Addressing the Health Impacts of Extreme Heat

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Elizabeth Rhoades, PhD
Program Director,
Climate Change and Sustainability Program
Los Angeles County Department of Public Health

Why Public Health?

- Climate change has serious public health implications; we must enact strategies that protect people from those impacts
- Framing climate change in the context of health is the most effective way to talk about it so that people care.[1]
- Climate solutions have health benefits

Presentation Outline

- Public health impacts of extreme heat
- Vulnerable populations and widening disparities
- Co-benefits of interventions
- Additional needs

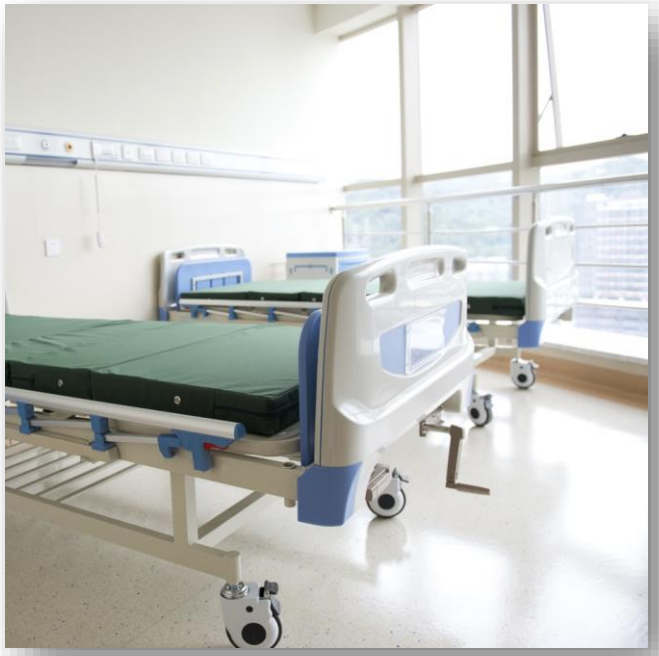
Hotter Temperatures: Health

- Heat waves are serious:
  - Philadelphia (1993): **118 deaths**
  - Chicago (1995): **739 deaths**
  - California (2006): > **650 deaths**
- Extreme heat leads to more deaths in the US each year than floods, storms, and lightning combined[2]

