



HEAT WAVE ACTION PLAN
OF
ANDHRA PRADESH
2016

REVENUE (DISASTER MANAGEMENT) DEPARTMENT

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1. Introduction

1.1 There is a strong and global scientific consensus that the climate is changing and this change will cause an increase in average global temperatures, as well as the number and intensity of heat-waves. Heat-waves are a significant cause of death and morbidity across the world, and the impacts of heat events are likely to increase due to changing frequency, severity, and intensity of heat-waves caused by climate change.

1.2 India too is feeling the impact of climate change in terms of increased instances of heat waves which are more intense in nature with each passing year, and have a devastating impact on human health thereby increasing the number of heat wave casualties. Heat waves have contributed to more deaths than any other natural disaster in Andhra Pradesh and represent a significant risk to public health.

2. Heat Wave, Thermal Heat Indices, Heat index & Heat Health Temperature Threshold

2.1 What is a Heat wave?

2.1.1 There is no single accepted definition for a Heat wave because similar temperatures can have different impacts on communities at different times. Generally, a heat wave is a prolonged period of excessively hot weather which may be accompanied by high humidity especially in oceanic climate countries. The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death.

2.1.2 In India, Heat Waves typically occur between March and June, and in some rare cases even extend till July.

India Meteorological Department (IMD) criteria for Heat Wave and Severe Heat Wave

- Heat wave is considered only after maximum temperature of a station reaches at least 40° C for plains and at least 30° C for hilly regions.

- i. When normal maximum temperature of a station is $<$ or $=$ 40° C
Heat Wave- Departure from normal is 5° C to 6° C
Severe Heat- Wave Departure from normal is 7° C or more

- ii. When normal maximum temperature of a station is $>$ 40° C
Heat Wave- Departure from normal is 4° C to 5° C
Severe Heat Wave- Departure from normal is 6° C or more

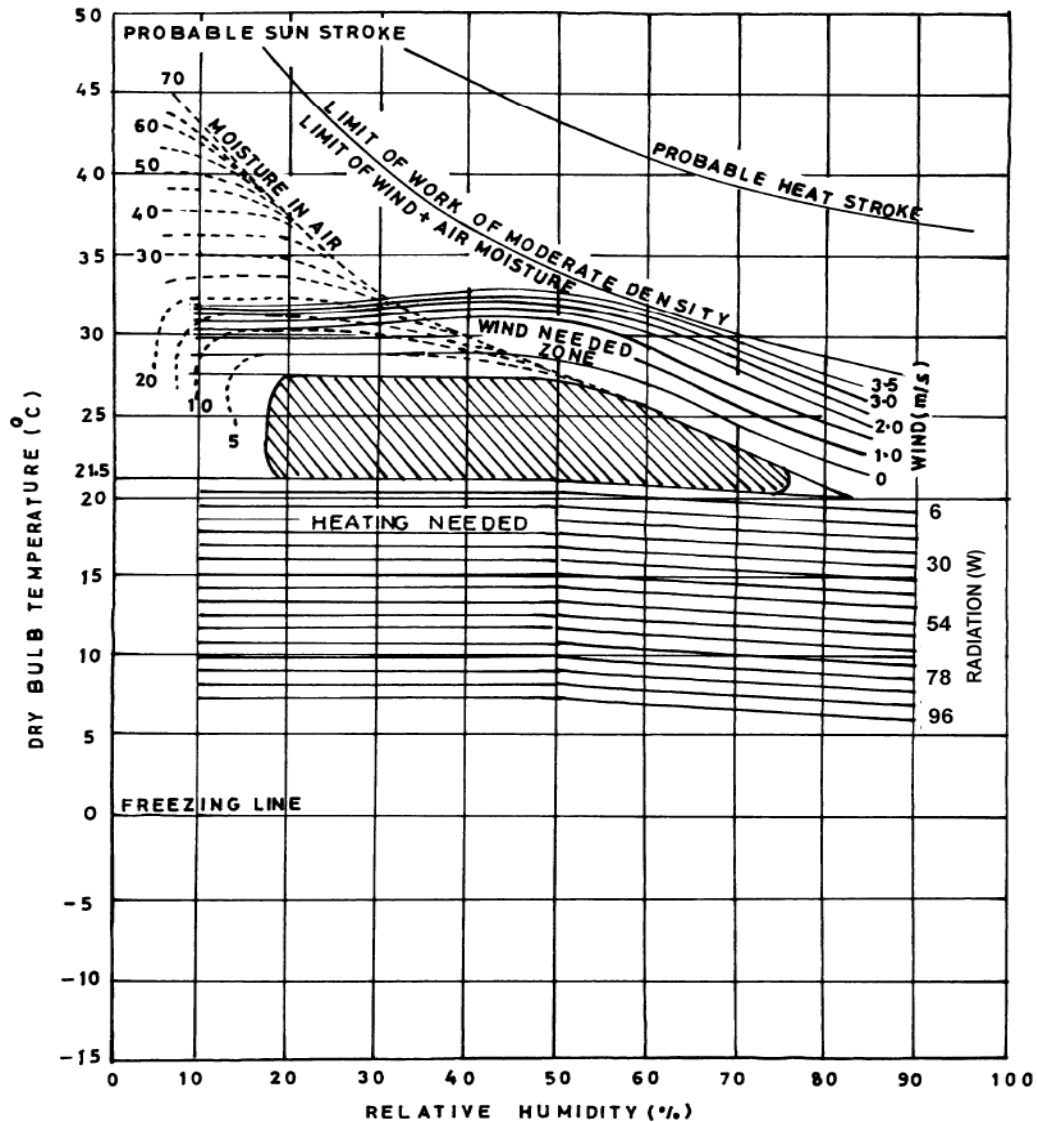
- When actual maximum temperature is 45° C or more, irrespective of normal maximum temperature, heat wave should be declared.

