinenberg)

- **By age**
  - Elders at much greater risk
- **By race**
  - Blacks more vulnerable than whites; Latinos experienced uniquely low vulnerability
- **By gender**
  - Men more vulnerable than women
- **By neighborhood**
  - Klinenberg offers evidence of differential heat-related death rates across neighborhoods

# Research Question

- *Why did some neighborhoods experience greater vulnerability to heat-related death than others during the 1995 heat wave?*

# Jane Jacobs

# Social Disorganization Theory

## Structure

* Poverty

* Residential instability

* Ethnic heterogeneity

## Outcomes

* Crime
* Health

## Social Disorganization

* Heightened disorder
* Diminished collective efficacy

# Integrated Social Disorganization/Ecological (Jacobs) Approach
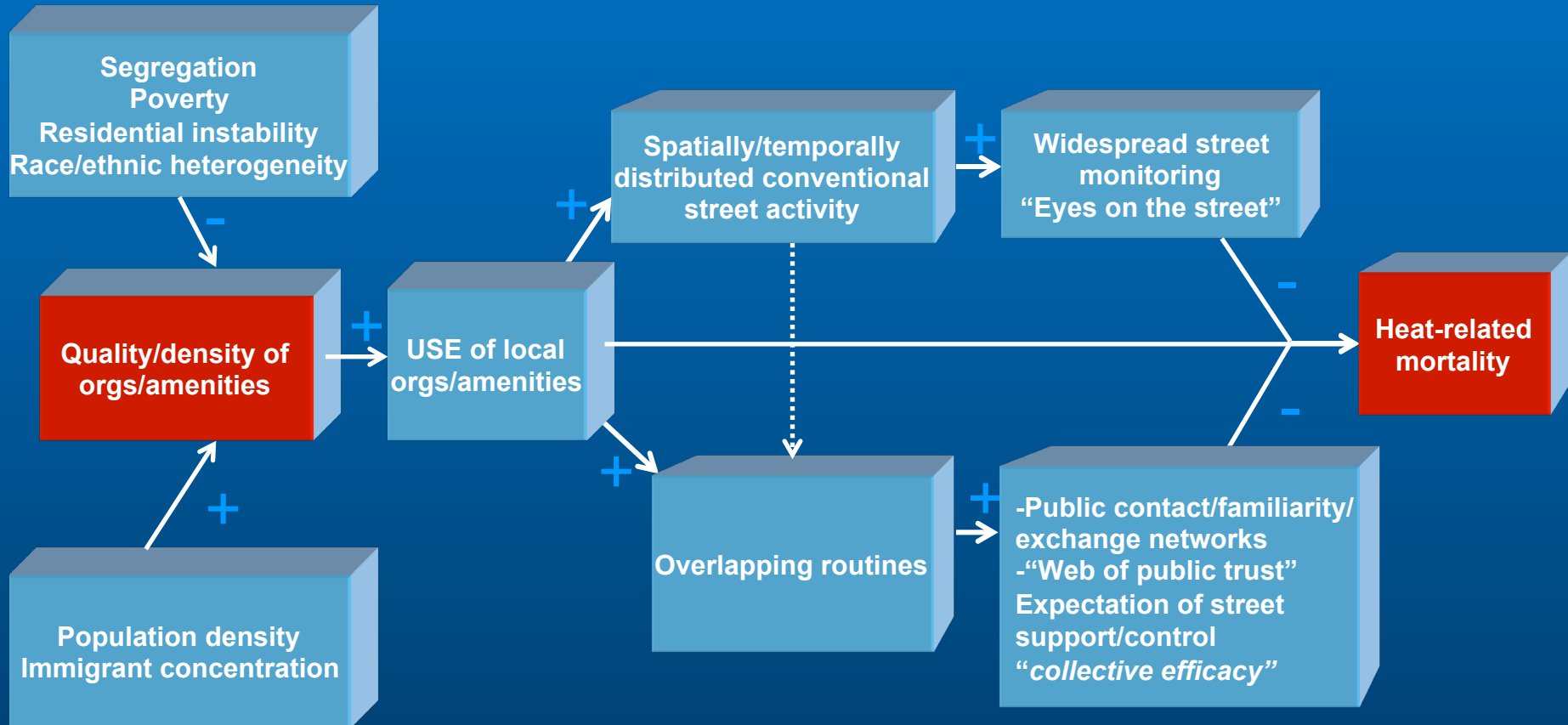
# Hypotheses

- Structural characteristics of neighborhoods (including affluence, residential instability, population density, and proportion of older population living alone) explain variation in neighborhood level heat-related death

# Hypotheses (cont'd)

- Neighborhood level social processes and physical conditions (social interaction/ exchange, collective efficacy, commercial conditions) independently explain heat-related death variation across neighborhoods during heat wave

- Neighborhood social processes account for structural effects on heat-related death

# Data

- Illinois Department of Public Health Mortality data for Chicago pop age 60 plus during July 14-20 (1990-96)
- 1990 Census data

# Data

- 1994-95 Project on Human Development in Chicago Neighborhoods Community Survey
  - Cross-sectional survey of Chicago residents
  - 8782 respondents living in 343 neighborhood clusters (NCs)
  - NCs aggregation of 1-3 census tracts
  - Response rate = 75%
  - Timing fortuitous

# Data

- **PHDCN Systematic Social Observation (SSO)**
  - Videotaped and coded data on physical conditions of 23,000+ face blocks in Chicago

# Mortality

- Deaths among 60 plus population by:
  - Age (60-69, 70-79, 80+)
  - Race (black, white, Latino)
  - Sex
  - Year
  - Census tract

# Neighborhood structure

- Structural characteristics from 1990 Census data:
  - Concentrated poverty: % in poverty, unemployed, on public assistance, under 18, female-headed households
  - Residential stability: % same house '85, home owner
  - Logged population density
  - Proportion of age 60+ population living alone

# Neighborhood Social Processes

- Health-related collective efficacy (reliability = .73)
  - respondent's level of agreement:
    - neighbors are close-knit,
    - neighbors are trustworthy
    - neighbors are helpful
    - neighbors don't get along (reverse coded)
    - can count on neighbors to shop for groceries if sick
    - can count on neighbors to watch out for children's safety
    - neighbors would intervene if a fight broke out

# Neighborhood Social Processes (cont'd)

- Social interaction/reciprocated exchange (reliability = .61):
  - number of friends in neighborhood,
  - frequency of parties
  - frequency of visits
  - frequency of advice-giving
  - frequency of favor exchange among neighbors