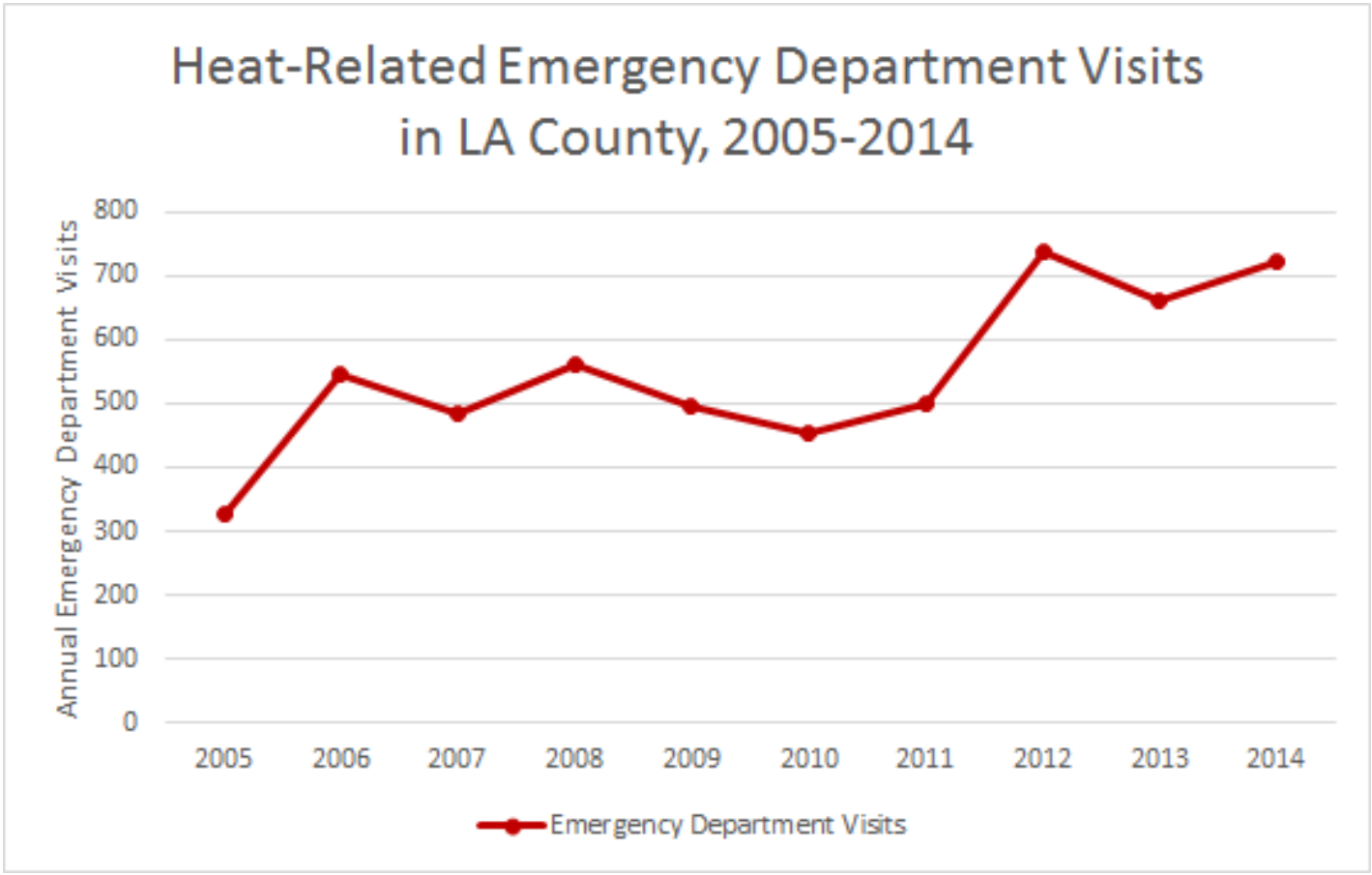
Credit: Irfan Khan / Los Angeles Times

Hotter Temperatures: Health

- California's 2006 heat wave[3]
  - 16,166 excess emergency department visits
  - 1,182 excess hospitalizations
  - More than $133 million in health-related costs[4]
- Higher energy use can lead to power outages
  - Foodborne illness
  - Loss of power to hospitals, nursing homes, restaurants, schools, etc.



Hotter Temperatures: Health



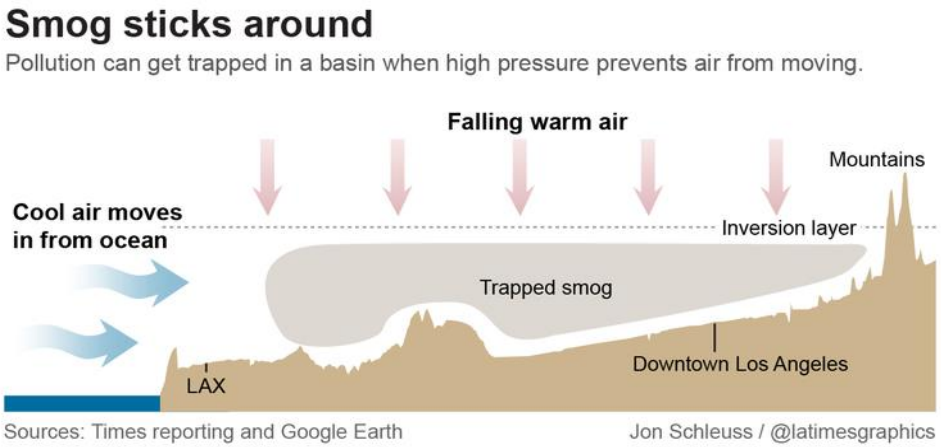
Source: Office of Statewide Health Planning and Development. Hospital Discharge and Emergency Department Visit Data, prepared by the Los Angeles County Department of Public Health.

