Climate Adaptation in NYC: Preparing for Heat Emergencies

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Outline

- NYC Climate & Health Program
- Extreme heat
  - Current response
  - Risk assessment
  - Adaptation planning

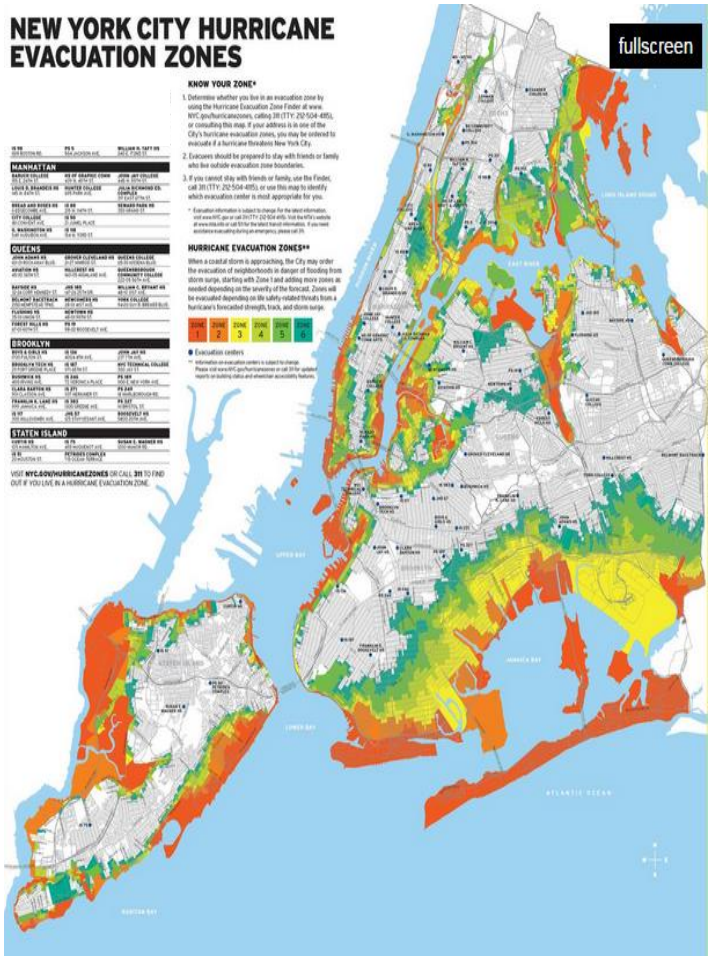
NYC Climate Projections

- Summers will be hotter
  - Increase in number and intensity of heat waves
- More heavy precipitation events
- Increase in intensity, frequency and duration of flooding associated with coastal storms and hurricanes
- Shorter snow season as winters warm
  - Uncertainty about changes in intensity of snowfall per storm

Source: NYC Panel on Climate Change; SIRR Climate Analysis, 2013

NYC Climate & Health Program

- Assess climate-related health impacts and vulnerabilities
- Develop adaptation strategies to prepare and respond
- Inform climate change adaptation and resiliency efforts to ensure public health is key consideration



Supported by CDC Climate-Ready Cities and States Initiative: Grant #5UE1EH001120-02

Priority Climate-Related Hazards

Criteria:

– Strong empirical data* to relate projected climate change to greater local exposure to environmental hazards

and

– Significant current health impact or potential risk in NYC under current climate

Selected Hazards:

- Extreme Heat/Ozone
- Coastal Storms/Flooding
- Power Outages

*2009 New York City Panel on Climate Change (NPCC) report

THE WALL STREET JOURNAL.
WSJ.com

JULY 7, 2010

Record-High Heat Strains Power Grid

By ANDREW GROSSMAN And JOY RESMOVITS

With utilities urging people to turn down their air conditioners amid record heat and near-record power demand Tuesday afternoon, Tony Johnson left work in Harlem armed with a MetroCard and a simple plan.

USA TODAY

In wake of Irene, flooding fears along Eastern Seaboard

By Carolyn Pesce and William M. Welch, USA TODAY

Tropical Storm Irene was weakening as it moved into the Northeast and headed toward Canada, but officials warned the worst is yet to come in some areas along the Eastern Seaboard where flooding has become the big concern.

