DEVELOPMENT AND IMPLEMENTATION OF HEAT-HEALTH ACTION PLAN IN AHMEDABAD: A SUCCESS STORY

Dr. Priya Dutta,

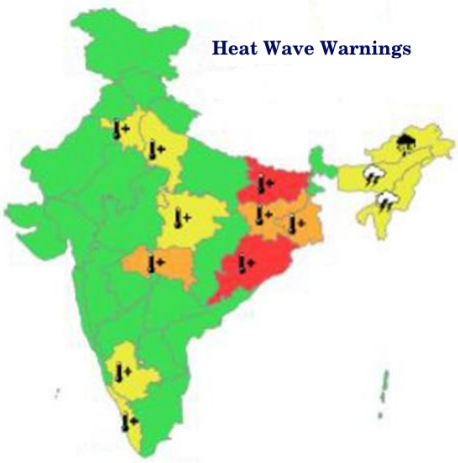
Indian Institute of Public Health-Gandhinagar, India

Ahmedabad Heat & Climate Study Group

4TH INTERNATIONAL CLIMATE CHANGE ADAPTATION CONFERENCE

INDIA CURRENT WEATHER OBSERVATION

- Heat wave condition in many parts of the country like Jharkhand, Telangana, Bihar, West Bengal, Vidarbha region Maharashtra, south coastal Andhra Pradesh and north and interior of Tamil Nadu.
- Several states of India are facing severe water crisis.
- Concern for worsening exposures with climate change in India and elsewhere

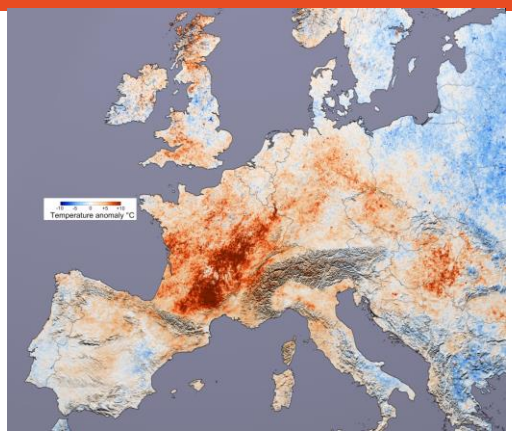


BACKGROUND

- In India the Maximum Temperatures have been increasing steadily over the past 30 years
- The associations between heat and all-cause mortality using various methods
- Extreme heat events resulted deaths, economic losses, power outages, and even riots
- Climate resilience and adaptation efforts in cities and states can reduce heat vulnerability, maintain economic stability, and protect people's health.

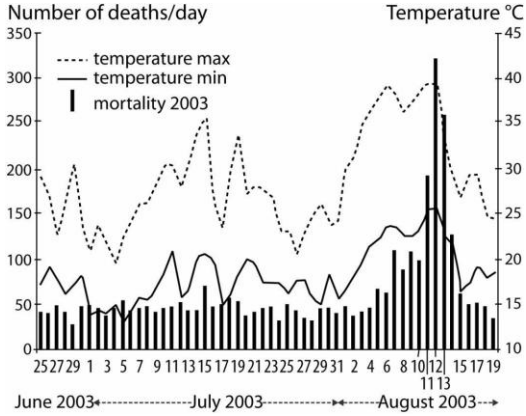
Origin of the Ahmedabad Heat and Climate Study Group

2003 EUROPEAN HEAT WAVE



5

2003 EUROPEAN HEAT WAVE - FRANCE



- **Total excess Deaths in Europe = 70,000**
  - **France – 14,802**
  - Portugal – 2039
  - Netherlands – 1500
  - Spain - 141