# Neighborhood Social Processes

- Commercial density
  - Prevalence of local businesses (20 different categories)
- Commercial decline (reliability = .91)
  - Commercial buildings in fair or poor condition;
  - Burned out, abandoned, or boarded up commercial buildings
  - Liquor stores
  - Bars and alcoholic beverage services
  - Pool hall or videogame parlors
  - Signs advertising beer, whiskey or other alcoholic beverages

# Analytic Strategy

- Three objectives:
  - Control for social composition
  - Isolate 1995 death rate for July 14-20 period
  - Predict variation in death across neighborhoods based on neighborhood structural and social/physical mechanism measures

# Excess Mortality for Chicago Neighborhoods: July 14-20, 1995



Excess mortality for July 14-20, 1995

- low
- medium
- high
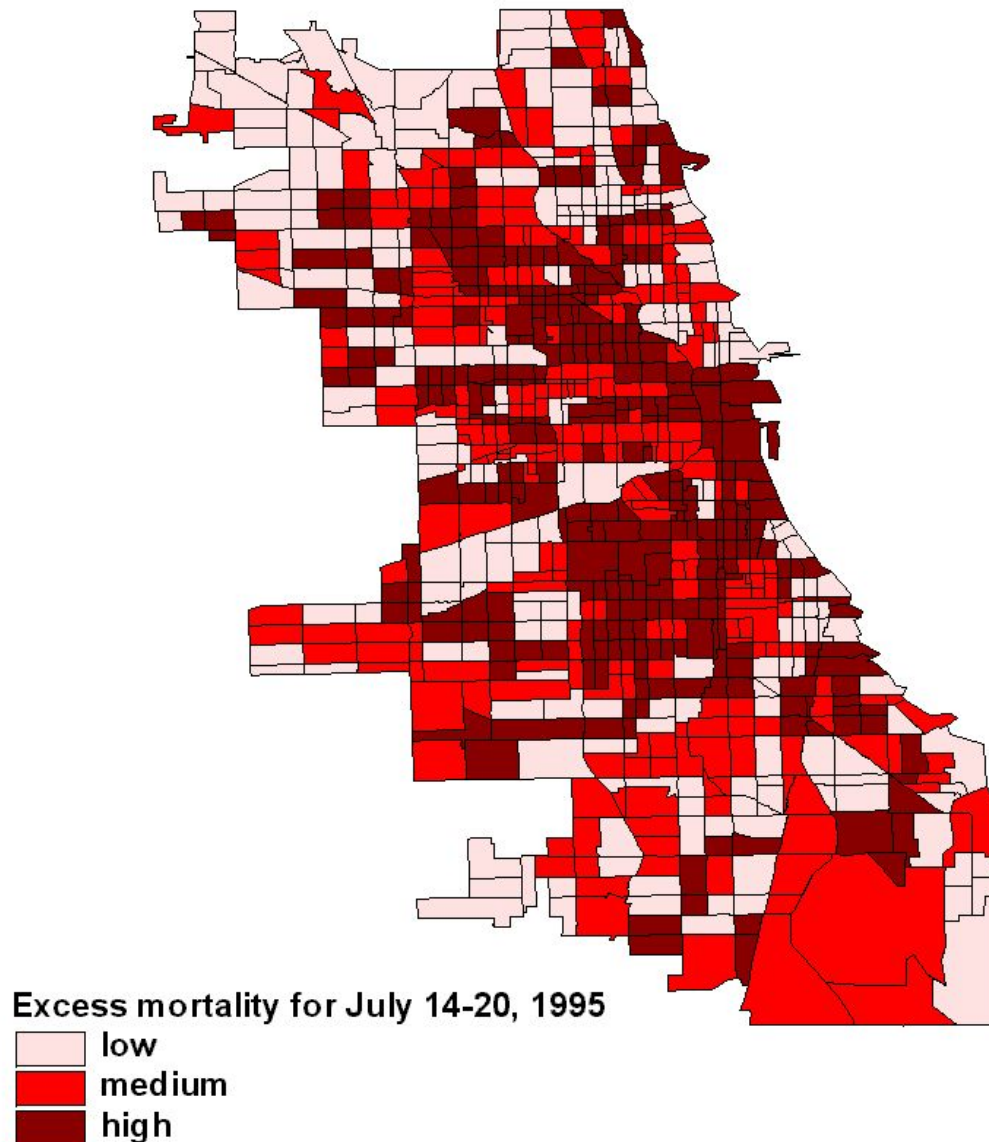
Correlation between network measure and 1995 death: -.11*

*Social Network Interaction/Exchange in Chicago Neighborhoods*

Social network interaction/exchange
- low
- medium
- high
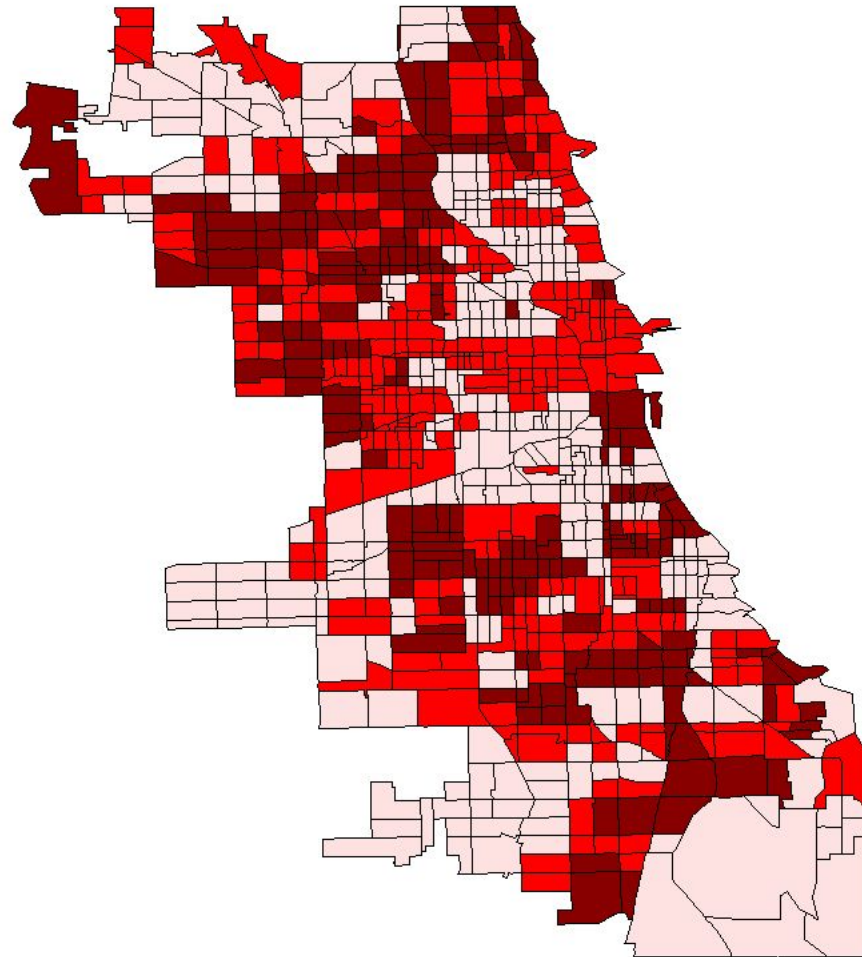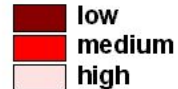
*p* < .05  **p** <.01  *** p < .001