Hotter Temperatures: **Health**

- Projections indicate that in California, a high emissions scenario could lead to
  - 2,100 – 4,300 additional deaths/year by 2025
  - 6,700 – 11,300 additional deaths/year by 2050[5]

2. Ostro, B., Rauch, S., & Green, S. (2011). Quantifying the health impacts of future changes in California, *Environmental Research, 111*(8): 1258-1264. https://doi.org/10.1016/j.envres.2011.08.013

Poor Air Quality



- More creation of ground-level ozone
- Temperature inversions
- Wildfires
- Disproportionate impact on low-income communities, communities of color

May lead to:

- Allergies
- Respiratory illness

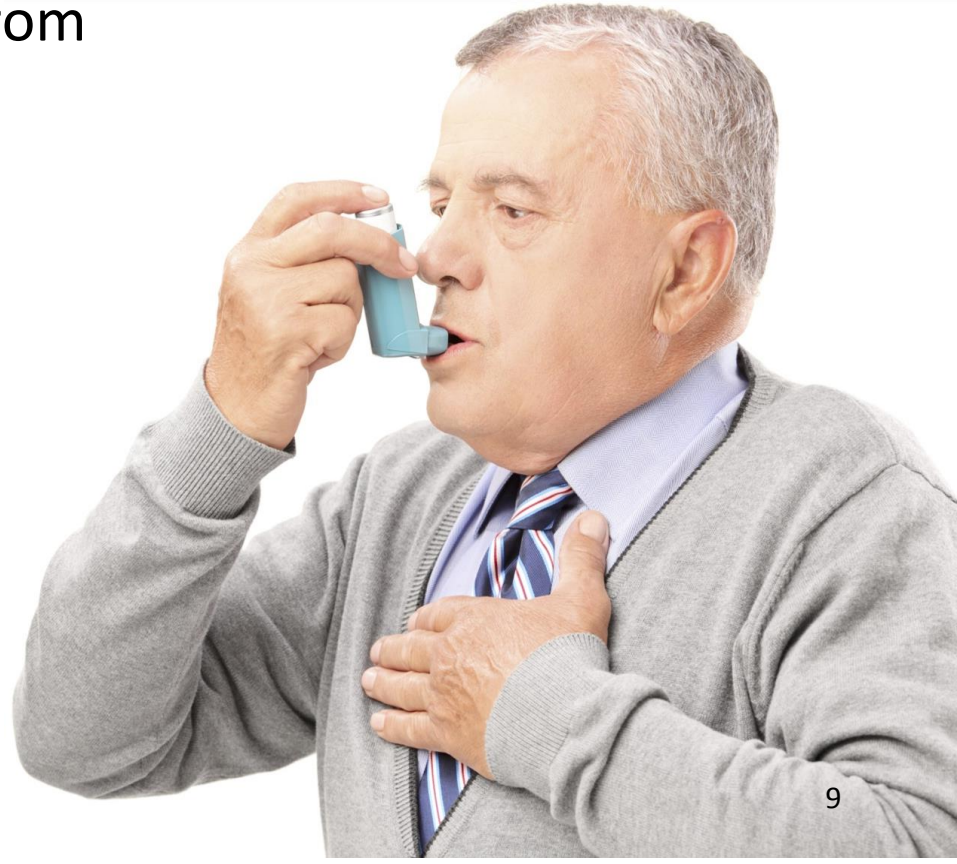
Wildfires

- 15 of the 20 largest fires in California's history occurred since 2000[6]
- The recent Mendocino Complex fire is the largest in California's history, with >290,000 acres burned