6

MOU - VIBRANT GUJARAT SUMMIT 2011

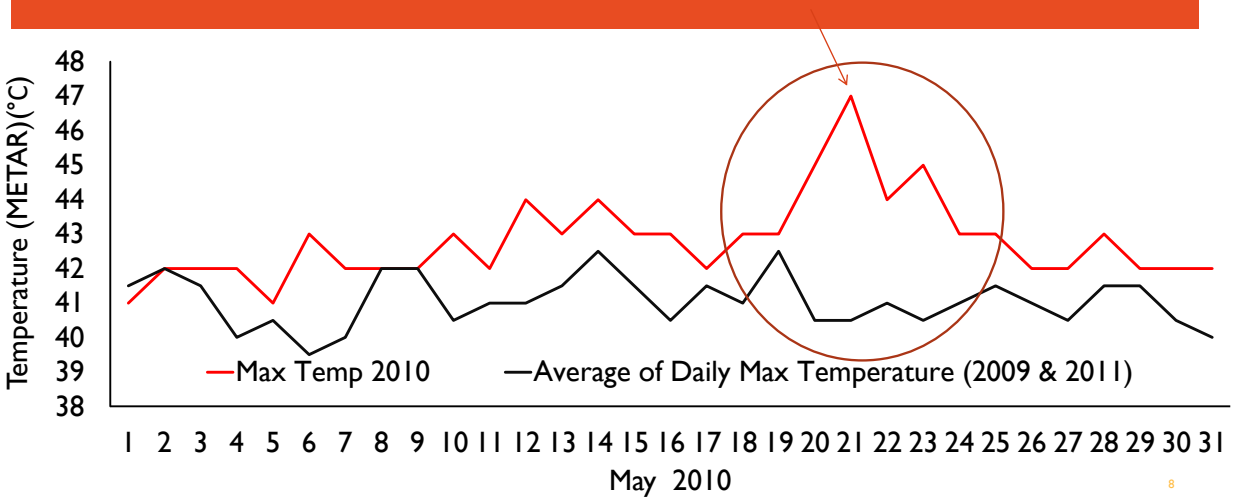
PHFI-IIPH and NRDC hosted a **first scientific Workshop on climate change and Heat-health** in Ahmedabad to convene and mobilize relevant scientists, stakeholders, and partners in March 2011

PHFI-IIPH and NRDC entered into MOUs with the state of Gujarat and the city of Ahmedabad (AMC) for joint work on heat

A number of **preliminary studies** were commissioned to assess the situation on the ground in Ahmedabad

