India's Heat Wave: Lessons Learned for World Cities

On August 19th, 2015, Meredith Connolly from the Natural Resources Defense Council (NRDC) discussed the topic of heat waves in South Asia with a special focus on the Heat Action Plan that was developed for the city of Ahmedabad in Gujarat, India.

With a population of approximately 7 million people, Ahmedabad is one of the fastest growing cities in India. It is also at risk for heat waves and heat-related mortality as climate change fuels hotter temperatures. During a major heat wave in 2010, temperatures reached 115 degrees Fahrenheit and over 1,300 excess deaths were associated with the extreme weather event. This was a wake-up call to the local government that more needed to be done. NRDC worked with the local government, international experts and local stakeholders to draft and launch a citywide Heat Action Plan in 2013, the first plan of its kind for a city in South Asia.

In May 2015, India experienced another major heat wave and more than 2,500 people died in various regions of the country. In Ahmedabad, with the Heat Action in place, only seven casualties were officially reported during this period of high temperatures.

The Ahmedabad Heat Action Plan

As part of the effort to create the Heat Action Plan, NRDC and their collaborators put together a roadmap that included key measures, such as historical temperature data and threshold values to create an early warning system and heat alerts. The scientific process to develop the preparedness plan also identified vulnerable populations, including children, the elderly, outdoor workers, including construction workers and traffic police, manufacturing and other indoor workers who operate in poorly ventilated environments, and poor and homeless individuals and families. The collaboration to develop the Heat Action Plan included the Ahmedabad Municipal Corporation (AMC), Indian Institute of Public Health, Gandhinagar, Public Health Foundation of India, Natural Resources Defense Council, Icahn School of Medicine at Mount Sinai, and Rollins School of Public Health at Emory University. Georgia Institute of Technology's CFAN group provided daily 7-day forecasts to the AMC.

The Heat Action Plan is organized around the following three key strategies:

- Building public awareness about the health risks of heat waves through community outreach;
- Initiating an early warning system with a 7-day forecast that provides advance notice to the public about predicted high temperatures and impending heat waves; and
- Increasing capacity among Ahmedabad’s health care professionals for treating people with heat-related illnesses.

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To implement these key strategies the authorities have taken the following actions:

- Creation of formal communication channels to more efficiently communicate and respond during extreme heat events;
- Appointment of a lead (“nodal”) officer who issues advance warnings and coordinates the Plan’s activities to improve communication within government and with the public ahead of extreme heat events;
- Capacity building and trainings for health care professionals to improve medical officers’ overall ability to recognize and respond to heat-related illnesses;
- Awareness-raising trainings and activities to improve worker safety protocols during heat waves; and
- Community outreach and education through trainings and communication materials developed for urban health centers and schools to increase resilience among vulnerable populations.

Information about heat wave preparedness, Ahmedabad, India

One lesson highlighted by the media during the 2015 heat wave was that the recommendation issued by many local governments to stay indoors and not work outside if the temperatures reached dangerous temperatures may be less effective than expected because for many poor individuals having to forgo wages to avoid the heat is not an option. This is one area where cooperation between policy makers and the private sector is needed so that this issue can be addressed. The Heat Action Plan in Ahmedabad recommends that the labor department and local companies shift outdoor workers’ hours from the hottest part of the day and provide water and breaks in the shade.

In some parts of the Middle East, labor codes state that workers should not be allowed to work above certain temperature thresholds. Some companies in these environments also shift maintenance and other outdoor work from daytime to nighttime hours to avoid health impacts related to heat. Such labor regulations could also be applicable to parts of South Asia and beyond that are at risk for heat waves.
The 2015 heat wave also spotlighted why proactive interventions to prepare for extreme temperatures – like the heat action plan in Ahmedabad – are much more effective than reactionary steps when a heat wave hits.

**Future challenges related to heat waves**

Estimates included in a recent report by leading medical experts in the 2015 Lancet Commission on Health and Climate Change suggest that, given urbanization and climate trends, by the year 2100 the number of vulnerable people, such as those aged 65 years and over, exposed to heatwave risks will increase significantly and lost labor and agricultural productivity are also expected to rise (**). In India, the urban areas that are expected to suffer most from heat related incidents are Delhi, Bangalore, Mumbai, Ahmedabad and Kolkata.

As with many other urban areas around the world, the problem of heat waves is exacerbated by the heat island effect. Infrastructure materials such as tin, asphalt and tar absorb heat in the dense urban core and temperatures can be several degrees higher than in surrounding rural areas. This problem can be addressed by making changes to the built environment. For example, a hospital in Ahmedabad moved its neonatal unit to the ground floor to avoid excess temperatures related to the design of the building and changed the building’s roof from black tar to white china mosaic tile that reflects sunlight rather than absorbs it. Ahmedabad’s government is also exploring having hospitals install solar panels to address heat distribution and to generate electricity that is more reliable than the common power cuts.

A related challenge for Ahmedabad and other cities in India and in the region is that a rapidly growing middle class is increasingly using more air conditioning. This trend is associated with rapid increases in energy demand which can strain power grids and energy infrastructure. According to recent estimates, in Mumbai about 40% of all electricity consumed is used for air conditioning (**).

Heat waves are predicted to increase in frequency and severity due to climate change. Implementing a heat action plan and establishing the right communications channels can protect health and save lives in cities that are at risk for heat waves.

More information about the Ahmedabad Heat Action Plan is available at:  
http://www.nrdc.org/international/india/extreme-heat-preparedness

**See:** Nick Watts et al. 2015. “Health and climate change: policy responses to protect public health,” *The Lancet Commission on Health and Climate Change*. Available at: http://dx.doi.org/10.1016/S0140-6736(15)60854-6

**See:** Cox, S. 2012. “Cooling a Warming Planet: A Global Air Conditioning Surge,” environment360. Available at:  
http://e360.yale.edu/feature/cooling_a_warming_planet_a_global_air_conditioning_surge/2550/