

# Heat, Health, and Adaptation

**Resilient Chicago**

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**Samuel Dorevitch, MD, MPH**

**UIC School of Public Health**



# Big concepts

- Multiple, serious, health problems linked with heat
- Designating cooling centers is just the beginning of resilience
- Data to for informing resilience strategies are limited

# Deaths in heat waves

- July, 1995: 700 people died
- Vulnerability:
  - Elderly
  - Living alone
  - Poverty
  - No air conditioning
  - Chronic medical conditions



A.P. ile photo in the Chicago Tribune Aug. 25, 1995  
Homewood Memorial Cemetery, Homewood IL

# Heat waves: a small part of the problem

- During heat waves
  - Deaths due to over-heating (heat stroke)
  - Excess natural cause mortality
- Outside of heat waves
  - 80 vs. 75 degrees, 85 vs. 80 degrees
  - More acute cardiac events with higher temperatures
  - Higher temperatures means higher ozone levels: more asthma attacks



# Climate Change Adaptation: Increasing Resilience



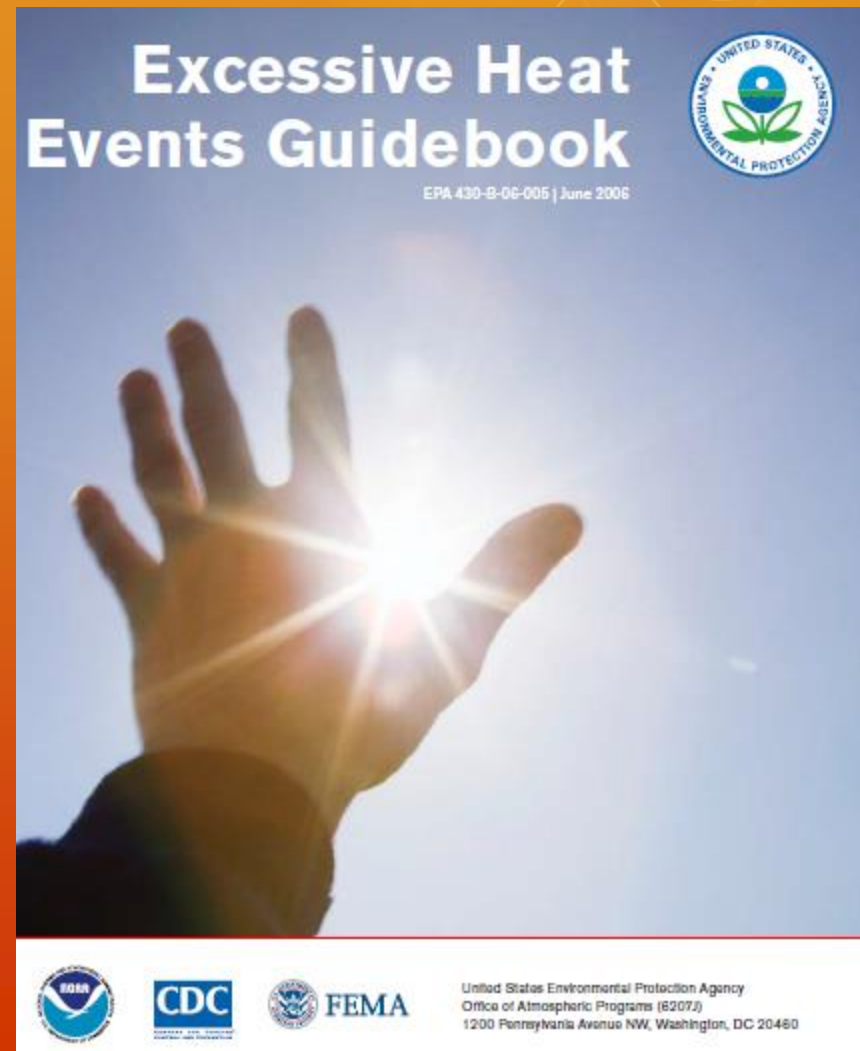
I-10, August 30, 2005  
Associated Press