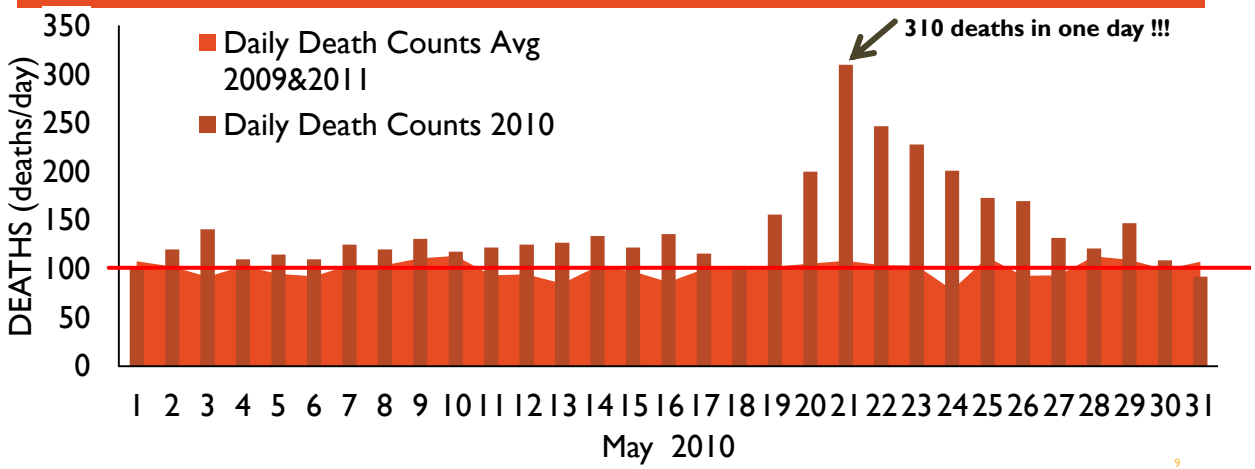
7

2010 HEAT WAVE IN AHMEDABAD – TEMP. 47DEG C ON 21ST MAY



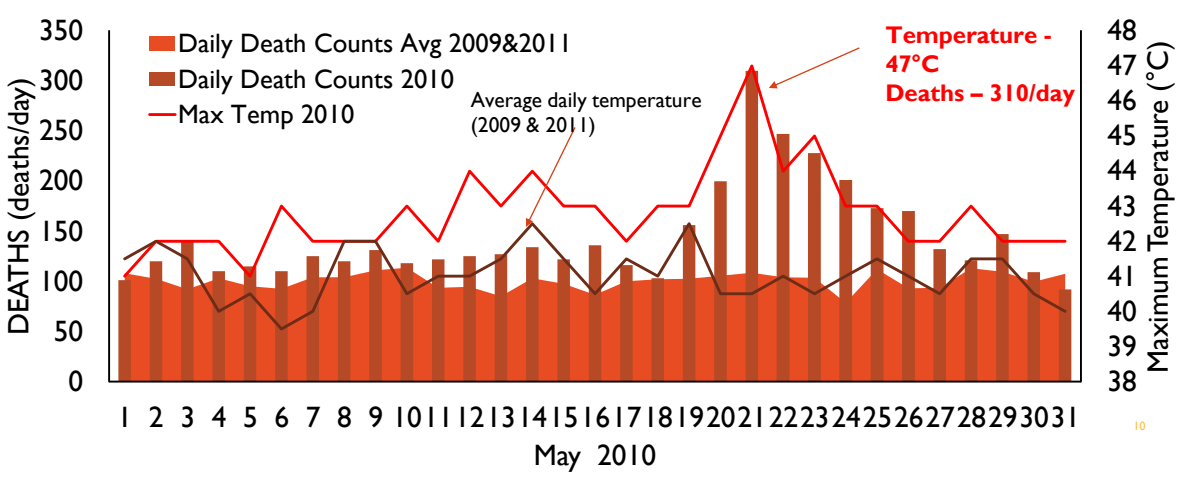
8

DAILY MORTALITY IN MAY 2010 COMPARED TO AVERAGE OF 2009 AND 2011



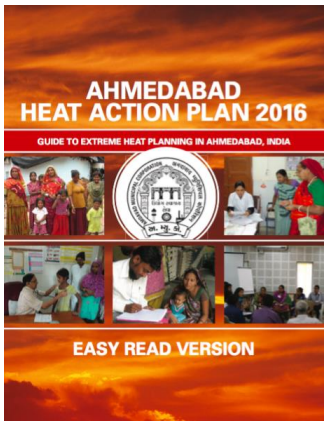
9

2010 AHMEDABAD HEAT WAVE : MAY 20-27TH – EXCESS DEATHS 800 IN ONE WEEK AND 1344 EXCESS DEATHS IN MAY 2010.



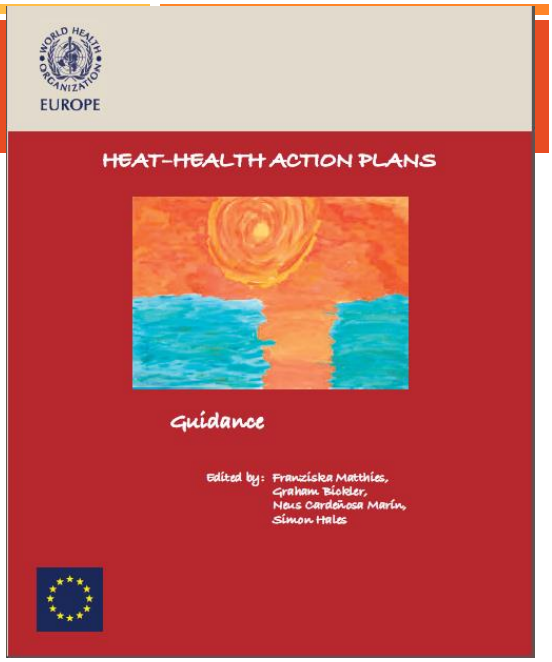
10

DEVELOPMENT OF AHMEDABAD HEAT ACTION PLAN 2013 - AN COLLABORATIVE EFFORT



GUIDANCE ON HAP

- WHO and European union document which gives guidance to other countries wanting to develop their own heat action plans
- Based on plan that were generated after 2003 – 2006 heat waves
- Freely available



HEAT ACTION PLAN FOCUSES ON THREE STRATEGIES

- ***Initiating an Early Warning System and Inter-Agency Coordination*** to alert residents of predicted high and extreme temperatures. The AMC has created formal communication channels to alert governmental agencies, the Met Centre, health officials and hospitals, emergency responders, local community groups, and media outlets of forecasted extreme temperatures.

- ***Capacity Building Among Health Care Professionals*** to recognize and respond to heat-related illnesses, particularly during extreme heat events. Such trainings focus on primary medical officers and other paramedical staff, and community health staff so they can effectively prevent and manage heat-related cases so as to reduce mortality and morbidity.

- ***Reducing Heat Exposure and Promoting Adaptive Measures*** by launching new efforts including mapping of high-risk areas of the city, increasing outreach and communication on prevention methods, access to potable drinking water and cooling spaces during extreme heat days. Collaboration with non-governmental organizations is also identified as a means to expand outreach and communication with the city's most at-risk communities.

