2019 UPDATE

AHMEDABAD HEAT ACTION PLAN

GUIDE TO EXTREME HEAT PLANNING IN AHMEDABAD, INDIA

EASY READ VERSION

AHMEDABAD HEAT ACTION PLAN 2019: EASY READ VERSION

Extreme heat can lead to dangerous, even deadly, health consequences, including heat stress and heatstroke. Climate change drives temperatures higher, increasing the frequency and severity of heat waves. After the devastating 2010 heat wave with 1,344 additional deaths, the Ahmedabad Municipal Corporation (AMC) and partners prepared the first Heat Action Plan (HAP or Plan) in 2013.[1] The Heat Action Plan is guide to extreme heat planning in Ahmedabad and includes an early warning system for extreme heat. The AMC releases an updated version of the HAP periodically.

The HAP aims to provide a framework for the implementation, coordination, and evaluation of extreme heat response activities in Ahmedabad. The Plan's primary objective is to alert those populations most at risk of heat-related illness that extreme heat conditions either exist or are imminent, and to take appropriate precautions. The HAP also includes longer term measures, such as the Ahmedabad Cool Roofs Program.

A 2018 study evaluated the effectiveness of the Ahmedabad HAP before and after implementation. The study found that an estimated 2,380 deaths were avoided in the post-HAP period.[2] The findings suggest that the Ahmedabad HAP protected health against mortality associated with extreme heat. The study evaluated the HAP's impact on all-cause mortality in 2014–2015 relative to a 2007–2010 baseline and found a decrease in all-cause mortality in the first two years (2014–2015) the HAP was implemented.

I. KEY STRATEGIES

Building Public Awareness and Community Outreach to communicate the risks of heat waves and implement practices to prevent heat-related deaths and illnesses. Disseminating public messages on how to protect people against extreme heat through media outlets and orientation materials, such as pamphlets and advertisements on heat stress prevention. Use text messages, email, radio and social media, such as WhatsApp. Special efforts will be made to reach vulnerable populations through inter-personal communication from March to June annually.

Initiating an Early Warning System and Inter-Agency Coordination to alert residents of predicted extreme temperatures. The AMC has created formal communication channels to alert government agencies, health officials and hospitals, emergency responders, local community groups, and media outlets of extreme temperatures forecasted by the Indian Meteorological Department's (IMD) Meteorological Centre located in Ahmedabad.

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, paramedical staff, and community health staff so that these experts can effectively prevent and manage heat-related cases and reduce mortality and morbidity.

Reducing Heat Exposure and Promoting Adaptive Measures by launching new efforts, including a draft city-wide Cool Roofs Program. The citywide Cool Roof Program includes mandatory, voluntary, and low-income housing focused measures.

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[1] Azhar, G.S., et al., 2014. Heat-related mortality in India: excess all-cause mortality associated with the 2010 Ahmedabad heat wave. PLoS One, 9(3), p.e91831.

[2] Hess, J.J., et al., 2018. Building Resilience to Climate Change: Pilot Evaluation of the Impact of India's First Heat Action Plan on All-Cause Mortality. Journal of Environmental and Public Health.

IV. HEAT ACTION PLAN (HAP) IMPLEMENTATION

Implementation of the Heat Action Plan involves three main strategies. The first is the heat alert system and inter-agency communication efforts led by the AMC Nodal Officer. The second is key action taken under the Heat Action Plan by key stakeholders. The third is an effort to reduce ambient temperatures, focused on vulnerable communities, though cool roof strategies.

A. Activating the Heat Action Plan

Successful implementation of the Heat Action Plan in Ahmedabad requires coordinated action amongst diverse stakeholders, including government departments, health care professionals and emergency medical personnel, health center and hospital staff, and community groups. Following the forecast of an extreme heat event, immediate communication to the public and all those addressed the response is critical to ensure the plan is activated.