Correlation between health-related collective efficacy and 1995 excess death: -.24***

**Health-related Collective Efficacy for Chicago Neighborhoods**
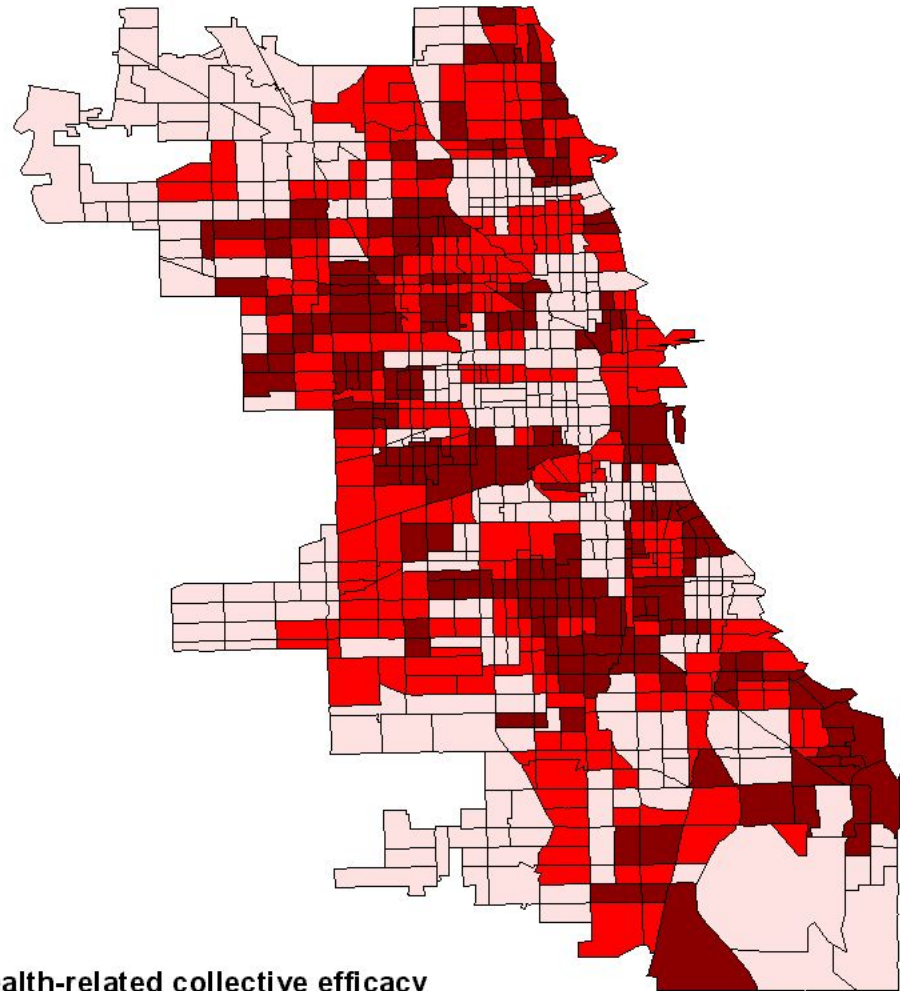
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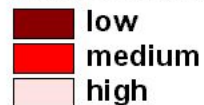
# Table 1. Three Level HGLM of Baseline 1990-96 and Excess 1995 Mortality [a]

| Independent Variables | Model | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Affluence (1995) | -.18 * | | | | |
| Collective efficacy (1995) | - | | | | |
| Network density (1995) | - | | | | |
| Commercial density (1995) | - | | | | |
| Commercial decline (1995) | - | | | | |
| 1995 effect | 1.02 *** | | | | |

[a] Neighborhood level N=77; Year level N=2,401; Count Level N=11,179.
* p < .05  ** p <.01  *** p < .001   (two-tailed tests).
Note: Additional structural covariates omitted.

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|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Affluence (1995) | -.18 * | -.19 * | | | |
| Collective efficacy (1995) | - | - | | | |
| Network density (1995) | - | .06 | | | |
| Commercial density (1995) | - | - | | | |
| Commercial decline (1995) | - | - | | | |
| 1995 effect | 1.02 *** | 1.09 *** | | | |

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| Commercial density (1995) | - | - | - | .09 | |
| Commercial decline (1995) | - | - | - | .24 * | |
| 1995 effect | 1.02 *** | 1.09 *** | 1.11 *** | 1.06 *** | |

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|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Affluence (1995) | -.18 * | -.18 * | -.19 * | .01 | .01 |
| Collective efficacy (1995) | - | - | .06 | - | .01 |
| Network density (1995) | - | .06 | - | - | .08 |
| Commercial density (1995) | - | - | - | .09 | .10 |
| Commercial decline (1995) | - | - | - | .24 * | .25 * |
| 1995 effect | 1.02 *** | 1.09 *** | 1.11 *** | 1.06 *** | 1.17 *** |