KEY COMPONENTS OF HEAT ACTION PLAN

- The Plan consists of
  - **Develop a early warning system** for heat waves
  - **Nodal officer of AMC for communication and coordinating** an interagency emergency planning and response effort when heat waves hit.
  - **Increasing public awareness** of the risks of extreme heat through community outreach and communication activities.
  - **Increase capacity among Ahmedabad's medical staff** to respond to heat-related illnesses and to reduce mortality.
  - **Regular research & evaluation of the impact** of the plan and continual improvement each year

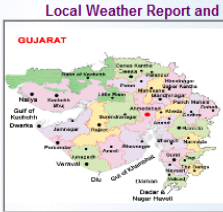
TEMPERATURE THRESHOLDS DECIDED BASED ON MORTALITY RISE

Condition	Temperature Thresholds	Alert Level
No Alert (Cool Day)	<41.0	White
Hot Day	41.0 – 42.9	Yellow
Heat Alert Day	43.0 – 44.9	Orange
Extreme Heat Alert Day	≥45.0	Red

15

EARLY WARNING SYSTEM BY IMD

Local Weather Report and Forecast For: Ahmedabad Dated :May 10, 2016



Past 24 Hours Weather Data	
Maximum Temp(°C) (Recorded. on 10/05/16)	43.0
Departure from Normal(°C)	2
Minimum Temp (°C) (Recorded. on 10/05/16)	29.4
Departure from Normal(°C)	3
24 Hours Rainfall (mm) (Recorded from 0830 hrs IST of yesterday to 0830 hrs IST of today)	NIL
Todays Sunset (IST)	19:11
Tommorows Sunrise (IST)	06:00
Moonset (IST)	22:54
Moonrise (IST)	09:20

7 Day's Forecast

Date	Min Temp	Max Temp	Weather
10-May	28.0	43.0	Clear sky
11-May	28.0	43.0	Clear sky
12-May	28.0	43.0	Clear sky
13-May	28.0	43.0	Clear sky
14-May	27.0	43.0	Clear sky
15-May	27.0	42.0	Sunny Day
16-May	27.0	42.0	Sunny Day