Color Signals for Heat Alert

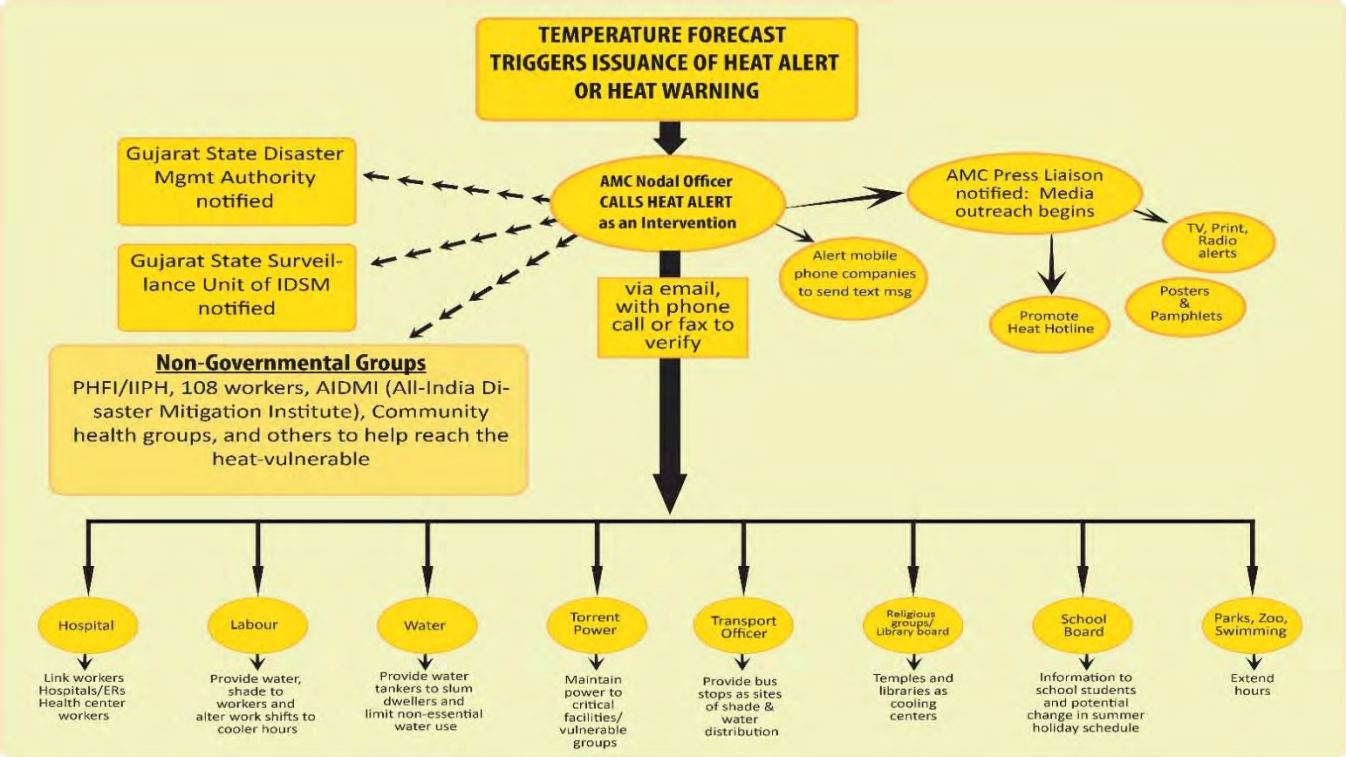
The AMC will issue heat alerts, based on temperature thresholds determined by the AMC, as an additional means of communication by using the following color signal system:

Alert Category	Alert Name	Temperature Threshold (°C)
Red Alert	**Extreme Heat Alert Day**	**≥ 45°C**
Orange Alert	**Heat Alert Day**	**43.1°C – 44.9°C**
Yellow Alert	**Hot Day Advisory**	**41.1°C- 43°C**
White	**No Alert**	**≤41°C**

Nodal Officer and Interagency Coordination

The AMC has appointed an **AMC Nodal Officer** to head the coordination of stakeholders and ensure implementation of the Heat Action Plan. The appointed nodal officer is responsible for coordinating and communicating actions ahead of, and during, extreme heat events, and provides support staff for HAP functions through the Nodal Office as necessary.

Communication Plan for AMC Nodal Officer Activation of a Heat Alert



B. Key Actions Under the Heat Action Plan

Phase 1: Pre-Heat Season (Annually from January through March)

AMC Nodal Officer:

- Convenes key agency leaders to respond to extreme heat events.
- Engage state and local agencies to facilitate internal communications.
- Organizes preventative training and outreach efforts for health workers, link workers, school children, and the local community with the Health Department.

AMC Health Department and Medical Professionals:

- Enhance targeted training programs, capacity building efforts, and communication on heat illness for medical staff at local hospitals and Urban Health Centres (UHCs). The trainings should include nursing staff, paramedics, field staff and line workers, and consider the susceptibility of particular wards to extreme heat.
- Require hospital admissions and emergency case records to be updated and track heat-related morbidity and mortality and update existing databases of heat-related morbidity and mortality.
- Train hospital staffs to improve expedience of recording of cause of death certificates. The training could also include recording information education & communication (IEC) efforts.
- Update simple means to track daily heat-related data and behavioral change impacts.

108 Emergency Service:

- Create displays on ambulances during local extreme heat events to build public awareness
- Identify areas of vulnerable populations, in part by utilizing the list of high-risk areas.