[a] Neighborhood level N=77; Year level N=2,401; Count Level N=11,179.
* p < .05  ** p <.01  *** p < .001  (two-tailed tests).
Note: Additional structural covariates omitted.
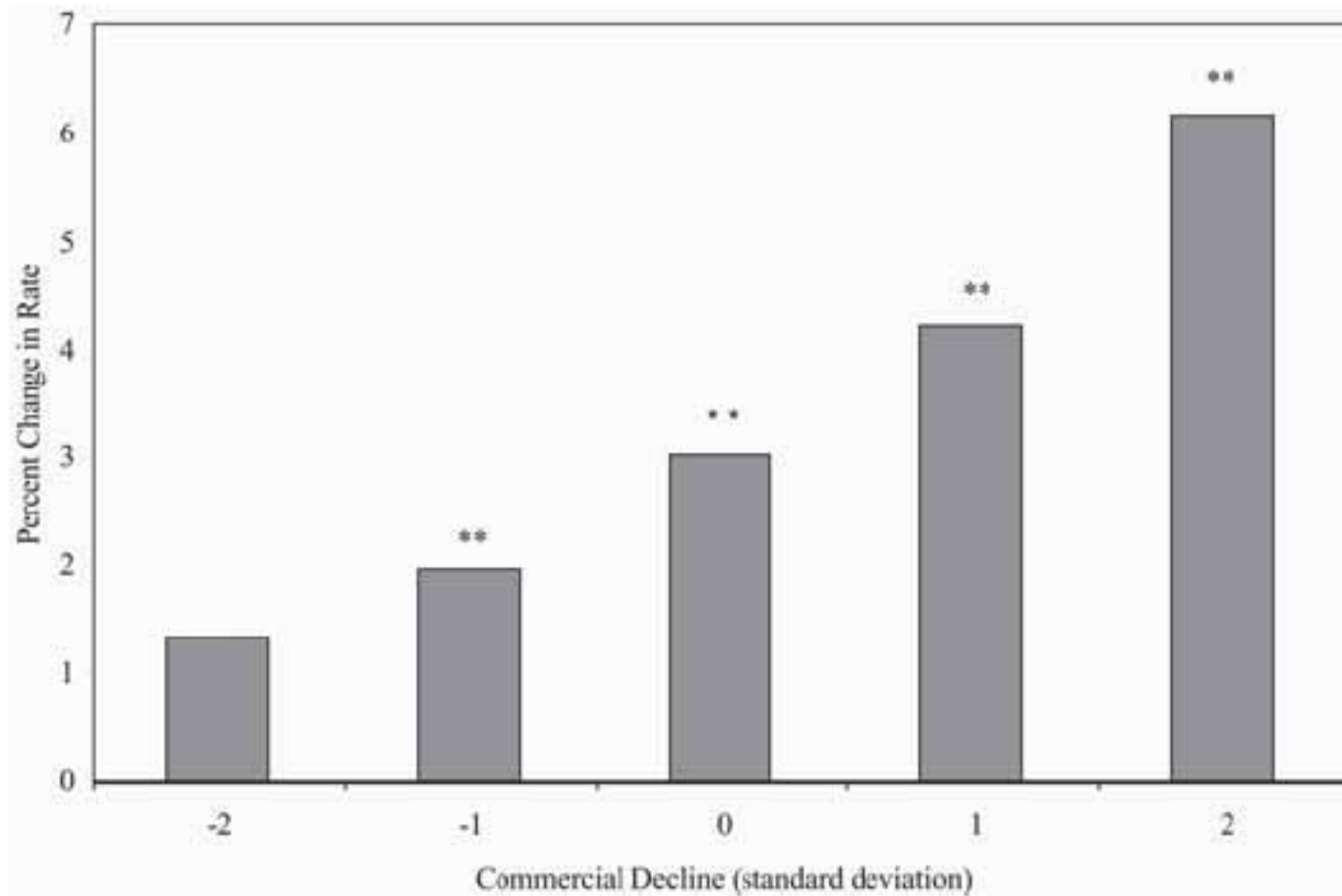
**Figure 1.** Adjusted Proportionate Change in Mortality Rate for July 14–20, 1995 by Level of Commercial Decline

# Conclusions

- Note: Collective efficacy / networks matter for *average* conditions

- Neighborhood affluence decreased the vulnerability of older adults to heat-related death

- Commercial decline increased vulnerability to heat-related death and accounts for affluence effect

- Neighborhoods with very low levels of commercial decline experience no significant increase in the death rate during the heat wave.

# Limitations

- Analyses are Chicago-based so generalizability limited

- Lack of individual-level data on heat wave decedents

- Can we generalize to a population of events/ disasters?

- *Actual data on exposure is lacking*

# Three Components

- IVs
  - Activity space – GPS and EMA methods
  - *Array of Things* – Neighborhood-based sensors
- DVs
  - Olfaction – NSHAP illustration

*Focus on role of disorder*

# Part 1. Activity Space

- Current approaches may not effectively assess exposure

- Residential neighborhood a small part of daily experience?

  - Arbitrary census-based units may obscure more complicated geographic exposures

  - Where/how people spend time may prove more valuable for health, well-being, access to care

# Research on "Neighborhoods Effects" and Health

- Theoretical approaches largely neglect actual spatial exposure patterns (beyond residential address)

- Integrate
    - Social disorganization theory
    - Social ecological approach (Jane Jacobs)
- Incorporate conceptualization of individual level exposures ("activity space")
- Emphasize age and aging
    - Circumference of turf may shrink
    - Neighborhoods—and networks within—may be more consequential

# Neighborhood Research:
## *Theory*



| Neighborhood structure | → | Mechanisms? | → | Neighborhood outcome |

→ Individual
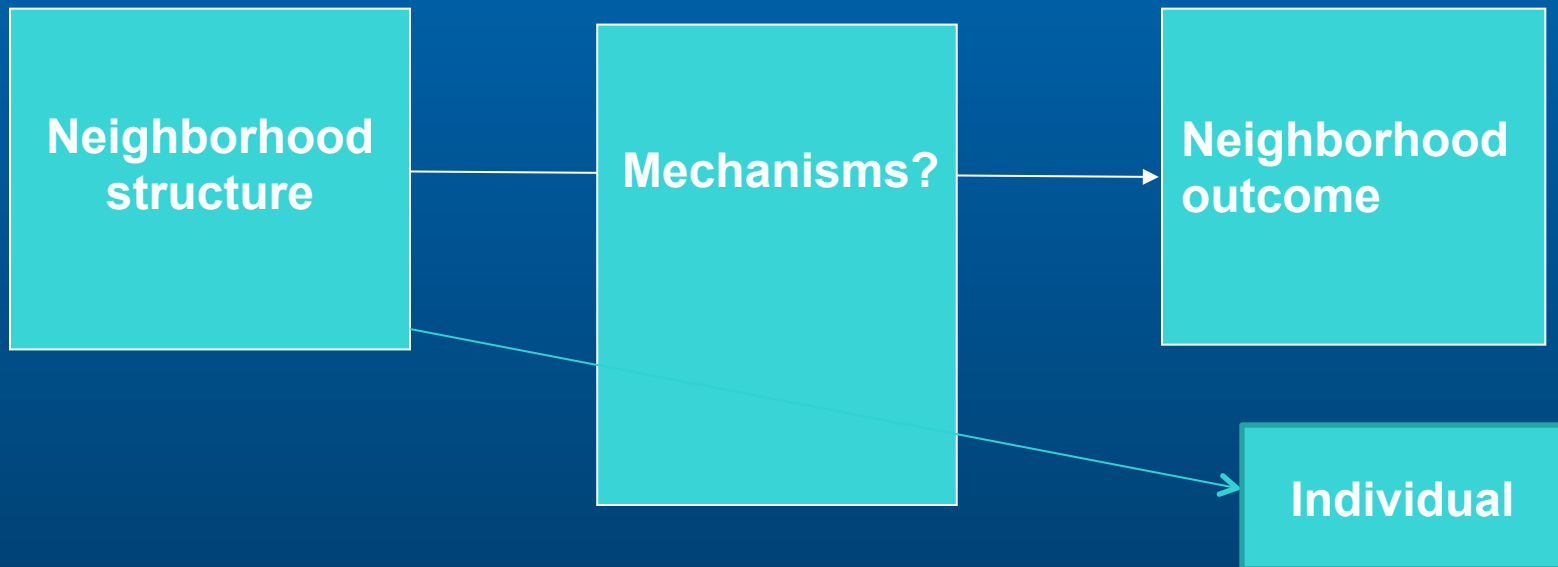
*Theory:* What processes link e.g., poverty to outcomes?
Kasarda (social networks); Sampson (collective efficacy); Skogan (disorder);
Wilson (institutions); Anderson (culture)

