Indicators for Extreme Weather and Health: What is Needed for Better Surveillance

Paul English, PhD, MPH
Environmental Health Investigations Branch
California Department of Public Health

Outline

- Need for indicators
- Direct and indirect health effects of extreme weather
- Review of indicator work
- Vulnerability Indicators
- Gaps in Surveillance Indicators
- Recommendations for Future Work

Why are indicators needed?

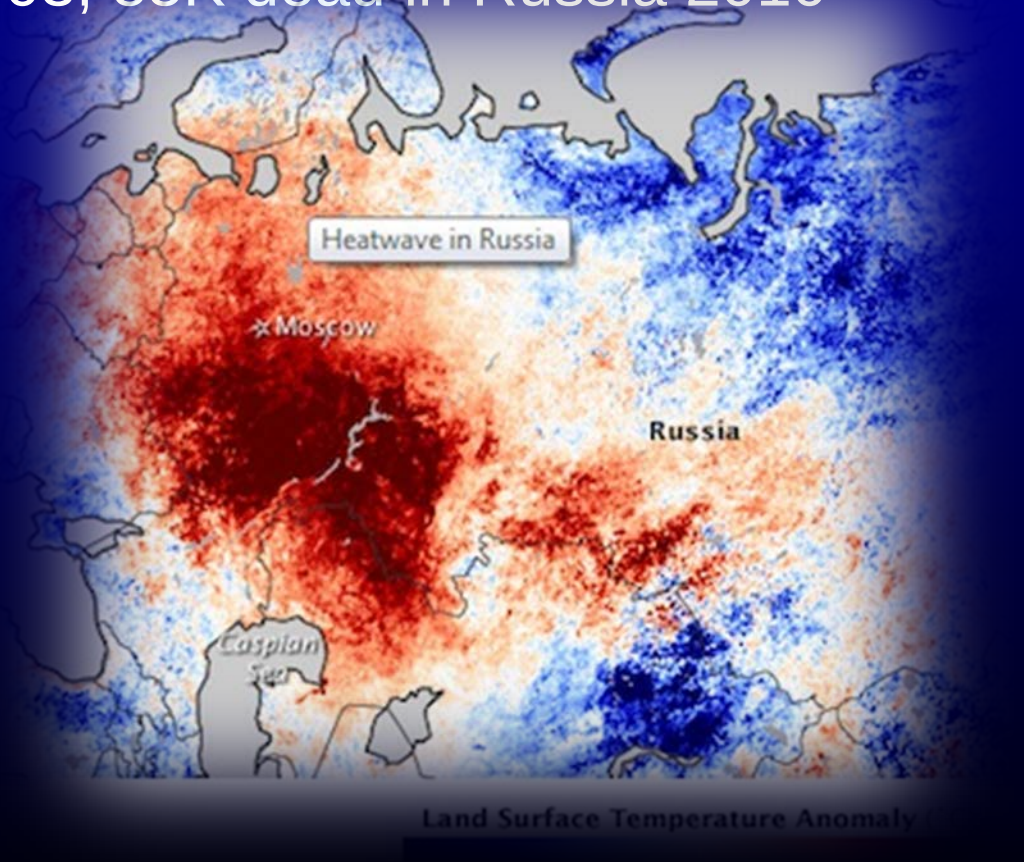
- Where are health events occurring?
- Who is vulnerable? (vulnerability assessments)
- Are trends increasing/decreasing?
- Program/policy evaluation
- Predicting future disease burdens
- Communication tools

Health Burden associated w/ extreme events

- Heat Wave deaths and illnesses (associated with greatest mortality of all extreme events in U.S.) 40-60K Dead in Europe 2003; 55K dead in Russia 2010

- Deaths and injuries from storms, hurricanes, extreme precipitation

- Direct and Indirect effects of extreme events



Extreme Weather Events are associated with direct and indirect effects on public health

Direct: Deaths, Illnesses, and Injuries (e.g. 971 direct deaths from Katrina)

Indirect: Population displacement, mental illness, health care disruption, exacerbation of pre-existing illness, water contamination (infectious and chemical)

Previous work

- WHO/Europe (2009)
- National Research Council (“Monitoring Climate Change Impacts, 2010)
- Council of State and Territorial Epidemiologists (2009)
- National Environmental Public Health Tracking Program CDC
- National Climate Assessment Indicators

- WHO: focus on food, water, and vector-borne disease: indirect effects of extreme events such as flooding