Phase 2: During the Heat Season (Annually from March through July)

AMC Nodal Officer:

- Activates a **heat alert** and the local response citywide when extreme heat events are forecast by notifying the key agency leaders, AMC Deputy Municipal Commissioners, and the Gujarat state agencies in accordance with the Communication Plan above.
- Monitors and increases the **heat alert** level when necessary to match the severity of the forecast and threshold established and alerts the Municipal Commissioner to convene a special meeting with key agency leaders.
- Activates "cooling centers," such as temples, public buildings, malls, during a **heat alert** and/or AMC-run temporary night shelters for those without access to water and/or electricity.
- Expands access to shaded areas for outdoor workers, slum communities, and other vulnerable populations. For example, confirms that night shelters stay open all day for migratory populations during a **heat alert**.
- Holds a frequent, possibly daily, conference call to discuss reports and breaking developments during a **heat alert**, and ensures that communication channels remain operational.
- Identifies and set up public displays of temperature and forecasts, such as LED electronic scrolling boards.
- Continues surveillance of temperature data and forecasts from IMD's Meteorological Centre in Ahmedabad.
- Communicates the suspension of all non-essential uses of water (other than drinking, keeping cool) via the AMC Water Project's protocol procedures during any water shortage.
- Increases efforts to distribute fresh drinking water to the public. For example, expands potable water access during a **heat alert** at religious spaces including temples and mosques, BRTS transit stations, pouch handouts to the poor, and high-risk areas (identified by the mapping of high-risk areas).

- Communicates the local utility protocol to prioritize maintaining power to critical facilities (such as hospitals and UHCs).
- Notifies the Steering Committee and relevant agencies when the **heat alert** is over.

Community Groups and Individuals:

- Keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.
- Check on vulnerable neighbors, particularly during a **heat alert**.
- Limit heavy work in direct sun or indoors if poorly ventilated, especially during a **heat alert**.

Phase 3: Post-Heat Season (Annually in July through September)

AMC Nodal Officer:

- Organizes an annual Heat Action Plan evaluation meeting with key agency leaders and relevant stakeholders.
- Evaluates the Heat Action Plan process based on performance and revises accordingly.
- Evaluates the reach and impact of the Plan and revise accordingly.
- Posts the revised Plan to the AMC website ahead of the heat season for stakeholders.
- Builds on the "Green Cover" activity to establish tree-plantation campaign in hotspot areas such as roadsides and during plantation festival in June. Incorporates student volunteers or incentivize builders to plant trees to help effect this effort.
- Explores establishing cooling center facilities in high-risk areas around city.

C. Draft Ahmedabad Cool Roofs Program

Cool roofs offer a simple and cost-effective solution to urbanization challenges. Cool roofs save energy, increase thermal comfort and reduce cooling demand. Cool roofs reflect sunlight and absorb less heat. Depending on the setting, cool roofs can help keep indoor temperatures lower by 2 to 5°C (3.6 - 9°F) as compared to traditional roofs.[3]

The AMC and knowledge partners have conducted several cool roof pilot programs, including pilots in 2017 and 2018, applying white lime wash to 3,000 low-income homes in the city, with 500 in each city zone, covering almost 2% of the city's low-income households.[4]

The city is developing a city-wide cool roof program with a focus on the wellbeing of its most vulnerable residents. The Ahmedabad Cool Roofs Program is a target-based program to increase the percentage of cool roofs in the city. Using three main strategies for different building types, the Cool Roofs Program focuses on yearly targets and implementation plans to increase installation of cool roofs across the city. The Ahmedabad Cool Roofs Program is a unique initiative building on the inclusion of cool roofs into the Ahmedabad Heat Action Plan, and pioneering pilot initiatives by the AMC and other organizations.

The Ahmedabad Cool Roofs Program aims to meet the following specific objectives:

a. Drive rapid city-wide adoption of cool roofs to save energy, strengthen heat resilience and increase thermal comfort.
b. Support inter-agency coordination to implement the city-wide cool roof program.
c. Identify financing frameworks and outreach and awareness building tools for implementing cool roofs
d. Support workforce development and training programs for cool roof application

Three main strategies can help achieve these objectives:

Strategy 1: Mandatory cool roofs for all municipal, commercial and government buildings.
With government spearheading the Cool Roofs Program, it is important for all government office buildings, new and existing, to adopt cool roofs. The key driver for this building sector is to showcase leadership in adoption of the cool roof technique with the benefits of thermal comfort, energy savings, and reduction of urban heat island affect. The commercial sector includes all offices, retail complexes/shops, malls, hotel, industrial buildings etc. The key driver for adoption of cool roofs for these types of buildings is the cooling load reduction and resulting energy savings. Thus, a pay-back period of cool roofing material installations is important for these types of buildings, which would have an impact on the overall energy bill of the building.

Strategy 2: Voluntary cool roofing for residential buildings.
The residential segment includes all multi-level apartment complexes as well as individual houses. The key driver for this segment of the population staying in these buildings in addition to

[3] V. Garg, et al. 2016, Assessment of the impact of cool roofs in rural buildings in India, Energy and Buildings, 114, 156-163 (available at http://dx.doi.org/doi:10.1016/j.enbuild.2015.06.043)

[4] Ahmedabad's Slum Free City Plan lists 691 notified slum settlements in the Ahmedabad Municipal Corporation area, containing 162,749 houses and a population of 727,934. Ahmedabad Municipal Corporation, "Ahmedabad Slum Free City Action Plan", 2014 http://pas.org.in/Portal/document/PIP%20Application/Ahmedabad%20Slum%20Free%20City%20Action%20Plan%20RAY.pdf (accessed on 10 January 2019)

the thermal comfort would be the cooling load reduction and resulting energy savings. Thus, a pay-back period of cool roofing material installations is important for these types of buildings.