# Neighborhood Research
## *Unit of Analysis*

**Neighborhood structure** → **Mechanisms?** → **Neighborhood outcome**

**Individual outcome**
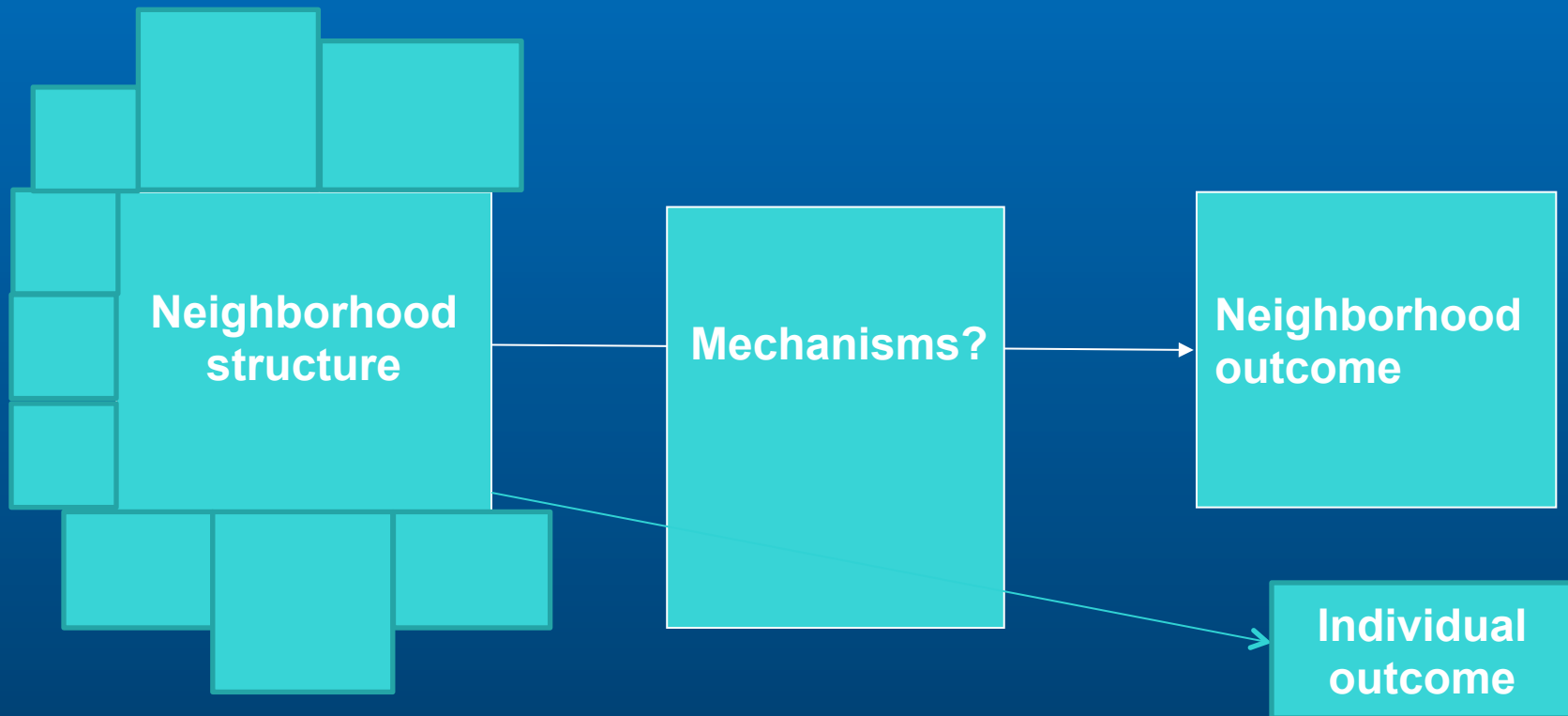
*Neighborhood unit:* What boundary is most appropriate? Assumption of independence (residents may be exposed to other nearby units)

