

Scientists study impacts of climate change on public health

By Audrey Pinto

The NIEHS Partnerships for Environmental Public Health hosted a webinar April 25 highlighting the research of two NIEHS-funded scientists, Antonella Zanobetti, Ph.D., and Julia Gohlke, Ph.D., who are developing methods to assess and quantify the role of climate change on human health.

In the NIEHS [2012-2017 Strategic Plan](#), climate change was identified as an emerging environmental threat to human health (see [story](#)), and an area that needed further research to help inform policy. [Zanobetti](#),

(<http://www.hsph.harvard.edu/antonella-zanobetti/>)

senior research scientist at the Harvard School of Public Health, and [Gohlke](#),

(<http://www.norc.uab.edu/people/jgohlke>)

Professor at the University of Alabama School of Public Health, are attempting to fill the data gaps.

Quantifying health effects

"Currently, the most pressing need in environmental health research is to focus on estimating and assessing the potential health effects of climate variability on public health," explained Zanobetti.

To this end, she and her colleagues investigated the short-term and long-term health effects of weather exposure on nearly 25 million people, in 135 U.S. cities, older than 65, with predisposing diseases.

Zanobetti's group linked Medicare records to data from several sources, including the National Oceanic and Atmospheric Administration, 2000 census, and [2001 National Land Cover Dataset](#). (<http://www.epa.gov/mrlc/nlcd-2001.html>)

They then examined hospital admissions and causes of death from 1985 through 2006.

"We investigated the long-term effects of exposure to summertime temperatures on survival among adults who were hospitalized with heart disease, respiratory illness, and neurological disorders during the study period," Zanobetti said.

Climate variability affects certain populations

Zanobetti and colleagues found measurable increases in mortality associated with increased summer temperatures among persons older than 65 who had been hospitalized with chronic conditions, such as congestive heart failure and diabetes. The mortality rates were also higher for nonwhite women and those living in poverty. There was a greater chance of survival for individuals with college educations and for individuals living in areas with more green space.

"Our findings contribute important information for targeting and implementing effective public health programs during extreme hot and cold weather events, for elderly populations living in cities with little or no green space," she concluded.

Community collaboration

In a health study of urban and rural communities, Gohlke collaborated with the Friends of West End Inc. in Birmingham, Alabama, and the [West Central Alabama Community Health Improvement League](#),

(<http://www.soph.uab.edu/csch/community/wcacchil>)

which serves several Alabama rural counties, to investigate the impact of extreme heat events on preterm births (PTB) and nonaccidental deaths (NAD).

"Our initial aims were to establish strong partnerships across community organizations and local health departments in urban and rural communities in Alabama, establish environmental health priorities, and assess health outcomes associated with extreme heat events using birth and death records from 1990-2010," Gohlke said.



Zanobetti's work was cited in *A Human Health Perspective on Climate Change*, (<http://www.niehs.nih.gov/news/newsletter/2014/6/science-climate/file692195.pdf>) (5MB) a 2010 report published by the journal *Environmental Health Perspectives* and NIEHS. (Photo courtesy of Antonella Zanobetti)



Gohlke was a member of the Interagency Working Group on Climate Change and Health, which authored the 2010 report (<http://www.niehs.nih.gov/news/newsletter/2014/6/science-climate/file692196.pdf>) (5MB). (Photo courtesy of University of Alabama at Birmingham)

A unique tool for studying heat-related effects

Using birth and death records, and a unique exposure metric that measures heat wave days at the ZIP code level - the National Land Data Assimilation System Phase 2 ([NLDAD-2](#))

(<http://ldas.gsfc.nasa.gov/>)

- Gohlke and colleagues designed a study to examine associations between PTB and NAD in extreme heat conditions.

Gohlke reported, "We found that relative, average, and maximum heat waves were associated with increased PTB and NAD, and the association between heat waves and NAD are greater in urban areas."

"We believe our findings suggest that developing tangible adaptation strategies to address community priorities may be the most effective approach to climate change adaptation," Gohlke said in closing.

Citation: Zanobetti A, O'Neill MS, Gronlund CJ, Schwartz JD.

(<http://www.ncbi.nlm.nih.gov/pubmed/22493259>)

2012. Summer temperature variability and long-term survival among elderly people with chronic disease. Proc Natl Acad Sci U S A 109(17):6608-6613.

(Audrey Pinto, Ph.D., is technical editor for the NIEHS journal Environmental Health Perspectives.)

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