Strategy 3: Cool roofing for low income housing under HAPs and through CSR initiatives
In low-income communities, cool roofs keep temperatures lower and increase thermal comfort. In the long run, cool roofs for vulnerable communities also introduce the concept of cool roofs for existing buildings and potentially new buildings in the future, thus locking in energy savings and reducing the demand for cooling conditions indoors. The driver for this segment of the population for cool roofs is increased thermal comfort and lower indoor temperatures. Also, since for a large proportion of these households, their homes are also their place of work, increased thermal comfort due to cool roofs, would also lead to enhanced productivity.

The city-wide program with the above three main strategies also defines the regulatory, outreach and awareness, and financial mechanisms, along with the implementation plan for the program.

Cool Roofing Material

The choice of an appropriate cool roof material in a particular context depends on a range of factors, from existing roof material, life and maintenance, availability, cost, time needed for installation and availability of skilled labor. To help cater to a range of contexts, cool roofs techniques can be broadly divided into four categories and building owners can choose from these techniques as appropriate for implementing cool roofs.

- *Coated cool roofs:* these roofs involve the coating of a material or paint with high reflectivity on top of a conventional roof material to increase the roof surface's solar reflectance index. These are liquid applied coatings made of simple materials such as lime wash or an acrylic polymer or plastic technology and are usually white in color.
- *Membrane cool roofs:* these roofs involve using pre-fabricated materials such as membranes or sheeting to cover an existing roof in order to increase the roof surface's SRI. These types of roofs can be polyvinyl chloride (PVC) or bitumen-based.
- *Tiled cool roofs:* these roofs involve the application of high albedo, china mosaic tiles or shingles on top of an existing roof or to a new roof.
- *Special cool roof materials such as ModRoof:* these roofs, made of coconut husk and paper waste, have been installed in households around Gujarat and Delhi and can serve as an alternative to reinforced cement concrete roofs.
- *Green roofs:* green roofs make use of vegetation to help the roof absorb less solar energy by providing a thermal mass layer to reduce flow of heat into a building. Vegetation is especially useful in reflecting infrared radiation. Green roofs are also considered cool roofs, but due to higher costs and need for water, they are likely not a cost-effective solution for heat reduction in low-income communities in India.

The cost implications vary by the type of material used for cool roofing. However, most of these materials have been applied locally in India and are available through local vendors.

APPENDIX

Heat Illness – Treatment Protocol

Recognizing that treatment protocols may vary slightly according to the setting (EMS, health center, clinic, hospital emergency department, etc.), the following protocol should apply generally to any setting and to all patients where there is a potential concern for heat illness. Special thanks to Drs. Arthur Yancey and Nee-Kofi Mould-Millman of Grady Emergency Medical Services, Emory University Department of Emergency Medicine, Atlanta, GA USA

1. Initial patient assessment – primary survey (airway, breathing, circulation, disability, exposure), vital signs, including temperature

2. Consider heat illness in differential diagnosis if:
    a. Presenting with suggestive symptoms and signs (see table)
    b. Patient has one or more of the following risk factors:
        i. Extremes of age (infants, elderly)
        ii. Debilitation/physical deconditioning, overweight or obese
        iii. Lack of acclimatization to environmental heat (recent arrival, early in summer season)
        iv. Any significant underlying chronic disease, including psychiatric, cardiovascular, neurologic, hematologic, obesity, pulmonary, renal, and respiratory disease
        v. Taking one or more of the following:
            1. Sympathomimetic drugs
            2. Anticholinergic drugs
            3. Barbiturates
            4. Diuretics
            5. Alcohol
            6. Beta blockers

3. Remove from environmental heat exposure and stop physical activity

4. Initiate passive cooling procedures
    a. Cool wet towels or ice packs to axillae, groin, and around neck; if patient is stable, may take a cool shower, but evaluate risk of such activity against gain and availability of other cooling measures
    b. Spray cool water or blot cool water onto skin
    c. Use fan to blow cool air onto moist skin

5. If temperature lower than 40°C, repeat assessment every 5 minutes; if improving, attempt to orally hydrate (clear liquids, oral rehydration salts can be used but not necessary; cool liquids better than cold) and observe

6. If temperature 40°C or above, initiate IVrehydration and immediately transport to emergency department for stabilization

Agency Action Checklists

Checklist for AMC Nodal Officer

Pre-Summer

- ✓ Designate heat-health point-of-contact for each department
- ✓ Reengage key agencies to facilitate communications and schedule monthly meetings
- ✓ Establish heat mortality tracking system and update datasets
- ✓ Establish Heat Action webpage on AMC website
- ✓ Educate school children and send home age-appropriate pamphlets about the heat season
- ✓ Create list of high-risk areas for extreme heat in the city