# Neighborhood Influences on Health



Browning and Cagney, 2016
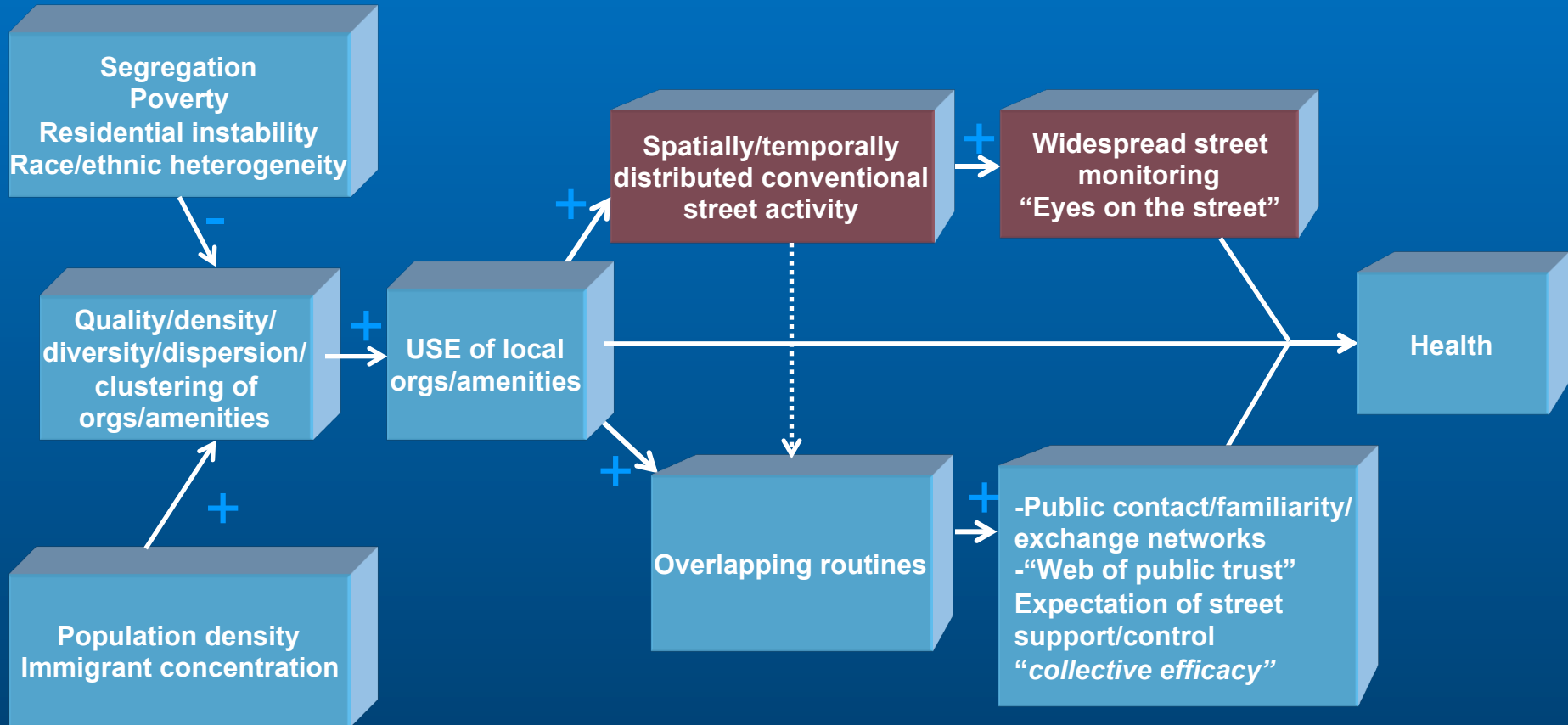
# The Structure of Sociospatial Exposure

*Activity space*:

The set of places individuals come into contact with as a result of their routine activities



Kwan, 2013

# Older Adult Activity Space & Health Pilot Studies

- **Chicago**
  - Funded by NORC
  - N=17, aged 60+
  - Suburban
  - Pre-study focus group, 7 days with smartphone, post-study focus group

- **New York City**
  - Funded by Cornell
  - N=60, aged 60+
  - Urban
  - Attention to race/ethnic, SES diversity
  - 7 days with smartphone

# Older Adult GPS/EMA Week

- **GPS approx every 5 min**
- **EMA**
  - 15 questions
    - Where are you?
    - Who are you with?
    - How do you feel? (e.g., mood, health, pain, stress, loneliness)
  - Three times daily (Chicago); Four times daily (NYC) – 9AM-9PM
  - Randomly chosen times
  - Two hour completion window

# Screenshots from smartphone-based EMA



Welcome to the Health on the Move Survey!

Please complete the next few questions about what you are doing and how you are feeling. If you are driving, please wait to complete this survey until you are no longer driving.

Press "Next" to continue.

Screenshots from smartphone-based EMA

Chicago

# Screenshots from smartphone-based EMA

# Screenshots from smartphone-based EMA

Screenshots from smartphone-based EMA

Chicago

Screenshots from smartphone-based EMA

Chicago

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Comparing activity spaces:
Estimates from pilot data

Chicago

R6 Area: 25.31 sq. miles
Mean distance from home: 3.14 mi.

R7 Area: 4.17 sq. miles
Mean distance from home: 2.27 mi.

R9 Area: 18.23 sq. miles
Mean distance from home: 4.61 mi.

R10 Area: 47.0 sq. miles
Mean distance from home: 6.68 mi.
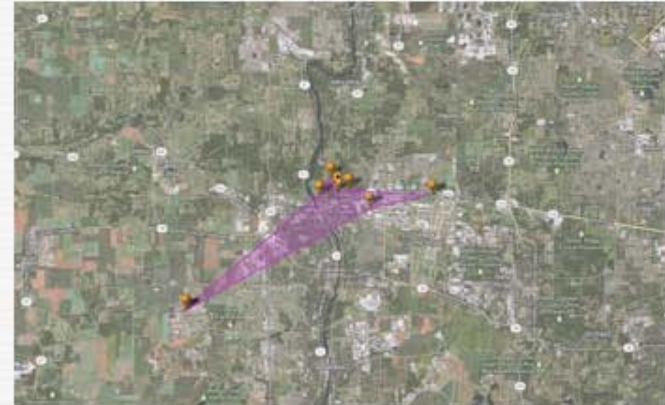
York Cornwell, 2012

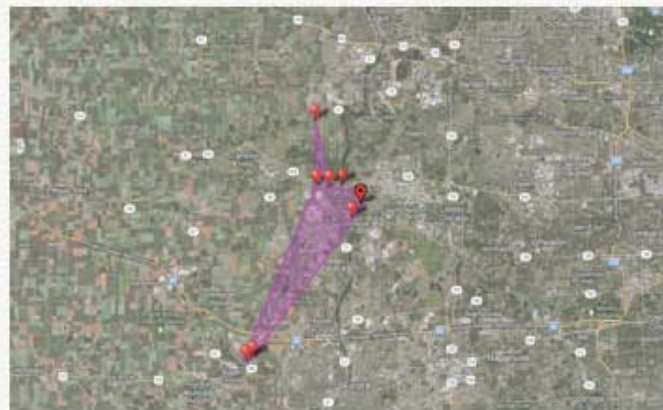Comparing activity spaces: Estimates from pilot data — Chicago

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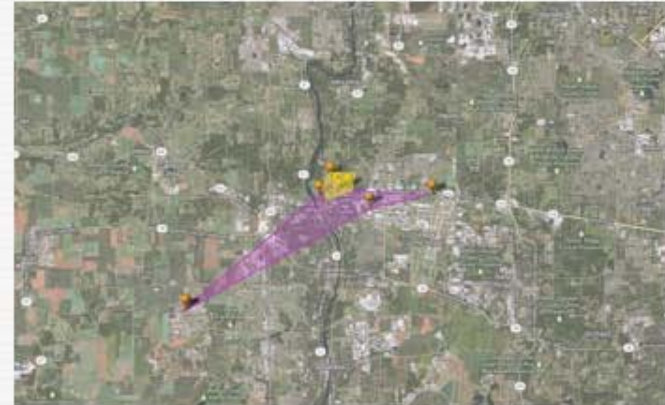## Activity Space