<http://www.twinspanbridge.com>

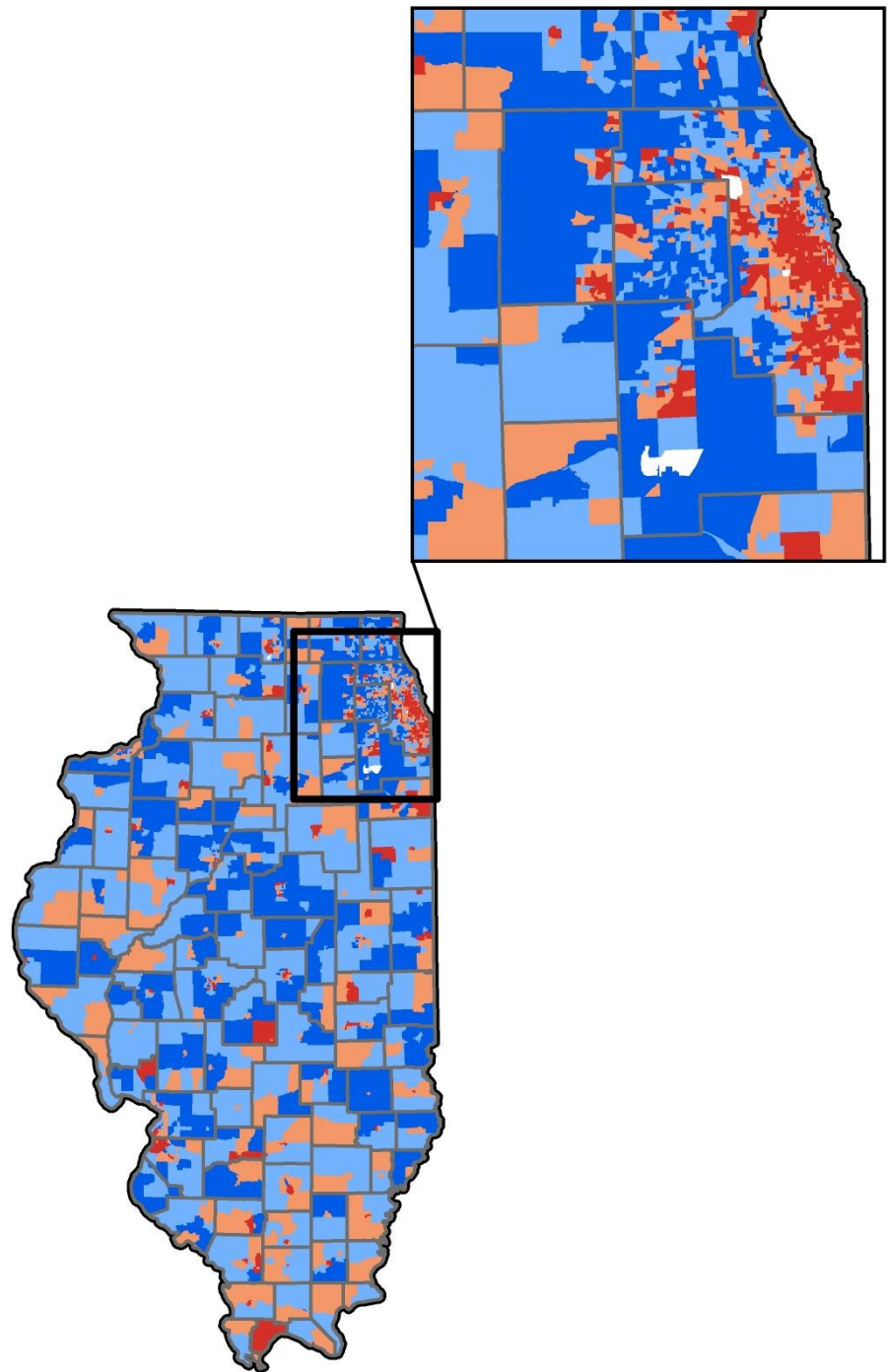
# Plans for extreme heat events

- Leadership
- Triggers
- Communications
  - “Open the cooling centers”
  - Notify at-risk groups
  - Reaching the hard-to-reach
- Facilities, back-up power
- Suspend utility shut-off
- Public event rescheduling