During Heat Event

- ✓ Contact point-person in each department announcing heat event at least seven days in advance
- ✓ Maintain contact with department points-of-contact for updates on conditions
- ✓ Ensure staff presence and availability of supplies with each department – including distributing fresh drinking water
- ✓ Communicate locations of emergency facilities and cooling centers/shaded areas with each department
- ✓ Monitor heat alert and increase level when severe forecast

Post-Summer Evaluation

- ✓ Review quantitative and qualitative data for process evaluation and improvements
- ✓ Call meeting for annual evaluation of heat plan with key agency leaders and community partners
- ✓ Post revised heat action plan online for stakeholders

Checklist for Medical Colleges and Hospitals

Pre-summer

- ✓ Adopt heat-focused examination materials
- ✓ Get additional hospitals and ambulances ready
- ✓ Update surveillance protocols and programs, including to track daily heat-related data
- ✓ Establish more clinician education
- ✓ Continue to train medical officers and paramedics

During Heat Event

- ✓ Adopt heat-illness related treatment and prevention protocols
- ✓ Equip hospitals with additional materials
- ✓ Deploy all medical staff to be on duty
- ✓ Keep emergency ward ready
- ✓ Monitor water-borne diseases, malaria and dengue
- ✓ Keep stock of small reusable ice packs
- ✓ Report heat stroke patients to AMC daily
- ✓ Expedite recording of cause of death certificates

Post-summer Evaluation

- ✓ Participate in annual evaluation of heat action plan
- ✓ Review revised heat action plan

Checklist for Public Health Managers

Pre-summer

- ✓ Identify areas that are vulnerable
- ✓ Check inventories of medical supplies in health centers
- ✓ Identify cooling centers and barriers to access cooling centers
- ✓ Community involvement for workers' and trainers' education

During Heat Event

- ✓ Prepare rapid response team
- ✓ Distribute "Dos and Don'ts" to community
- ✓ Effectively send a "Don't Panic!" message to community
- ✓ Ensure access to Medical Mobile Van in the Red Zone
- ✓ Ensure additional medical vans available

Post-summer Evaluation

- ✓ Participate in annual evaluation of heat action plan
- ✓ Review revised heat action plan

Checklist for Urban Health Centres and Link Workers

Pre-summer

- ✓ Distribute pamphlet and other materials to community
- ✓ Sensitize link workers and community leaders
- ✓ Develop and execute school health program
- ✓ Dissemination of materials in slum communities
- ✓ Coordinate outreach efforts with other community groups, non-profits, and higher education

During Heat Event

- ✓ Recheck management stock
- ✓ Modify worker hours to avoid heat of day
- ✓ Visit at-risk populations for monitoring and prevention
- ✓ Communicate information on tertiary care and 108 service

Post-summer Evaluation

- ✓ Participate in annual evaluation of heat action plan
- ✓ Review revised heat action plan

Checklist for AMC Press Officer

Pre-Summer

- ✓ Secure commercial airtime slots for public service announcements
- ✓ Identify areas to post warnings and information during heat season
- ✓ Organize training for health workers and medical professionals
- ✓ Activate telephone heat hotline
- ✓ Begin placing temperature forecasts in newspapers
- ✓ Increase installed LED screens with scrolling temperature data

During Heat Event

- ✓ Issue heat warnings in heat and electronic media
- ✓ Contact local FM radio and TV stations for announcements
- ✓ Use SMS, text and WhatsApp mobile messaging and centralized mobile databases to send warnings
- ✓ Contact BRTS and transport department to place warnings on buses

Post-Summer Evaluation

- ✓ Evaluate reach of advertising to target groups and other means of communication such as social media
- ✓ Participate in annual evaluation of heat action plan
- ✓ Review revised heat action plan

Checklist for Labour Department

Pre-Summer

- ✓ Heat illness orientation for factory medical officers and general practitioners
- ✓ Generate list of factory medical officers and contractors to include in heat action communications from Nodal Officer
- ✓ Communicate directly about heat season with non-factory workers
- ✓ Utilize maps of construction sites to identify more high-risk outdoor workers.
- ✓ Conduct publicity campaigns during high-risk days in identified high-risk areas

During the Heat Season

- ✓ Provide water at work sites
- ✓ Request use of A/C at factory facilities
- ✓ Extended hours at Occupational Health Centers
- ✓ Consider extended afternoon break or alternate working hours for workers

Post-Summer Evaluation

- ✓ Participate in annual evaluation of heat action plan
- ✓ Review revised heat action plan
- ✓ Pilot project to provide emergency ice packs and heat-illness prevention materials to traffic police, BRTS transit staff and construction workers

Checklist for 108 Emergency Service

Pre-Summer

- ✓ Prepare handouts for paramedics about heat illness
- ✓ Create displays on ambulances to build public awareness during major Spring events
- ✓ Establish Dynamic Strategic Deployment Plan for ambulances
- ✓ Ensure adequate supply of IV fluids
- ✓ Identify at-risk areas
- ✓ Prepare SMS messages to disseminate during emergencies
- ✓ Identify media point of contact