Locations outside of the respondent's residential tract: 40.1%

Tracts visited: mean = 30.8

- Gramercy Park
- East Harlem
- N Bed-Stuy
- S Bed-Stuy

# Key Variables from EMAs

## Symptoms of Distress



Cornwell and Cagney, 2016

# Key Variables from EMAs

**Symptoms of Distress (DV)**
- Any symptom = 50.8% of EMAs
- Multiple symptoms = 30.7% of EMAs

**Disorder on current block** (range = 0, 8; mean = 1.0; SD = 1.3)
Includes: Vacant buildings, broken windows, trash or litter, graffiti, damaged sidewalks, people yelling, people hanging out, drug/alcohol use

## Odds Ratios from Multilevel Logistic Regression Models Predicting Real-Time Reports of Symptoms of Distress

| | Any Symptom | | Multiple symptoms | |
|---|---|---|---|---|
| | OR | (95% CI) | OR | (95% CI) |
| At home | 1.05 | (.66, 1.67) | 1.86* | (1.05, 3.31) |
| Poverty level (%) | 1.01 | (.98, 1.04) | 0.99 | (.96, 1.03) |
| Disorder | 1.45** | (1.10, 1.93) | 1.53** | (1.14, 2.05) |
| | | | | |
| Lagged symptoms | 2.87*** | (1.79, 4.61) | 5.15*** | (2.90, 9.13) |
| | | | | |
| N of EMAs | 939 | | 939 | |
| N of respondents | 60 | | 60 | |

*p < .05; ** p < .01; *** p < .001 (two-tailed)
Time of day is included in the model but not shown.

# Main Findings

- Activity spaces — including non-residential areas — may be consequential for health

- Disorder in the immediate environment is associated with an increase in symptoms of distress

- Smartphone-based methods offer an opportunity to examine real-time exposures and shorter-term fluctuations in health

# Older Adult Focus Groups

- Respondent: *One of the funniest things is that I was at church when it pinged but I had accidentally left it at home. So, I got home and it had rung and I thought, "I was not home, I was at church," and I had been at home a lot when it rang. So, I got back in my car and I drove back to church*.

Biomeasures (In Home)

Health Questions (Paper)

Social Environment Questions (Paper)

Behavioral Questions (Paper)

Wave 1: Baseline (All In-Home)

Wave 2: Follow-Up (In-Home Assessments and Leave-Behind Questionnaire)

Wave 3: Follow-Up (In-Home Assessments and Leave-Behind Questionnaire)

ECOLOGICAL MOMENTARY ASSESSMENT (EMA 1-3)
7-day Real-Time Data Capture of Variation ($\triangle$)

e.g., $\triangle$ Pain

e.g., $\triangle$ Positive Affect

e.g., $\triangle$ Social Engagement

e.g., Activity Space (Geographic Location)

N=600
40 Chicago neighborhoods

# Next Steps

- Intersection of activity space approaches with "big data" opportunities

- New ways to examine inequality in exposure and resources

- Attention to variation in the micro-environment, *Array of Things*

# Part 3. Neighborhood Disorder and Olfaction

- Disorder in communities may result in:
  - noxious air
  - difficulties in monitoring pollutants/engaging in remediation
- Older adults who live in more disordered neighborhoods[4,5] may have higher rates of olfactory dysfunction
  - carbon exposure linked more strongly with census tract poverty than individual income or education[6]
- Olfactory nerve only part of nervous system exposed to open air—offers poisons/pathogens a quick route to brain

4. Diez and Roux 2010, Annals of NY Acad. Sci. 5. Cornwell and Cagney 2014, J. of Gerontology 6. Krieger et al 2014, Environmental Pollution