The New York Times

July 22, 2011

How Hot Is 104? New York Counts the Miseries

By N. R. KLEINFIELD

It felt like Death Valley as stifling heat reached down on Friday and took the city in its clammy grip, transforming the streets and sidewalks into hot griddles and creating instant dripping wretchedness.

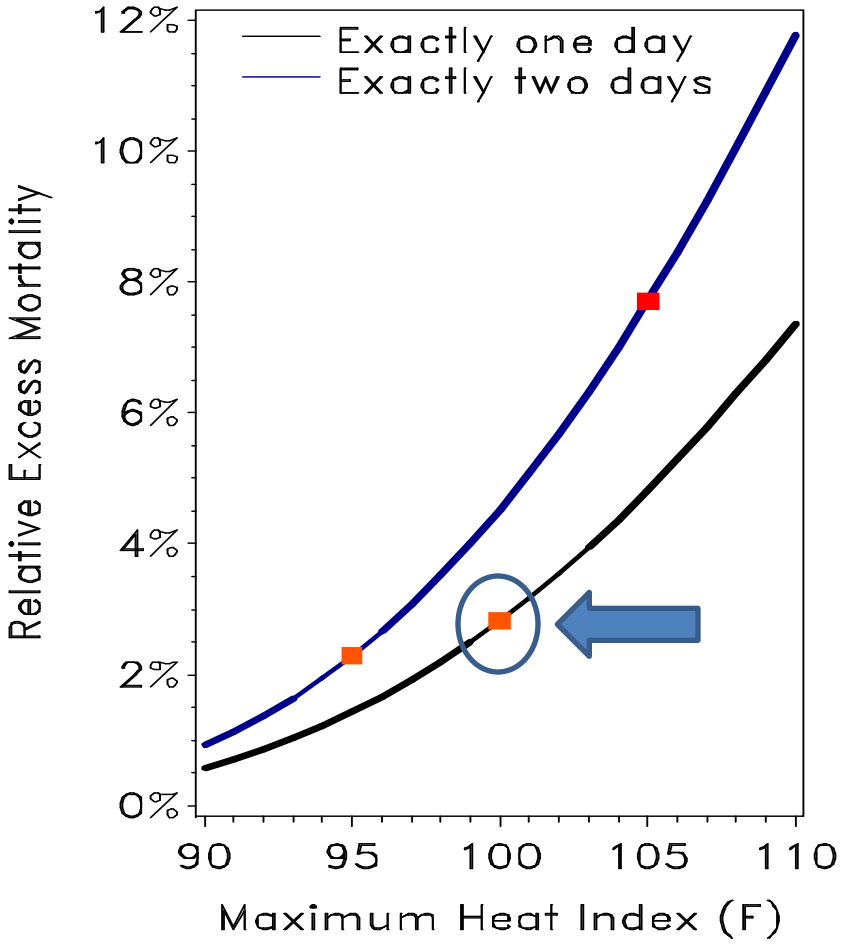
A Current Public Health Threat

- Heat waves kill more Americans than all other natural disasters combined
  - Heat stroke deaths
  - Excess natural cause deaths
  - Hospital visits
- 1995, Chicago/Midwest
  - ~750 deaths
- 2003, Europe
  - 35,000+ deaths
- 2006, NYC
  - ~150 deaths

Chicago, 1995 *AFP/Getty Images*

Heat Emergency Activation Threshold

- Retrospective analysis to evaluate heat advisory thresholds (May-Sept 1997-2006)
  - Substantial excess mortality below conventional heat warning threshold
- New advisory level set in 2008
  - 2 days with HI ≥95°F
  - 1 day with HI ≥100°F
- Heat emergency criteria different in other areas



Source: Metzger, Ito, Matte, 2010

NYC Heat Emergency Response

- OEM coordinates multi-agency response including:
  - Health advisories
  - Advance warning – special needs
  - Cooling centers
  - Homeless outreach
  - Protection of water and power supply
  - Syndromic surveillance
- Ongoing programs:
  - Education for providers & public
  - Cooling assistance program