During the Heat Season

- ✓ Ready medicine stocks
- ✓ Keep accurate records of pre-hospital care
- ✓ Send messages to all employees alerting them of heat action plan
- ✓ Activate Dynamic Strategic Deployment Plan
- ✓ Staff surplus employees and restrict leave

Post-Summer Evaluation

- ✓ Provide data to key agency leaders
- ✓ Participate in annual evaluation of heat action plan
- ✓ Review revised heat action plan

Ahmedabad Heat Action Plan (HAP) departmental wise suggested activities during heatwave days:

S.No	Department	Agency responsibilities
1	AMC Nodal Officer	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Organize preventative training and outreach efforts for health workers, link workers, school children, and the local community with the Health Department. • Distribute multilingual pamphlets and posters with tips to prevent heat stress to hospitals, schools, and professional associations (see pamphlets attached). • Create a list of the high-risk areas of the city vulnerable to heat waves for more focused activities on heat prevention. • Regular meetings with NGOs and slum leaders on weekly basis for preparation for next week and review of previous week activities for heat resilience.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Reengage state and local agencies to facilitate internal communications. • Follow-up meetings with stakeholders, NGOs and slum leaders regarding activities on heat prevention and heat alerts • Organise workshop with doctors and health professionals for identification of heat illness. • Organise meeting to take special measures for the elderly and infants. • All cause deaths should be daily reported by SMS to AMC and totalled and declared to press every day.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Convene key agency leaders to respond to extreme heat events. • Announcement should be made in all areas like slums, semi slum areas about the red alert. • Inform to all ward councillors, NGO and representative of Ward. • Publicity using Auto rickshaw should be done for Red alert • Activate "cooling centers," such as temples, public buildings, malls, during a heat alert. • Expand access to shaded areas for outdoor workers, slum communities, and other vulnerable populations. • Hold a frequent, possibly daily, conference call to discuss reports and breaking developments during a heat alert, and ensure that communication channels remain operational. • Identify and set up public displays of temperature and forecasts. • Continue surveillance of temperature data and forecasts. • Communicate the suspension of all non-essential uses of water (other than drinking, keeping cool) • Increase efforts to distribute fresh drinking water to the public. • Communicate the local utility protocol to prioritize maintaining power to critical facilities (such as hospitals and UHCs).

		• Notify the Steering Committee and relevant agencies when the heat alert is over.
2	Media and AMC Press Officer	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Media training workshop on heat wave prevention and heat alert. • Provide information and heat communication materials developed by the AMC to the public. • Increase the number of installed LED screens with rolling updated temperature forecasts available to the public.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Increase public communication including distributing the multilingual pamphlet and advertisements on heat stress prevention and tips for health protection during extreme heat events. • Commence public messaging to the public about the dangers of heat-related illness with the AMC Nodal Officer via AMC press conferences.
		Red Alert—Extreme Heat Alert Day (≥ 45°C)
		• Using Electronic and Print Media, publicity should be done on large scale. • Publish heat IEC materials provided by the AMC to the public. • Circulate warnings via text alerts or WhatsApp mobile messages, in collaboration with private sector telecom companies utilizing centralized mobile databases, in addition to traditional media during a heat alert. • Inform all citizens about RED alert by using bulk SMS. • Develop an SMS alert system to send direct messages to private practitioners in addition to the medical professionals at public hospitals and UHCs. • Utilize local radio FM broadcasts to disseminate heat protection tips and high temperature warnings to the city's at-risk populations during a heat alert. • Explore other means of communications, such as broader use of social media, for example, Facebook and the WhatsApp mobile application.
3		**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**

	AMC Health Department and Medical Professionals	• Enhance targeted training programs, capacity building efforts and communication on heat illness for medical staff at local hospitals and Urban Health Centres (UHCs), based on the Framework of AMC Medical Professionals and Health Workers (see attachment). These efforts should include nursing staff, paramedics, field staff and link workers, and consider the susceptibility of particular wards. • Hospitals should be instructed to update their admissions and emergency case records to track heat-related morbidity and mortality. • Train hospitals to improve expedience of recording of cause of death certificates. • Create simple, user-friendly means to track daily heat-related data and behavioural change impacts. • Organize training on recording information education & communication (IEC) efforts.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Adopt heat-focused examination procedures at local hospitals and urban health centres. • Purchase and distribute reusable soft plastic ice packs for the citywide UHCs, 108 emergency centres, ambulances and hospitals. • Produce weekly reports of the public health impact for AMC Nodal Officer during a heat alert.
		Red Alert—Extreme Heat Alert Day (≥ 45°C)
		• Keep all UHCs functional till 7 PM. • Keep sufficient stocks of reusable soft plastic ice packs for the citywide UHCs, 108 emergency centres, ambulances and hospitals. • Explore creation of ice pack dispensaries to increase access to vulnerable communities. • Post heat-related illness prevention tips and how to stay cool around hospitals and UHCs. • Ensure adequate medical supplies available. • Produce weekly reports of the public health impact for AMC Nodal Officer during a heat alert. • Increase staffing at hospitals and UHCs to attend to the influx of patients during a heat alert, if feasible. • Increase link worker and community health worker outreach in at-risk neighbourhoods during a heat alert, if feasible. • Have zonal health officer visit UHCs to confirm proper preparation has been made for heat related illness and conduct case audits during heat season. • Provisions should be made to treat Heat stroke patient in emergency.
4		**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**