# Olfactory Dysfunction

- Olfactory dysfunction affects 24.5% of older adults[1]
- Alters quality of life, nutrition and safety, foreshadows major neurodegenerative disorders and death[2]
- Environmental exposures may play a role[3]
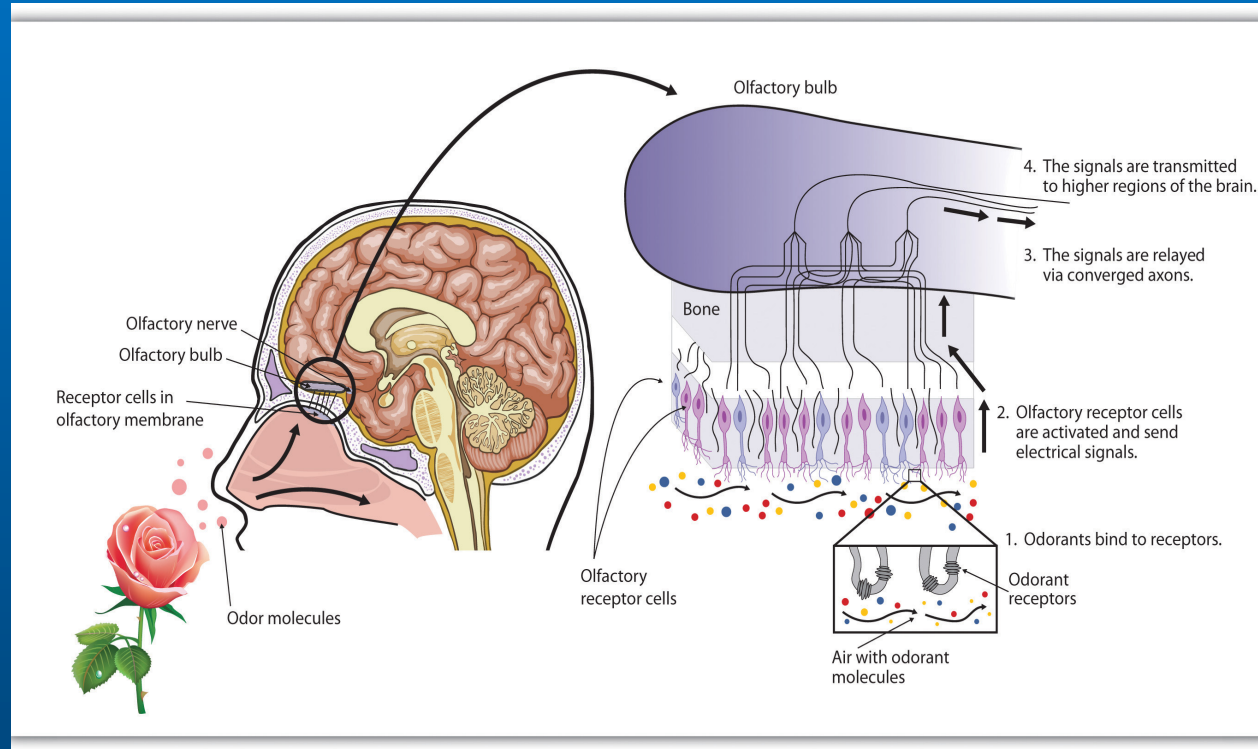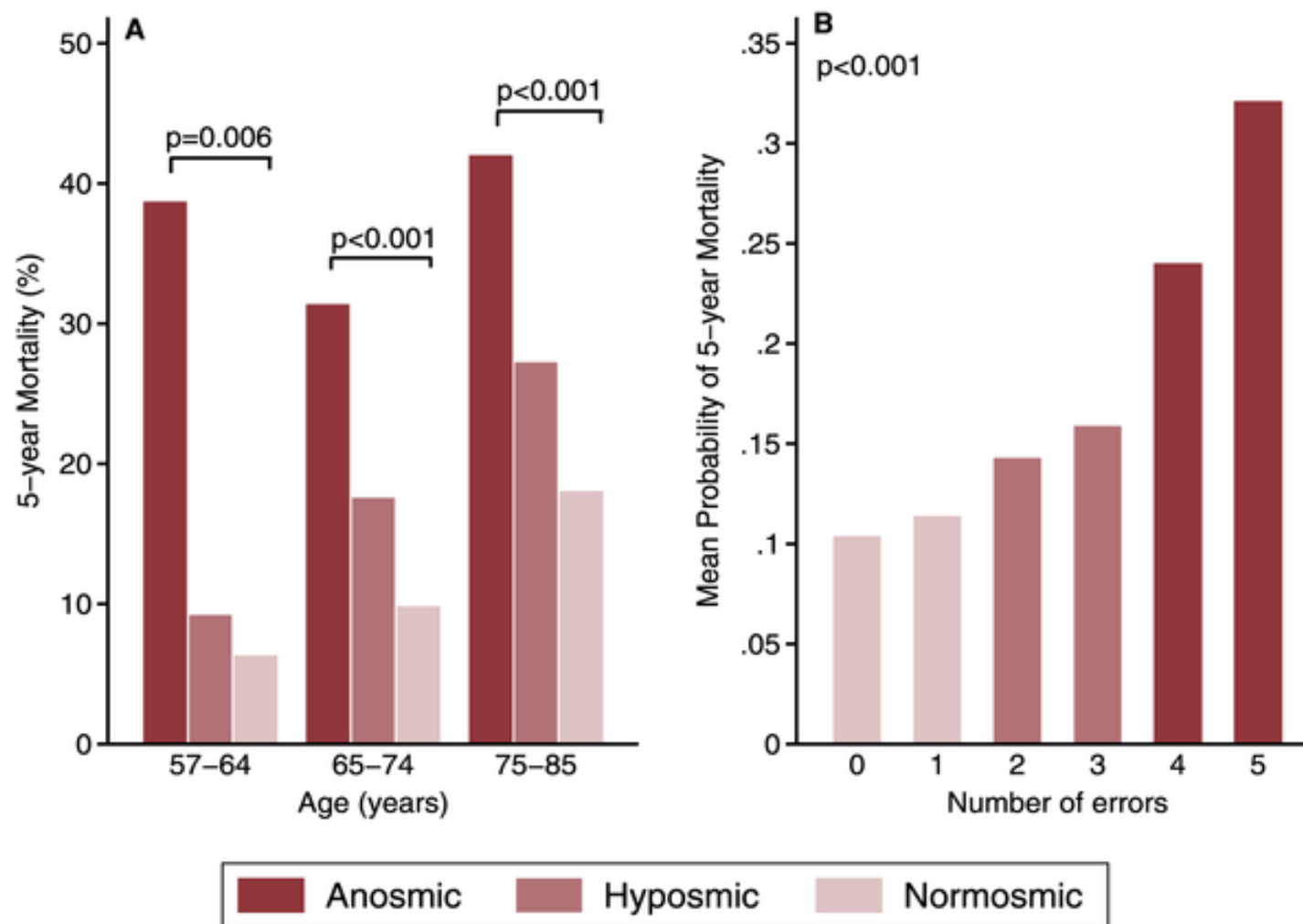


1. Murphy et al. 2002 , JAMA  2. Pinto et al. 2014, PLOS One 3. Ranft et al 2009, Env. Research

## Figure 1.

# Methods

- **The National Social Life, Health, and Aging Project (NSHAP)**

- **Nationally representative, longitudinal survey of 3005 adults living at home ages 57 to 85 years at baseline**

- **Trained interviewers from the National Opinion Research Center (NORC) collected**
  - Survey Data
  - Biomeasures

McCartin et al., 2016

# Odor Identification Test



*Sniffin' Sticks* – rose, peppermint, leather, orange, fish

Scored as number of errors (out of 5): more errors -> worse olfaction

# Neighborhood Measures

- Physical conditions of respondent's home
  - Odor, Cleanliness, Tidiness, Cramped, Lighting

- Physical conditions of respondent's street
  - Building Quality, Litter, Traffic Density

- Each scored on a 1-5 or 1-4 scale
  - Higher number -> more physical disorder

# Greater Disorder Predicts Worse Olfaction

| OUTDOOR MEASURES | COEFFICIENT | P VALUE |
| --- | --- | --- |
| Poor Building Quality: Resident | 0.11 | 0.010 |
| Poor  Building Quality: Neighbors | 0.10 | 0.039 |
| Heavy Street Traffic | 0.06 | 0.045 |

| INDOOR MEASURES | COEFFICIENT | P VALUE |
| --- | --- | --- |
| Room Dirty | 0.12 | 0.001 |
| Room  Messy | 0.08 | 0.004 |
| Room Cramped | 0.05 | 0.039 |

Adjusted for: Age, Gender, Race, Education, Charlson Comorbidity Index, Self-Reported Mental Health, Cognition, Alcohol Use, And Tobacco Use

# Olfaction/Disorder Conclusions

- Both outdoor and indoor physical disorder associated with olfactory dysfunction

- Effects not mediated by race, gender, age, education (SES), or general health

- First demonstration of home/neighborhood effects on a key sensory function

- Toxins/other physical exposures associated with disorder in home and local environment may disrupt olfactory system
  - e.g., formaldehyde from poor housing stock, heavy metals in soil of homes near factories, closer distance to roads/pollution emitters, etc.

# Summary

- Exposures – breadth and depth – inadequately addressed in existing research

- *Theory:* Need for a multicontextual approach to "neighborhood" research
  - e.g., schools, institutions, unstructured routine activity spaces

- *Unit of analysis:* From neighborhood to communities

- *Selection/causality:* impossible to address without adequate data on exposure to treatment

# Exercise

- Imagine you are collecting data in your favorite city (Chicago!)…
  - You are asked to develop three modules:
    - Resilience
    - Cohesion
    - Gentrification
  - Write four questions that you believe would factor or "hang together"
    - What theory did you use for guidance?
    - What methods will you use to collect the data?