Seasonal (sub-extreme) Hot Weather: Public Health Impacts and Prevention

Thomas Matte, MD, MPH, Assistant Commissioner
Bureau of Environmental Surveillance & Policy
New York City Department of Health and Mental Hygiene

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Heat Advisory Criteria for NYC

- 1997-2006 analysis
- HI vs alternative, correlated metrics
- Non-linear and lagged effects
- Confirmed risk at sub-extreme temperatures
- NYC advisory level
  - tradeoff of frequency vs risk
  - 2+ days with HI ≥95°F
  - 1+ day with HI ≥100°F

Figure 1: Risk ratio (and 95% CI) for the association of death rate per person comparable to previous heat waves (not including the study area) with heatwave days. Grey lines indicate significance at 5% level. Each risk ratio function is adjusted for temporal covariates for year, season, and day of week and for the composite lagged exposure effect.
Heat-associated mortality, extreme and non-extreme - NYC

- EHE excess non-external ~ 100
- All excess non-external ~ 350
- ‘Heat-specific’ ~ 13 (most during EHE)
- Mortality data lags by days -> months
- “Syndromic” heat ED and EMS spike during EHE

Sources: 2013 MMWR 62;617-621; Matte et al. 2014; NYC SIRR 2013
Heat-health surveillance

- During events: heat EMS and ED
- After extreme events: heat-related OCME case review
- Periodically, update multi year excess mortality modeling

2013 New York City heat-related deaths and maximum temperature or heat index

Heat-risk associations
NYC and elsewhere

- Risk increases across range of warm season temps
- ‘Heat waves’ mostly non-linear, lagged, and consecutive effects
- Vulnerability: social disadvantage, health, no AC, less green
- In NYC, residential exposures important in deaths and admissions
- Large vulnerable populations
- Power outage, other events can increase risk with seasonal heat
- Heat-mortality slopes have declined (why?)
- Heat-mortality risk across seasonal temps used climate change impact estimates.
- Excess and heat-specific deaths sometimes inappropriately compared
Heat Emergency Response Tactics

• Health advisories: public, clinical providers, VP service providers
• Cooling Centers
• Vulnerable population provider outreach (home-based and homeless)
• Formal and informal buddy systems
• Protection of water and power supply
Continuum of risk, response, and surveillance

**Adaptation:**
- UHI mitigation
- Building changes
- Improve population health

**How often does the temperature occur?**

**How high is the risk?**

- A/C provision, pre-season and routine outreach and education of vulnerable
- Alerts, outreach to most vulnerable
- Emergency responses

**Syndromic during event**

Periodic retrospective surveillance and research with vital records, ME, hospital data
How has evidence informed our strategies?

• Near-term strategies
  – Partner with NWS re: advisory criteria and messages
  – Promote cooling center use
  – Enhance vulnerable population outreach
    • Service providers
    • CBOs and public

• Long-term strategies
  – Urban heat Island mitigation:
    Cool roofs, tree planting
  – Community engagement
  – Electric grid resilience
  – A/C subsidies+responsible use
  – Code changes
  – Population health promotion (e.g. active transportation, nutrition)
A few communication Challenges

• Message penetration depends on others with larger audiences (e.g. media, NWS)
  – Extreme heat events – not exotic and no dramatic visuals
  – Outdoor activities vs
  – Indoor, hidden vulnerable

• Continuum of risk
  – Seasonal measures for vulnerable population and providers
  – Mobilize early for extreme events

• Air conditioning:
  – Messages for vulnerable
  – Responsible use for others including commercial
  – Public health protection vs CC mitigation
Stay cool