Website

भारत सरकार
पृथ्वी विज्ञान मंत्रालय
भारत मौसम विज्ञान विभाग
मौसम केंद्र,
आर एस/आर डब्लयू भवन,
हवाई अड्डा, अहमदाबाद-382,475
फोन नं. 079 22865012

Government of India
Ministry of Earth Sciences
India Meteorological Department
Meteorological Centre,
RS/RW Building, Airport,
Ahmedabad-382 475.
Phone: 079-22865012
Fax : 079-22865449

Issuing Office: Meteorological Centre, Ahmedabad
Time of Origin : 1200 Hrs. IST
Date : 10/05/ 2016
HAP20160510/01

Five days City weather forecast (Maximum temperature forecast) for Ahmedabad

Maximum Temperature forecast	Maximum temperature in deg Celsius	Probability of occurrences	High Temperature Warning
Day1 (Valid from time of origin to 0830 Hrs. IST of 11/05/2016)	43	Most likely	
Day2(Valid from 0830 Hrs. IST of 11/05/2016 to 0830 Hrs. IST of 12/05/2016)	43	Most likely	
Day3(Valid from 0830 Hrs. IST of 12/05 /2016 to 0830 Hrs. IST of 13/05/2016)	43	Very likely	
Day4(Valid from 0830 Hrs. IST of 13/05 /2016 to 0830 Hrs. IST of 14/05/2016)	43	Likely	
Day5(Valid from 0830 Hrs. IST of 14/05 /2016 to 0830 Hrs. IST of 15/05/2016)	43	Likely	

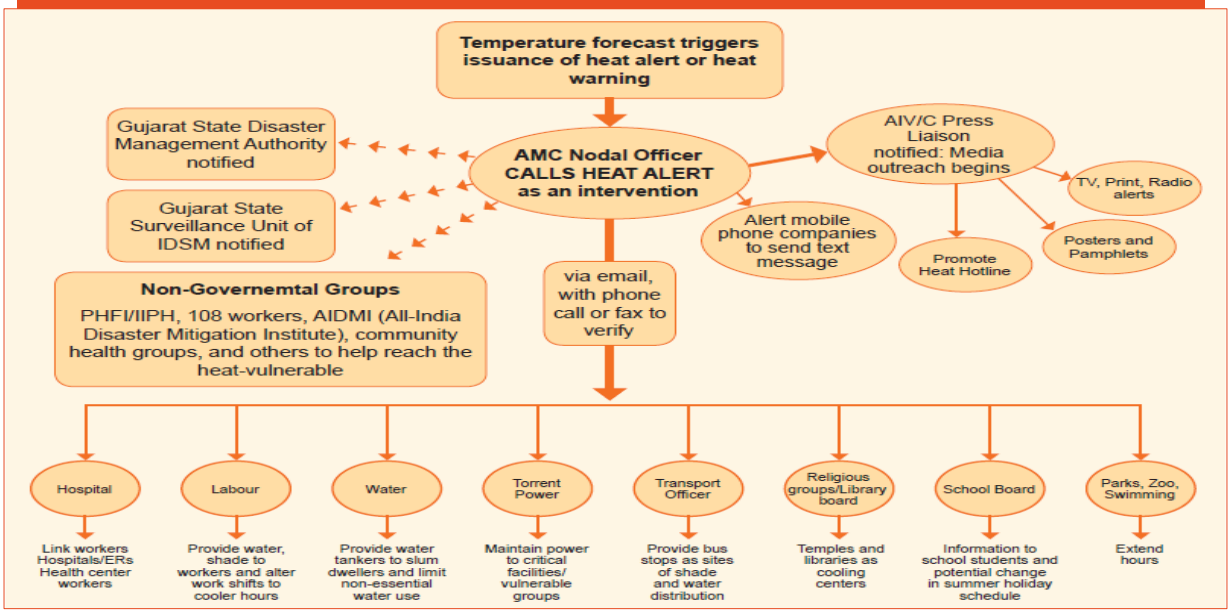
Legend: **Probability of occurrences**
Unlikely: less than 25 %
Likely: 25 to 50 %
Very likely: 50 to 75 %
Most likely: 75 to 100 %

