Ahmedabad Heat Action Plan
Development and Lessons

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2010 Ahmedabad heat wave: May 20-27\textsuperscript{th} – *excess deaths 800 in one week* and 1344 excess deaths in May 2010.

![Graph showing daily death counts and maximum temperature during the heat wave in Ahmedabad in May 2010. The graph indicates a peak in deaths around May 21st with a maximum temperature of 47°C.](image-url)
Pilot AHMEDABAD HEAT ACTION PLAN in 2013
Key steps in developing HAP

• City government engagement
• Background data & analysis – weather and mortality / health
• Understanding city and vulnerable groups
• Early warning system and setting thresholds
• Feasible interventions and detailing them
• Writing the plan and disseminating
• Implementing and monitoring the impact
• Revising the plan and scaling it up
HAP COMPONENTS

**EARLY WARNING SYSTEM & INTER AGENCY EMERGENCY RESPONSE PLAN**
Alert residents of predicted high and extreme temperatures & formally communication channels to alert governmental agencies.

**PUBLIC AWARENESS & COMMUNITY OUTREACH**
Communicate the risks of heat waves and implement practices to prevent heat-related deaths and illnesses.

**CAPACITY BUILDING OF MEDICAL PROFESSIONALS**
Training focus on primary medical officers and other paramedical staff, and community health staff.

**REDUCING HEAT EXPOSURE AND PROMOTING ADAPTIVE MEASURES**
Access to potable drinking water and cooling spaces during extreme heat days & promote adaptive measures.
Temperature Mortality scatter plot and fitted Curve – Setting the Thresholds
Intervention – 1 Early Warning System & Inter-Agency Emergency Response Plan

Five Days City Weather Forecast (Maximum temperature forecast) for Ahmedabad

<table>
<thead>
<tr>
<th>Maximum Temperature forecast</th>
<th>Minimum temperature in deg Celsius</th>
<th>Probability of occurrence</th>
<th>High Temperature Warning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1 (Valid from time of issue to 0830 hrs. IST of 10/06/2018)</td>
<td>43</td>
<td>Most likely</td>
<td></td>
</tr>
<tr>
<td>Day 2 (Valid from 0830 hrs. IST of 10/06/2018 to 0830 hrs. IST of 11/06/2018)</td>
<td>43</td>
<td>Most likely</td>
<td></td>
</tr>
<tr>
<td>Day 3 (Valid from 0830 hrs. IST of 11/06/2018 to 0830 hrs. IST of 12/06/2018)</td>
<td>43</td>
<td>Very likely</td>
<td></td>
</tr>
<tr>
<td>Day 4 (Valid from 0830 hrs. IST of 12/06/2018 to 0830 hrs. IST of 13/06/2018)</td>
<td>44</td>
<td>Likely</td>
<td></td>
</tr>
<tr>
<td>Day 5 (Valid from 0830 hrs. IST of 13/06/2018 to 0830 hrs. IST of 14/06/2018)</td>
<td>44</td>
<td>Likely</td>
<td></td>
</tr>
</tbody>
</table>

Legend: Probability of occurrence
- Uncertain: less than 20%
- Low: 20% to 25%
- Medium: 25% to 30%
- High: 30% to 50%
- Very high: 50% to 75%
- Most likely: 75% to 100%

For Director, Exchange Meteorological Centre
Ahmedabad
Intervention – 2

Public Awareness & Community Outreach
How to save yourself from Heat Waves

- Drink water, chaas, and other liquids (no soft drinks)
- Stay out of the sun
- Find a place to cool down
- Wear light clothing
- Check in with friends & family

Drink More Water

Heat Alert

Dos & Don'ts During Heat Waves

- Drink water, chaas, and other liquids (no soft drinks)
- Stay out of the sun
- Find a place to cool down
- Wear light clothing
- Check in with friends & family

Symptoms to watch for:

- Heat rash or irritation
- Heavy sweating and weakness
- Headache and nausea
- Lack of sweating despite the heat
- Head, neck, and dry skin
- Muscle weakness or cramps
- Nausea and vomiting

People at high risk: children, elders, and pregnant women

In case of an emergency, CALL 198
## Intervention – 3
### Building Capacity of medical community