	AMC Labour & Employment Department	• Sensitization workshop for employers, outdoor laborers and workers regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures. • Utilize maps of construction sites to identify more high-risk outdoor workers. Potentially overlay with irradiation map from IMD or heat island map.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Organize training for employers, outdoor laborers and workers regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Conduct publicity campaigns during high-risk days to these specific areas. • Provide sufficient portable drinking water. • Change working hours of labourers. Encourage employers to shift outdoor workers' schedules away from peak afternoon hours (1pm – 5pm) during a heat alert. • Pilot project to provide emergency ice packs and heat-illness prevention materials to traffic police, BRTS transit staff and construction workers.
5	108 Emergency Service	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Create displays on ambulances during local events to build public awareness (see ad attached) • Identify at-risk areas of vulnerable populations, in part by utilizing the list of high-risk areas. • Enhance targeted training programs and communication on heat illness for paramedics and field staff.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Keep sufficient stocks of reusable soft plastic ice packs for the 108 citywide emergency ambulances. • Organize training on recording information education & communication (IEC) efforts.
		Red Alert—Extreme Heat Alert Day (≥ 45°C)
		• Keep sufficient stocks of reusable soft plastic ice packs for the citywide 108 emergency ambulances. • Ensure adequate supply of ice packs and IV fluids. • Disseminate SMS text messages to warn local residents during a heat alert.
6		**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**

	Community Groups and Individuals:	• Lead child-friendly educational preventative trainings and distribute heat protection materials at local schools. For example, potentially design a "Teach the Teachers" workshop designed to equip teachers with knowledge with heat protection tips and materials that they can disseminate in classrooms on heat protection, and activities that can engage students on health dangers of extreme heat.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Conduct training workshops and outreach sessions with community groups and mobilizers such as Mahila Arogya Samiti, Self-Employed Women's Association (SEWA), ASHA workers, aanganwadis, and municipal councils to help inform and get vulnerable communities more actively involved. • Incorporate other sectors such as higher education, non-profits, and community leaders to increase reach to communities. • Encourage individuals to discussion of the early signs of heat exhaustion with their local doctor or Urban Health Centre. • Inform fellow community members about how to keep cool and protect oneself from heat • Limit heavy work in direct sun or indoors if poorly ventilated, especially during a heat alert.
		Red Alert—Extreme Heat Alert Day (≥ 45°C)
		• Regular meetings with community groups and inform them about red heat alert. • Communicate to keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing. • Check on vulnerable neighbours, particularly during a heat alert. • Limit heavy work in direct sun or indoors if poorly ventilated, especially during a heat alert.
7	Electricity Board	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Create awareness among people on energy conservation. • Develop a policy for power cuts depending on vulnerable areas and population. Power shedding should be cut down/reduced during severe heat (frequency and timing). The timing should be announced before one day. • Issue guideline for workers of the department. • Provision of funds for Heat Wave management.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Ensuring efficient electricity supply.
		Red Alert—Extreme Heat Alert Day (≥ 45°C)

		• No power cuts during red alert.
8	Transport Department/ AMTS / BRTS department	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)** • Obtaining lists of risk areas and review of bus timings and available shelters in the high-risk areas. • Planning for shade / shelter, drinking water and fans in the waiting areas of passengers. • Display of precautionary measures (Do's and don'ts) on busses, autos, in bus stations & auto stands and distribution of pamphlets to passengers.
		Orange Alert—Heat Alert Day (43.1°C-43°C) • Review measures of HAP with cab operator / auto / transport associations and also Highway patrol. • Provide ORS, ice packets etc. and medical services in bus stations. • Pilot project to provide emergency ice packs and heat-illness prevention materials to BRTS transit staff and all transport departments. • Display posters & distribute pamphlets on prevention of heat related illness in bus stands, auto stands etc.
		Red Alert—Extreme Heat Alert Day (≥ 45°C) • Establish health teams at major bus stands / terminals and other public places. • Ensure availability of shade / shelters, drinking water, ORS packets etc., in bus stands, auto stands etc. • Inform all the contractors and officers to keep road site jobs closed during 12 to 4 pm. • Make provision of water and buttermilk for all labourer staff. • Display of messages inside the bus on TV screen about RED alert.
9	School Board and Education Department	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)** • Design child-friendly educational preventative trainings and distribute heat protection materials at local schools. • Training of school teachers to equip them with knowledge of heat protection tips and activities which they can disseminate in classrooms. • IEC activities on heat wave prevention and management in schools. • Promote School Safety Plan. • Encourage plantation of trees and promote green campus. • Provision of funds for heat wave management.
		Orange Alert—Heat Alert Day (43.1°C-43°C)