Levels:
Yellow: 41.1- 43 deg Celsius
Orange: 43.1- 44.9 deg Celsius
Red : ≥45.0 deg Celsius

for Director In-charge
Meteorological Centre
Ahmedabad

Every Morning 5days forecast by Email

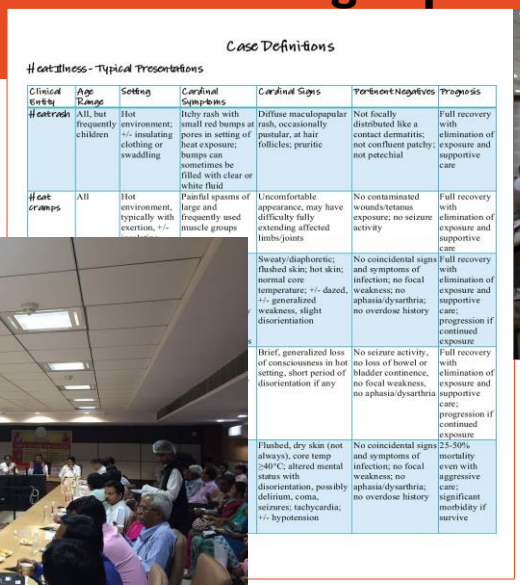
INTER- AGENCY EMERGENCY RESPONSE PLAN



PUBLIC AWARENESS MATERIALS

COMMUNITY OUTREACH

Building capacity

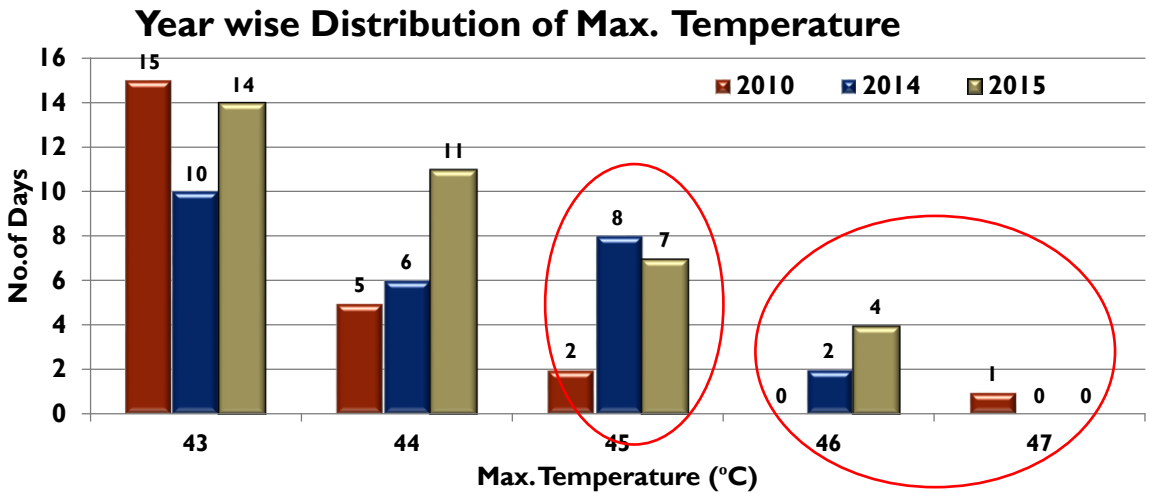


Case Definitions

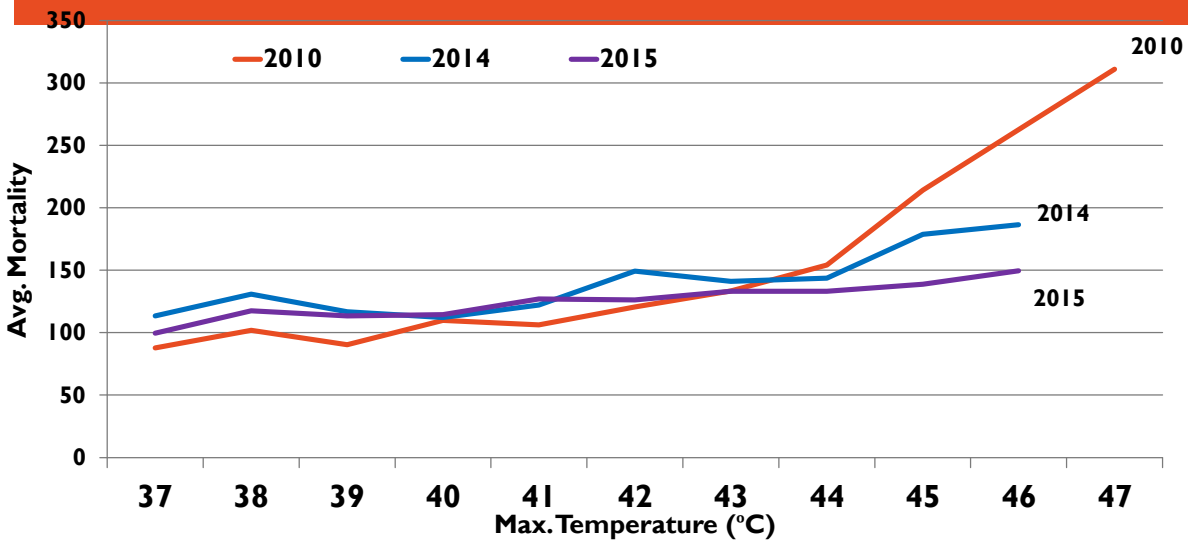
Heat Illness - Typical Presentations

Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal Signs	Pertinent Negatives	Prognosis
Heat rash	All, but frequently children	Hot environment; +/- insulating clothing or swaddling	Itchy rash with small red bumps at pores in setting of heat exposure; bumps can sometimes be filled with clear or white fluid	Diffuse maculopapular rash, occasionally pustular, at hair follicles; pruritic	Not focally distributed like a contact dermatitis; not confluent patchy; not petechial	Full recovery with elimination of exposure and supportive care
Heat cramps	All	Hot environment, typically with exertion, +/- [illegible]	Painful spasms of large and frequently used muscle groups	Uncomfortable appearance, may have difficulty fully extending affected limbs/joints	No contaminated wounds/tetanus exposure; no seizure activity	Full recovery with elimination of exposure and supportive care
[illegible]	[illegible]	[illegible]	[illegible]	Sweaty/diaphoretic; flushed skin; hot skin; normal core temperature; +/- dazed, +/- generalized weakness, slight disorientation	No coincidental signs and symptoms of infection; no focal weakness; no aphasia/dysarthria; no overdose history	Full recovery with elimination of exposure and supportive care; progression if continued exposure
[illegible]	[illegible]	[illegible]	[illegible]	Brief, generalized loss of consciousness in hot setting, short period of disorientation if any	No seizure activity, no loss of bowel or bladder continence, no focal weakness, no aphasia/dysarthria	Full recovery with elimination of exposure and supportive care; progression if continued exposure
[illegible]	[illegible]	[illegible]	[illegible]	Flushed, dry skin (not always), core temp ≥40°C; altered mental status with disorientation, possibly delirium, coma, seizures; tachycardia; +/- hypotension	No coincidental signs and symptoms of infection; no focal weakness; no aphasia/dysarthria; no overdose history	25-50% mortality even with aggressive care; significant morbidity if survive