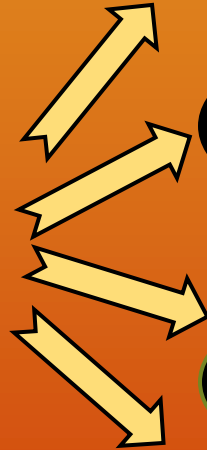
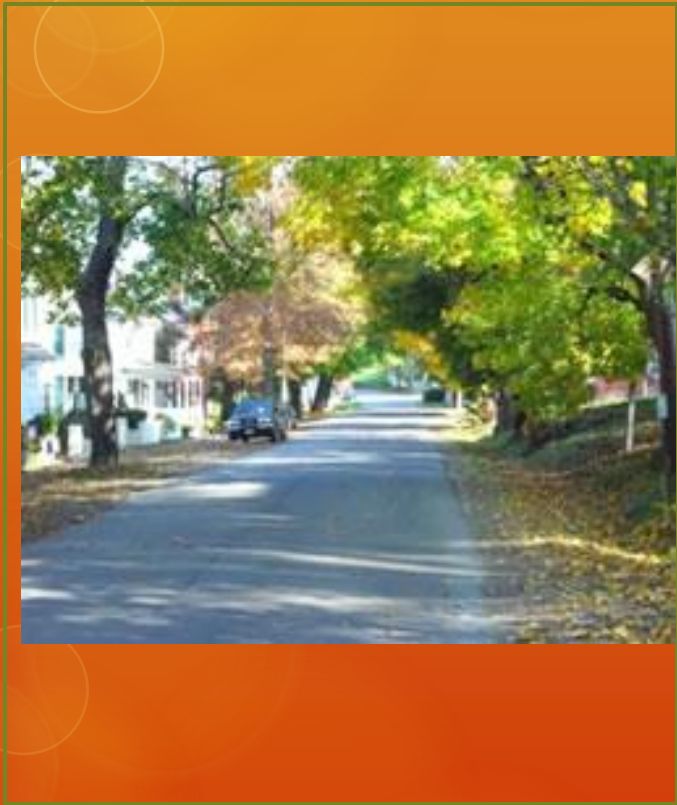


# CDC's 'Social Vulnerability Index'

- Socioeconomic
- Household composition
- Minority status/ language
- Housing/ transportation