Heat Syndromic Surveillance

- Supplement to the weather forecast – weather conditions most important for guiding response

- Situational awareness during a heat emergency
  - Monitor trends in emergency department (ED) visits & emergency medical services (EMS) calls
  - Time series models used to detect increases in heat-related illness beyond expected
  - Interpretation of results can be used to guide response, augment messages during ongoing heat wave

Risk Assessment

- Extreme heat risk assessment
  - In-depth analysis of NYC surveillance data
  - New analyses
    - Mortality vulnerability study
    - Heat-health behaviors and warning awareness phone survey
    - Focus groups
  - Attributable risk calculations to project potential future burden

Heat-Health Impacts in NYC

- On average, each summer in NYC:
  - 450 heat-related emergency department visits
  - 150 heat-related hospital admissions
  - 13 heat-stroke deaths
  - ~100 excess deaths from natural causes associated with heat waves

- Increases in hospital visits for respiratory, heart, and kidney disease

Sources: MMWR (2013), Heat Illness & Death in NYC, 2000-201, 62;617-621;
Matte et al. 2014; Lin et al. 2012; Epi Data Brief (2014), Heat-related Deaths in NYC, 2013

Who is Most At Risk?

- Older adults aged 65+
- Chronic health conditions
  - Heart disease
  - Obesity or diabetes
  - Alcohol and substance use
  - Serious mental illness & cognitive impairment
  - Respiratory conditions
- Taking medications that affect ability to maintain normal body temperature

Sources: MMWR (2013), Heat Illness & Death in NYC, 2000-2011
Epi Data Brief (2014), Heat-related Deaths in NYC, 2013