#### Case Definitions

<table>
<thead>
<tr>
<th>Heat Illness - Typical Presentations</th>
<th>Clinical Entity</th>
<th>Age Range</th>
<th>Setting</th>
<th>Cardinal Symptoms</th>
<th>Cardinal Signs</th>
<th>Pertinent Negatives</th>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat rash</td>
<td>All, but frequently children</td>
<td>Hot environment; +/- insulating clothing or swaddling</td>
<td>Itchy rash with small red bumps in setting of heat exposure; bumps can sometimes be filled with clear or yellow fluid</td>
<td>Diffuse maculopapular rash, occasionally pruritic at hair follicles; purpura</td>
<td>Not focally distributed like a contact dermatitis; not confluent patches; not petechial</td>
<td>Full recovery with elimination of exposure and supportive care</td>
<td></td>
</tr>
<tr>
<td>Heat cramps</td>
<td>All</td>
<td>Hot environment, typically with exertion; +/- insulating clothing</td>
<td>Painful spasms of large and frequently used muscle groups</td>
<td>Uncomfortable appearance, may have difficulty fully extending affected limbs/ joints</td>
<td>No contaminated wound/ tetanus exposure; no seizure activity</td>
<td>Full recovery with elimination of exposure and supportive care</td>
<td></td>
</tr>
<tr>
<td>Heat exhaustion</td>
<td>All</td>
<td>Hot environment; +/- exertion; +/- insulating clothing or swaddling</td>
<td>Feeling overheated, lightheaded, exhausted and weak, unsteady, nauseated, sweaty and thirsty, inability to continue activities</td>
<td>Sweaty/diaphoretic; flushed skin; hot skin; normal core temperature; +/- dazed, +/- generalized weakness, slight disorientation</td>
<td>No coincidental signs and symptoms of infection; no focal weakness; no aphasia/dysarthria; no overdose history</td>
<td>Full recovery with elimination of exposure and supportive care; progression if continued exposure</td>
<td></td>
</tr>
<tr>
<td>Heat syncope</td>
<td>Typically adults</td>
<td>Hot environment; +/- exertion; +/- insulating clothing or swaddling</td>
<td>Feeling hot and weak; lightheadedness followed by brief loss of consciousness</td>
<td>Brief, generalized loss of consciousness in hot setting, short period of disorientation if any</td>
<td>No seizure activity, no loss of bowel or bladder continence, no focal weakness, no aphasia/dysarthria</td>
<td>Full recovery with elimination of exposure and supportive care; progression if continued exposure</td>
<td></td>
</tr>
<tr>
<td>Heat stroke</td>
<td>All</td>
<td>Hot environment; +/- exertion; +/- insulating clothing or swaddling</td>
<td>Severe overheating; profound weakness; disorientation, obtundation, seizures, or other altered mental status</td>
<td>Flushed, dry skin (not always), core temp &gt;40°C; altered mental status with disorientation, possibly delirium, coma, seizures; tachycardia; +/- hypotension</td>
<td>No coincidental signs and symptoms of infection; no focal weakness; no aphasia/dysarthria; no overdose history</td>
<td>25-50% mortality even with aggressive care; significant morbidity if survive</td>
<td></td>
</tr>
</tbody>
</table>
Reducing Heat Exposure: cool roof initiative 2017

- Goal 3,000 low income households to get roof painting – cool roof
  - Strong political support: Initiative was inaugurated by the Mayor by painting of the slum roofs
  - Publicity through advertisements done for cool roof.
Impact of Heat Action Plan

• Reduction in all cause of mortality during heat waves

• Decrease in heatstroke cases and deaths in sentinel hospitals in the city
Relative Risk of Death with max temperature – Ahmedabad Pre & Post HAP
Heat Stroke Mortality and Morbidity before and after HAP on Selected 5 Municipal Hospitals of AMC
Engaging with Policy stakeholders Policy Papers: Issue Briefs

Available online from:
http://www.nrdc.org/international/india/extreme-heat-preparedness/
Engaging with National Disaster Management Authority (NDMA)

The Asian Age

Published on The Asian Age (http://www.asianage.com)

‘UP, Bihar must follow Gujarat’

By editor

Published: 11 Jan 2014 - 30:00

Vardhan asks states to act in battle against encephalitis

Bihar CM Nitish Kumar and Uttar Pradesh ruling party chief Mulayam Singh Yadav may not be publicly subscribing to Prime Minister Modi’s style of fund-raising, the Centre has suggested the two states to subscribe to the Gujarat model in dealing with meningitis encephalitis, that has resulted in 500-600 deaths this year so far.

In a meeting held today Dr Harsh Vardhan asked both UP and Bihar officials to replicate the “early warning system” installed in Ahmedabad. The minister asked the officials to approach the Natural Resources Defence Council and the Indian Institute of Public Health to replicate the existing system of Ahmedabad. “The government of Gujarat gets support from local health and environment groups to prepare local communities to the worst of extreme heat so that they can take all the necessary steps to protect themselves. My ministry will be happy to extend all possible assistance to put in place a preparedness plan,” he said during a high-level meeting held Tuesday, following recent deaths of over 40 children in Bihar due to encephalitis.
Engaging with States governments and National authorities for Scaling up

- States with HAP
  - Haryana
  - Odhisa,
  - Telangana,
  - Andhra Pradesh,
  - Uttar Pradesh
  - Bihar
  - Karnataka

- HAP as a part of State Disaster Management Plan
  - Gujarat
  - Rajasthan
City Resilience toolkit and How to Manual- Guide for other cities and state of India to develop HAP
Key lessons on development of HAP at local level

- Involvement of Local city or district administrative and health and political leadership
- Engagement with all stakeholders: IMD for weather data, Health data for analysis, city govt for various actions.
- Facilitation by local and national institutions / experts – universities
- Learning and adapted HAP developed in other countries / cities
- Measurement of process of implementation and Impact on mortality and morbidity
Thank You from all the partners

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