- NRC: focus on vulnerability factors:
  - Living in vulnerable areas; Migration; Elderly living alone; Infant Mortality

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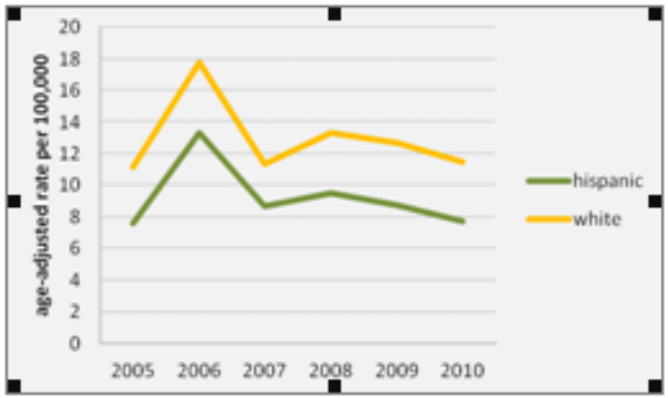
- CSTE:
  - Mortality/Morbidity due to Heat;
  - Deaths and Injuries due to extreme weather
  - Vulnerability Indicators

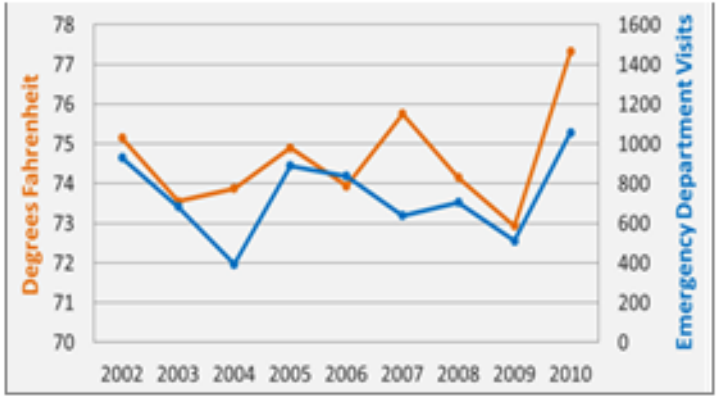
National Env Public Health Tracking

http://ephtracking.cdc.gov/showClimateChangeLanding.action

- By U.S. County:
  - Daily Estimates of max/min temp, heat index, excessive heat days
  - Heat related-mortality
  - Vulnerability Maps
- Morbidity data at State Portals:



Emergency department visits due to heat in California in summer months, 2005–2010



Heat stress ED visits and average of daily maximum summer temperatures in Massachusetts, 2002–2010

Vulnerability Indicators Vary by Climate Health Threat

Heat:

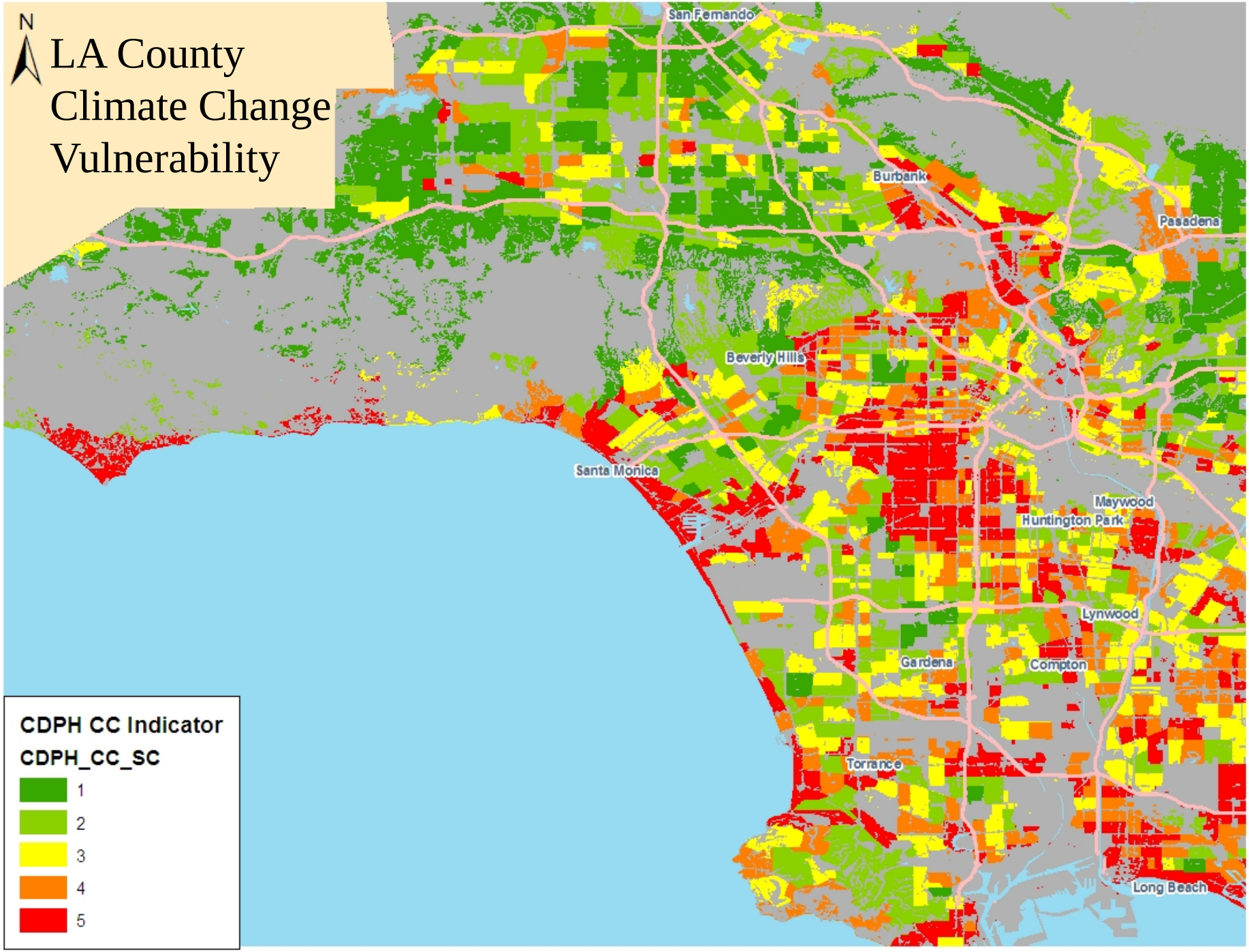
- Elderly, Medical compromised, Social Isolation, Children, low income, occupational

Flooding/Extreme events:

- Elderly, low-income, homeless, disabled, lack of transportation, obese, co-morbidities

Drought:

- dialysis patients, elderly, pregnant and nursing women, infants, immunocompromised individuals


N
LA County
Climate Change
Vulnerability
San Fernando
Burbank
Pasadena
Beverly Hills
Santa Monica
Maywood
Huntington Park
Lynwood
Gardena
Compton
Torrance
Long Beach
CDPH CC Indicator
CDPH_CC_SC
1
2
3
4
5

Gaps in Surveillance: Heat

1) No agreed-upon definitions for extreme heat and heat waves
2) No national hospitalization/ER database (HIE/HIT?)
3) Use of death certificates and hospitalization and ER records result in undercounts
4) Estimating excess mortality/morbidity from heat waves not straightforward

NWS heat products

- No comprehensive evaluation has been conducted to determine if heat products adequately protect human health

- Evaluation of heat products in San Francisco/Los Angeles in 2008-09 found most products responsive to emergency room visits for heat but two excessive heat events missed.

Deaths and Injuries from Extreme Storm Events

- Local storm reports (preliminary data)
- Service assessments (internal assessments of events)
- NWS Storm data
- Data collected: age, gender, location, whether fatality was direct or indirect result of event (often hard to determine)

Source: Ken Harding, Meterologist, NWS

NWS Storm Data

- From: “county, state and federal emergency management officials, local law enforcement officials, skywarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public.” Includes responders such as Red Cross
- “information from these sources may be unverified by the NWS”

Recommendations

- More heat products in different geographic locations should be evaluated for sensitivity to morbidity

- Temperature data should be analyzed separately
  - use relative temperature thresholds (e.g. 95% of temps for that date/location based on 30 yrs historical data)
  - see if heat products are issued and if morbidity occurs

Recommendations

- Criteria should be established for heat products by pooling evidence from national, multi-city analyses. This would provide a basis for evidence-based standards that vary by local climate and other factors
- Estimates of excess mortality/morbidity from heat waves to provide the best estimates of public health burdens from heat

Recommendations

- NWS, Red Cross, Local/state Health Depts., Insurance industry (?) should work together to obtain the most accurate verifiable data on deaths and injuries from storms (Note: CSTE Disaster Epi Meeting May 8/9, Atlanta)
- More attention needs to be given to collect data and develop indicators on indirect effects of storms on public health