Panel V: Policy Impact on Public Health
- Influence on Policy: Heat Index

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Background for overall project:

• Short-term associations between weather, air pollution, and various health outcomes have been reported in many cities in the U.S. and other counties.

• Time lag for availability of morbidity and mortality data can limit timeliness of public health decision making

• Syndromic surveillance provides timely data, but little research has been conducted on relationships of these near-real-time health to weather and air pollution.

• Potential for more timely public health action and policy.
Background:

New York City Department of Health and Mental Hygiene (NYCDHMH) has **Bureau of Environmental Surveillance and Policy** that:

- collects environmental data
- conducts policy-relevant health effects analysis
- conducts health impact assessment, and
- communicates findings to other city agencies for policy decisions
General goal of the EPA grant to NYU/NYCDHMH:

• To develop a framework to model, in near real time where possible, acute health outcome indicators of environmental exposures in a large metropolitan area using various health outcome indicators available at NYCDHMH.
Framework of relationships between weather, air pollution, and health outcomes

Weather
- Usual fluctuations
- Heat-waves
- Cold spells

Air Pollution
- Usual fluctuations
- Inter-continental dusts
- Transported Forest Fires

Symptoms

 ED Visits
Syndromic ED data

Hospitalizations

Deaths

Uncommon Events
- Infectious disease
- Bio-terrorism
- Water-borne disease
Background and goal for this set of analyses (see the poster for other analyses conducted under this EPA grant):

- National weather service criteria for heat advisories, watches and warnings were not based on NYC-specific exposure-risk relationships
- Goal: To determine, using natural cause mortality as an outcome, an appropriate threshold of temperature index at which the heat advisories should be issued and public heat responses initiated.
Methods

• Estimate weather–natural-cause mortality relationships using Poisson time-series generalized linear models (GLM) and generalized additive models (GAM) in the warm season (May-September) for the years 1997-2006.

• Examined various weather metrics, lag and averaging times, and functional forms.
Results:

• Comparable results for the parametric (A) and non-parametric (B) models.

• Non-linear relationship, with increasing slope $>\sim 95-100$ degrees HI.

• The impact of two consecutive days of 95 degrees HI on mortality was approximately equivalent to a single day of 100 degrees HI.

• HI performed as well or better than alternative metrics.

From Metzger, Ito, Matte, EHP 2010
Impact on Policy

• We met with the New York City Office of Emergency Management (OEM) and local National Weather Service office in mid-April, 2008, to communicate the findings.
• Considered both risk function and potential ‘alert fatigue’ from too frequent warnings
• Subsequently DOHMH formally recommended that these agencies modify the threshold (adding two consecutive days or more of 95+ degree HI) for heat advisories and activating a response.
• Provider and public outreach and free A/C program to vulnerable to address risk at less extreme temperatures
• Similar model used in DOHMH heat illness syndromic surveillance
Definitions

**Heat Wave:** At least 3 consecutive days with high temperatures of at least 90 degrees.

**Highest Temperatures:** Mid July through mid August across interior locations.

**Heat Index:** An estimate of how hot it feels when air temperature and humidity are combined.

**Heat Advisory:** Issued when maximum daytime heat index values are forecast to reach 100 to 104°F for at least 2 consecutive hours.

*NOTE: For New York City, a Heat Advisory is issued when the heat index is forecast to reach 95 to 99°F for at least 2 consecutive days or 100 to 104°F for any length of time.*

**Excessive Heat:** Issued when heat index values are forecast to reach or exceed 105°F for at least 2 consecutive hours. Warning is issued 24 to 48 hours of the event.

http://www.erh.noaa.gov/okx/ExcessiveHeat.html
Discussions:

- Timeliness:
  - The EPA grant started in 2007 November.
  - Focused analysis on heat-wave completed in April 2008.
  - Results communicated to OEM and weather service in mid-April 2008.
  - The new heat-wave warning plan implemented in July 2008.
  (- A peer-review paper published in EHP late 2009)

- Through the EPA grant, the collaboration between the university and NYCDOH produced a research result that impacted a policy decision of the city and improved health surveillance methods.