Credit: Mark Ralston, AFP/Getty Images, taken from USA Today news article

Wildfires: Health

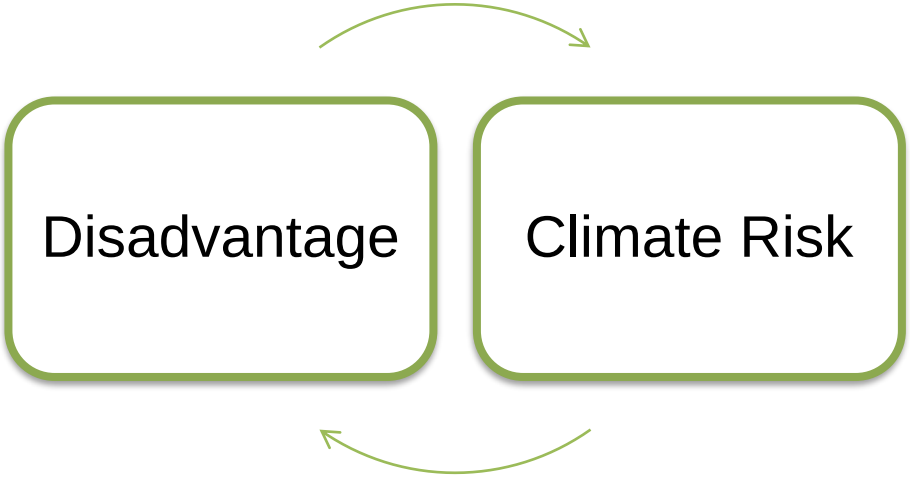
- Injuries and deaths
- Destroyed homes
- Mental health problems from trauma
  - PTSD
  - Anxiety
  - Depression
- Poor air quality
  - Eye irritation
  - Respiratory illness (like asthma, COPD)
  - Allergies



Vulnerable Populations

- Low-income populations
- Communities of color
- Older adults
- Young children
- People with a chronic disease
- Athletes
- Outdoor workers
- People experiencing homelessness
- People without air conditioning
- Undocumented immigrants

Vulnerable Populations



"The disproportionate impacts of climate change on individuals with pre-existing conditions and on socially disadvantaged groups threaten to greatly exacerbate existing health and social inequities, globally and within the U.S." – The Public Health Institute

Protecting People from Heat

1. Built environment strategies that cool neighborhoods (urban heat island reduction)
2. Emergency preparedness and response
3. Access to air conditioning + infrastructure resilience

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Urban Heat Island Reduction

Cool Roofs

Green Space

Trees

Cool Pavement

Co-Benefits of Trees

Public Health Benefits

- Improve air quality[7]
- Promote physical activity[8]
- Reduce stress[9]
- Calm traffic[10]
- Reduce noise[11]
- Reduce crime[12]

Co-Benefits of Trees

Economic Benefits

- Decrease energy costs[13]
- Stimulate commercial activity[14]
- Increase property values[15]
- Reduce need for infrastructure to manage stormwater[16]

Protecting People from Heat

Using data for Emergency Preparedness and Response

- Are trigger points for heat warnings based on thresholds shown to cause health impacts?
- Do we evaluate the effectiveness of heat-related messaging?
- Do we tack the use and effectiveness of cooling centers?
- Do we use data to ensure there are cooling centers in the most high-need areas?
- Do we use existing syndromic surveillance data on heat-related emergency care to inform health protective measures (such as alerts, targeted messaging, where to site cooling centers) and plan for future extreme heat events?

Additional Data Needs

- Improved projections for health impacts related to climate change (e.g. heat, air quality, vector-borne disease)
- Improved understanding of the use and effectiveness of intervention measures, particularly cooling centers
- Improved understanding of how people cope during extreme heat events, what resources they need, and how to best reach them with those resources

Thank you!