		• Scheduling of examinations before starting of heat period normally. • Ensure supply of water for students and teachers if school is functioning. • Communicate to keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing. • Restrict the school timings, if necessary • Ensure avoidance of physical activities during school hours.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Ensure that all school and colleges should be closed during heatwave days. • If school is not functioning, permit use of school premises as shelter during day time. • AMC schools and Private schools should get alert messages and also send messages to parents through Bulk messages. • Sensitize school teachers about RED alert.
10	Water Department	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Release water in canals during summer. • Promote sprinkler irrigation.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Ensuring efficient portable water supply.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Supply drinking water at various locations of the city.
11	Fire Department	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Train staff regarding health impacts of extreme heat and recommendations to protect themselves during high temperatures.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Ensure adequate numbers of vehicles and firefighting equipment.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Ensure presence of staff during heat alert period, if necessary by restricting leaves. • Ensure functioning of communication equipment to receive messages / alerts of occurrence of fire. • Ensure adequate supply of water and foam to fight fire.
12		**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**

	Garden, Parks, Zoo Departments	• Directive for making water available for animals in reserved/ protected forests and make necessary provisions, where necessary. • Issue directives to the zoo authorities for special arrangements for the animals in zoo to protect them from the effect of Heat Wave. • Provision of drinking water like ponds/water bodies for wild life. • Directive for provision of water to human habitations facing water scarcity inside reserved forests.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Ensure drinking water for wild life.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Keep gardens and park open during heat alert. • Provide drinking water, shelters and ORS for public
13	Women and Child Development/ ICDS Department	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Create awareness and educate young girls and mothers regarding the dangers of Heat Waves, its related health impacts and the precautionary measures to be taken. • Display IEC materials at Anganwadis and encourage integrated child development scheme (ICDS) workers to disseminate Heat Wave related information with special focus on infants, children below five years, pregnant and lactating mothers, and geriatric population to protect them from dehydration. • Ensure provision of drinking water and first aid at all the Anganwadi Centers, old age homes, orphanages. • Ensure provision of funds for Heat Wave management
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Ensure that they receive heat alert daily. • Distribution of ORS at AWC.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Special cooling measures for old people and infants. • Inform about RED alert to parents of children coming in Anaganwadi.
14	Solid waste Management Department	**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**
		• Training and awareness regarding heat health impacts and the precautionary measures to be taken. • Ensure provision of drinking water.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• All the Public Facility Cleaners work timing should be made from 4:30PM onwards, instead of 3 PM.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• If temperature is raised by more than 46 degree temperature than work should be stopped.
15		**Yellow Alert—Hot Day Advisory (41.1°C- 43°C)**

	Real estate department	• Distribute IEC materials regarding heat wave precautionary measures. • Create awareness regarding heat wave measures.
		Orange Alert—Heat Alert Day (43.1°C-43°C)
		• Distribution of buttermilk/water should be mandatorily done for all workers at construction site.
		Red Alert—Extreme Heat Alert Day ≥ 45°C
		• Stop work from 12 to 4 PM in afternoon. • Announcements using Microphones should be made on street wards for Publicity of Red alert and its preventive measures.

Cool Roof- Posters

Public Awareness Pamphlet (Gujarati and English)

How to Protect Yourself" Poster (English and Gujarati)

Heat Awareness Advertisement for Newspapers (English and Gujarati)

Medical Heat Awareness Pamphlet

ONLINE RESOURCES

Heat Action Plan and Research Materials are available at:
http://www.nrdc.org/international/india/extreme-heat-preparedness

Ahmedabad's Heat Action Plan

City Resilience Toolkit: Response to Deadly Heat Waves and Preparing for Rising Temperatures

Inside Story: Addressing heatrelated health risks in urben India: Ahmedabed's HeatAction Plan

Expert Committee Recommendations for a Heat Action Plan based on the Ahmedabad Experience

Evaluation of Ahmedabad's Heat Action Plan: Assessing India's First Climate Adaptation and Early Warning System for Extreme Heat

CUTTING EDGE SCIENTIFIC RESEARCH AND JOURNAL ARTICLES

International Journal of Environmental Research and Public Health: A Cross-Sectional, Randomized Cluster Sample Survey of Household Vulnerability to Extreme Heat among Slum Dwellers in Ahmedabad, India (June 2013)

International Journal of Environmental Research and Public Health: Development and Implementation of South Asia's First Heat-Health Action Plan in Ahmedabad (Gujarat, India) (January 2014)

Journal of Environmental and Public Health: Neonates in Ahmedabad, India, during the 2010 Heat Wave: A Climate Change Adaptation Study (January 2014)

PlosOne: Heat-Related Mortality in India: Excess All-Cause Mortality Associated with the 2010 Ahmedabad Heat Wave (March 2014)

Rising Temperatures, Deadly Threat: Series of Four Issue Briefs of Recommendations for Heat Adaptation in Ahmedabad

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