# Mitigation, adaptation, and public health co-benefits



↓ need for  
A/C

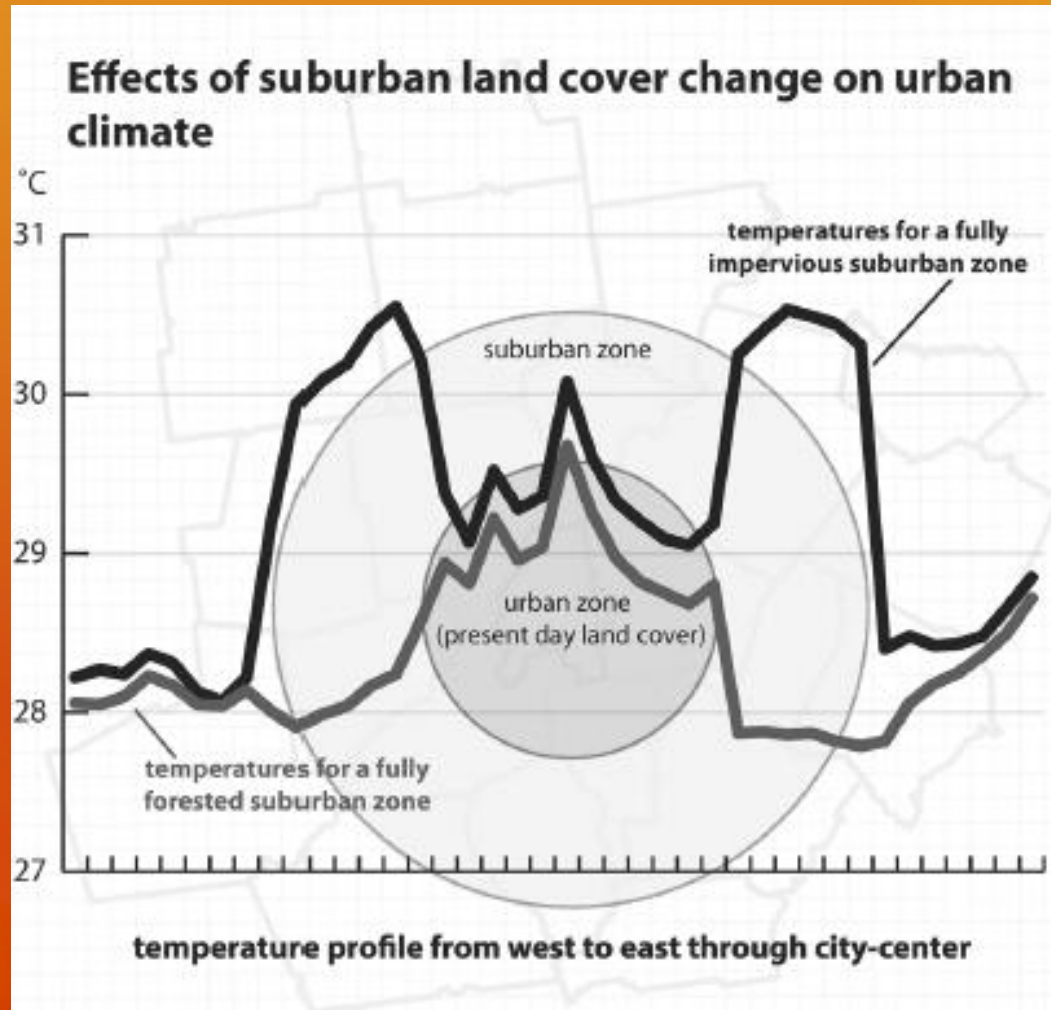
↓ urban heat  
island effect

↓ Storm  
water runoff

↑ greenspace  
phys. activity



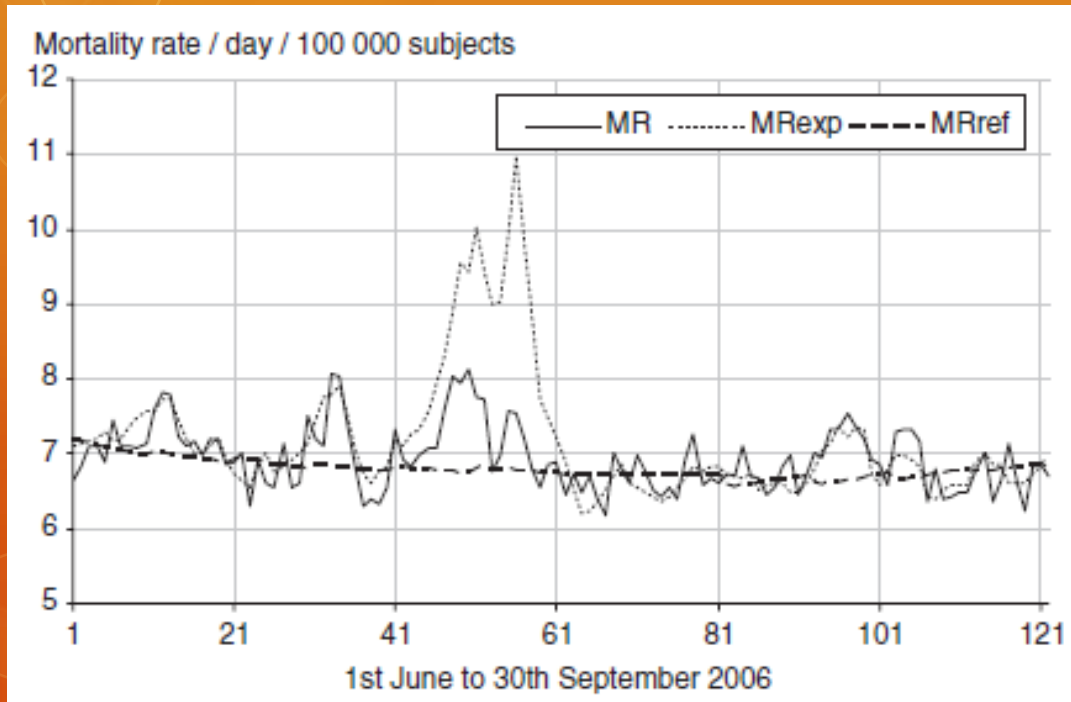
# Urban benefits from regional trees planting (from B.Stone, et al 2013)



# Impacts of adaptation in Chicago?

- 1995 heat wave (described by Semenza et al, others)
- 1999 heat wave (described by Naughton et al)
- Median age: 76 (1995) vs. 63 (1999)
- Perhaps a higher percent with chronic psychiatric and cardiac conditions in 1999
- 1999: no statistically significant benefit of cooling center visits, but study not large enough to evaluate
- Overall, similar risk factors: no air conditioning, elderly, living alone, chronic health problems, home-bound
- Implication: Outreach to elderly since 1995 improved but need more outreach to chronically mentally ill?

# Indications that adaptation works: France, 2006 vs. 2003 (Fouillette, 2008)



## After 2003 event

- A/C for hospitals, nursing home
- Public education
- Early warning and alert systems

## 2006 event

- 2,065 death occurred in 2006 heat wave
- 6,452 deaths 'expected' based on weather

Questions?