Elizabeth Rhoades, PhD
Program Director,
Climate Change and Sustainability Program
Los Angeles County Department of Public Health
erhoades@ph.lacounty.gov | 626-430-5537

References

1. Myers, T.A., Nisbet, M.C., Maibach, E.W., Leiserowitz, A.A. (2012). A public health frame arouses hopeful emotions about climate change. Climatic Change 113: 1105-1112.
2. Berko, J., Ingram, D.D., Saha, S., Parker, J.D. (2014). National Health Statistics Report: Deaths attributed to heat, cold, and other weather events in the United States, 2006-2010. Retrieved from https://www.cdc.gov/nchs/data/nhsr/nhsr076.pdf
3. Knowlton, K., Rotkin-Ellman, M., King, G., Margolis, H. G., Smith, D., Solomon, G., … English, P. (2009). The 2006 California heat wave: Impacts on hospitalizations and emergency department visits. *Environmental Health Perspectives, 117*(1), 61-67. doi: 10.1289/ehp.11594
4. NRDC. Cost of excess hospitalizations and emergency department visits for the 2006 California heat wave. https://assets.nrdc.org/sites/default/files/hea_08082601a.pdf?_ga=2.17659065.1072289568.1533666389-813895834.1533666389
5. Ostro, B., Rauch, S., & Green, S. (2011). Quantifying the health impacts of future changes in California, *Environmental Research, 111*(8): 1258-1264. https://doi.org/10.1016/j.envres.2011.08.013

References (2)

6. CAL FIRE's top 20 largest wildfires in California fact sheet
7. Nowak, D.J.; Crane, D.E.; Stevens, J.C. 2006. Air pollution removal by urban trees and shrubs in the United States. Urban Forestry and Urban Greening. 4: 115–123.
8. Fielding, J.E. M.D., Increasing Physical Activity: A Report on Recommendations of the Task Force on Community Preventive Services, Centers for Disease Control and Prevention, October 26, 2001, p.1.
9. Dwyer, J.F.; Nowak, D.J.; Noble, M.H.; Sisinni, S. 2000. Connecting people with ecosystems in the 21st century: an assessment of our nation's urban forests. PNWGTR-490. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 483 p.
10. Mok, J.-H., H. C. Landphair, and J. R. Naderi. 2006. Landscape improvement impacts on roadside safety in Texas. Landscape and Urban Planning 78(3):263–274
11. Maleki, K., and Hosseini, S.M. 2011. Investigation of the effects of leaves, branches and canopies of trees on noise pollution reduction. Annals of Environmental Science, *5*: 13-21.

References (3)

12. Kuo, F.E., & Sullivan, W.C. (2002).Environment and crime in the inner city: Does vegetation reduce crime? Environment & Behavior, 33(3), 343-367
13. Rosenzweig, C.; Solecki, W.D.; Slosberg, R.B. 2006. Mitigating New York City's heat island with urban forestry, living roofs, and light surfaces; final report for New York State Energy Research and Development Authority; contract 6681. New York, NY: Columbia University Center for Climate Systems Research & National Aeronautics and Space Administration/Goddard Institute for Space Studies.
14. Reviewed in Joye, Y.; Willems, K.; Brengman, M.; Wolf, K. (2010) The effects of urban retail greenery on consumer experience: reviewing the evidence from a restorative perspective. Urban Forestry and Urban Greening 9: 57–64.
15. Donovan, G.H.; Butry, D.T. (2010) Trees in the city: valuing street trees in Portland, Oregon. Landscape and Urban Planning 94:77–83
16. Fazio, J.R. "How Trees Can Retain Stormwater Runoff." Tree City USA Bulletin 55. Arbor Day Foundation. Retrieved from ttp://www.fs.fed.us/psw/programs/uesd/uep/products/11/800TreeCityUSABulletin_55.pdf

What LACDPH is Doing

Five Point Plan to Reduce the Health Impacts of Climate Change

Inform

...and engage the general public about the nature of climate change and the health co-benefits associated with taking action to reduce carbon emissions.

Promote

...local planning, land use, transportation, water, and energy policies that reduce carbon emissions and support the design of healthy and sustainable communities.

Provide

...guidance on climate preparedness to local government and community partners to reduce health risks and create more resilient communities.

Build

...the capacity of Departmental staff and programs to monitor health impacts, integrate climate preparedness, and improve climate response.

Adopt

...best management practices to reduce carbon emissions associated with Departmental facilities and internal operations.