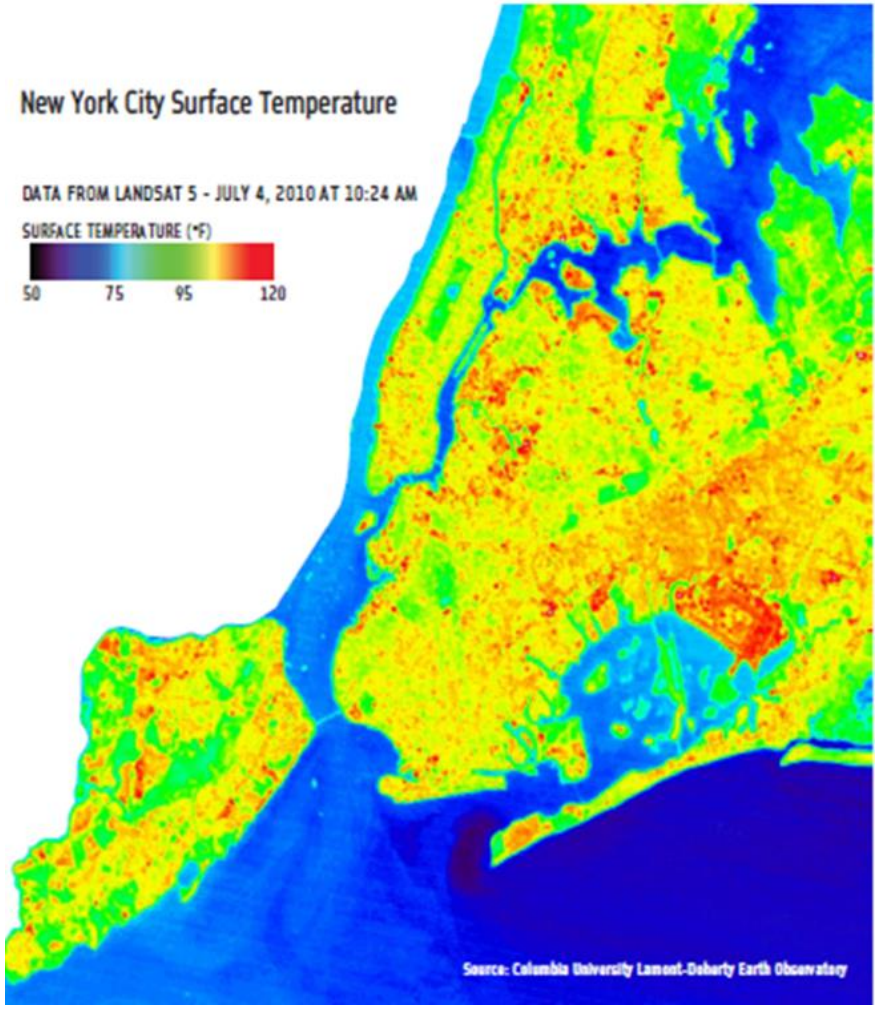
It Can be Dangerous Indoors

- 85% of heat stroke deaths from 2008-2011 exposed in the home
  - None had a working air conditioner
- In city apartments without AC, indoor temperatures can be much higher than outdoors, especially at night
- Fans alone aren't enough in very hot weather
  - 35% (6 of 17) decedents exposed at home during severe 2013 heat wave used fan

Sources: MMWR (2013), Heat Illness & Death in NYC, 2000-2011
Epi Data Brief (2014), Heat-related Deaths in NYC, 2013

Vulnerability: Neighborhood & Individual-level Risk Factors

- Higher daytime surface temperature & less vegetative cover
- Measures of social disadvantage (e.g. % poverty, receiving public assistance), African-American race
- Physical environment and demographic risks overlap in disadvantaged neighborhoods



Madrigano et al., 2015, in press

Heat-Health Behaviors Survey

- **Random sample telephone survey**
  - Administered to 719 adults in September 2011
- **AC prevalence**
  - 25% had no AC or never/rarely used it during hot weather
  - Common reasons: affordability, perceived need, preference
- **Most New Yorkers are aware of heat warnings**
  - ~80% aware of heat warning in previous summer, mostly on TV
- **~ 500,000 potentially vulnerable New Yorkers**
  - 8% of adults don't own/use AC AND have heat-health risk
  - About half stay home in hot weather, regardless of hearing warning

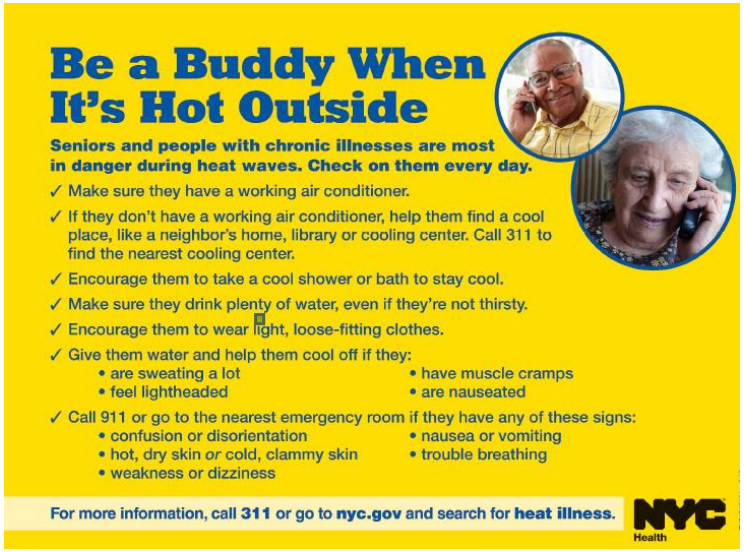
Lane et al. (2013). Extreme Heat & Protective Behaviors in NYC. J. Urban Health.

Focus Groups

- Vulnerable seniors & potential caregivers
- Vulnerable people may not understand risk
- Media coverage may not convey risk
  - Potential lethality
  - AC importance
  - Indoor exposure hazard
  - Vulnerable groups

Improving Heat-Health Resilience

- Near-term strategies
  - Encourage cooling center use
  - Increase access to AC
  - More outreach to vulnerable populations
    - Service providers, CBOs, public
    - Checklists for service providers
    - NWS messaging collaboration
- Long-term strategies
  - Urban Heat Island mitigation: Cool roofs, tree planting
  - Electric grid resilience
  - Building codes



More information

- NYC Climate & Health:

http://www.nyc.gov/html/doh/html/environmental/climate.shtml

- Heat and Health:

http://www.nyc.gov/health/heat