DISTRIBUTION OF MAX.TEMPERATURE (2010, 2014 & 2015) AHMEDABAD CITY



TEMPERATURE MORTALITY RELATIONSHIP - PRE AND POST HAP



KEY PUBLIC HEALTH LEARNING FROM AHMEDABAD HAP

- **Value of creating evidence**
- **Cost effective intervention**
- **Networking –Local (IIPHG), International (NRDC, CDKN)**
- **Advocacy at right level**
- **Stakeholder involvement and ownership to ensure sustainability**
- **Scaling up (supported by right advocacy)**

SCALED HAP

- leading governments in the Nagpur region of Maharashtra and Bhubaneswar coastal region of Odisha launched Heat Action Plans in 2016

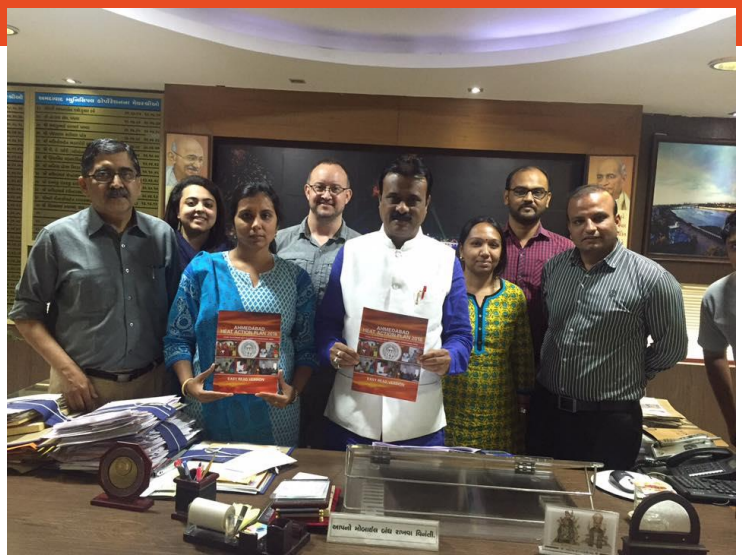
1. Vidharbha region of Maharashtra- Nagpur, Jalgoan, Gondia, Nanded, Chandrapur
2. Odisha region

OUTCOMES

JOURNAL PUBLICATIONS

- Kim Knowlton, Anjali Jaiswal, Gulrez Shah Azhar, Dileep Mavalankar, Amruta Nori-Sarma, Ajit Rajiva, Priya Dutta et al. (2014) **Ahmedabad, Gujarat: Development and Implementation of South Asia's First Heat-Health Action Plan**. Int. J. Environ. Res. Public Health, 11: 3473-3492. (IF: 2.197) http://www.mdpi.com/journal/ijerph/special_issues/weather-risks
- Gulrez Shah Azhar, Dileep Mavalankar, Amruta Nori-Sarma, Ajit Rajiva, Priya Dutta et al. (2014) **Heat-related mortality in India: Excess all-cause mortality associated with the 2010 Ahmedabad heat wave**. PLOS ONE 9(3): 1-8. (IF: 3.73) http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0091831
- Khyati Kakkad, Michelle L. Barzaga, Sylvan Wallenstein, Gulrez Shah Azhar, and Perry E. Sheffield (2014) **Neonates in Ahmedabad, India, during the 2010 Heat Wave: A Climate Change Adaptation Study**. Journal of Environmental and Public Health, Article ID 946875, 1:8. http://www.hindawi.com/journals/jeph/2014/946875/
- Tran, Kathy V., Gulrez S. Azhar, Rajesh Nair, Kim Knowlton, Anjali Jaiswal, Perry Sheffield, Dileep Mavalankar, and Jeremy Hess (2013). **A cross-sectional, randomized cluster sample survey of household vulnerability to extreme heat among slum dwellers in Ahmedabad, India.**" *International journal of environmental research and public health* 10, no. 6: 2515-2543. http://www.mdpi.com/1660-4601/10/6/2515
-

CITY LEADERSHIP RELEASING THE 2016 HAP



Thanks