- In the AP context, a heat wave would mean a departure from normal temperature by 4 - 5°C, while a severe heat wave is caused by temperature excess of 6 ° C or more from normal.

2.2 Thermal Heat Indices

2.2.1 Globally, a combination of maximum temperature and relative humidity are used to assess the impact of 'Heat Wave ' conditions.

2.2.2 For Indian conditions, the hand book of Energy Conscious Buildings by Ministry of New and Renewable Energy, GOI, indicates the zones of human comfort based on ambient temperature and humidity, mean radiant temperature, wind speed, solar radiation and evaporative cooling.



2.2.3 On the chart, dry bulb temperature is used as the ordinate, and relative humidity as the abscissa. The above chart developed for Indian conditions, shall be adopted for identifying the threshold conditions for discomfort/ alert / critical levels due to increased temperature and humidity levels.

2.3 The heat index and heat health temperature threshold

2.3.1 The combination of high temperature and high relative humidity serves to reduce the thermal comfort defined as the ability to tolerate the stress generated by this combination of temperature and humidity. A combined effect of Temperature and Humidity is defined as the Heat Index as a measure of Human Discomfort. Normally the temperature around 25°C and

the humidity >45% are the comfort zones. Any increase in this values leads to different levels of discomfort.

2.3.2 The heat health threshold temperature is based on the average, or mean, temperature using the forecast day maximum and the forecast overnight temperature for the following day.

Chart Indicating the Discomfort, Alert and Danger Levels based on Temperature and Humidity Values

		Temperature(°C)															
		22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
Humidity (%)	40	22	24	26	29	31	34	37	41	45	49	53	58	62	68	73	79
	45	23	25	27	30	33	36	40	43	48	52	57	62	68	73	79	
	50	23	26	28	31	34	38	42	46	51	56	61	67	73	80		
	55	24	26	29	32	36	40	44	49	55	60	66	73	79			
	60	25	27	30	34	38	42	47	53	58	65	71	78				
	65	25	28	32	36	40	45	50	56	63	69	77					
	70	26	29	33	37	42	48	54	60	67	75						
	75	27	30	35	39	45	51	57	64	72							
	80	28	32	36	41	47	54	61	69								
	85	29	33	38	44	50	57	65	73								
	90	40	35	40	46	53	61	69									
	95	31	36	42	49	57	65										
	100	33	38	45	52	60	69										

Danger
 Alert
 Discomfort
 Normal

3. History of Heat wave in AP

In the past five years, AP has endured heat waves almost every year and the duration of heat period is increasing in every part of the state.

Figure. 1

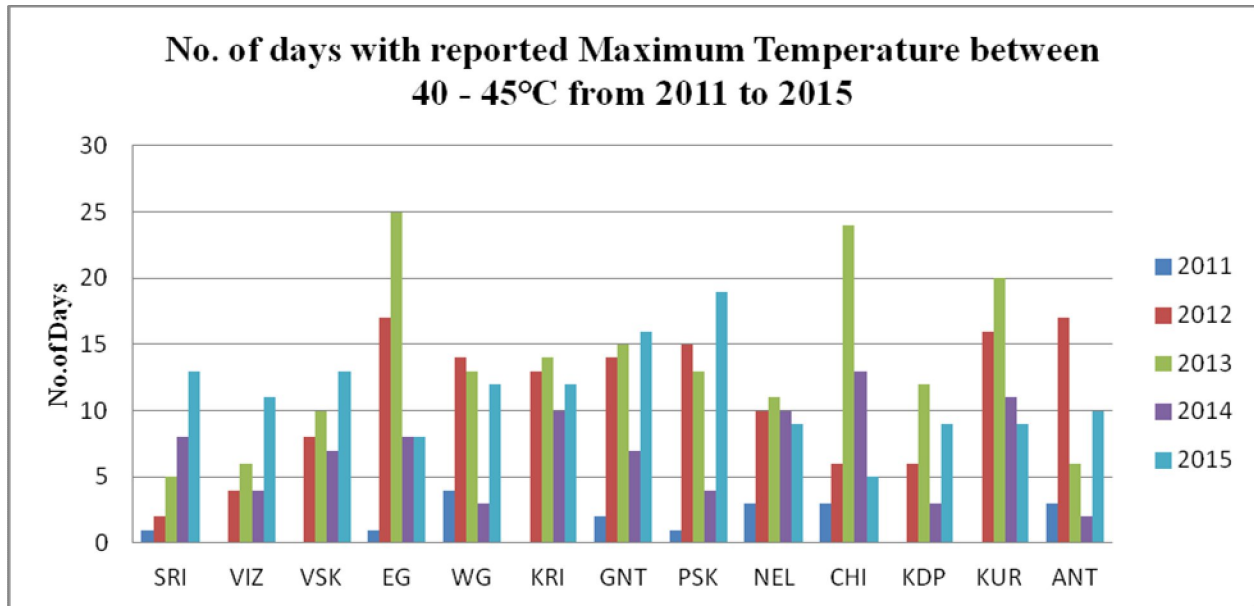


Figure.2

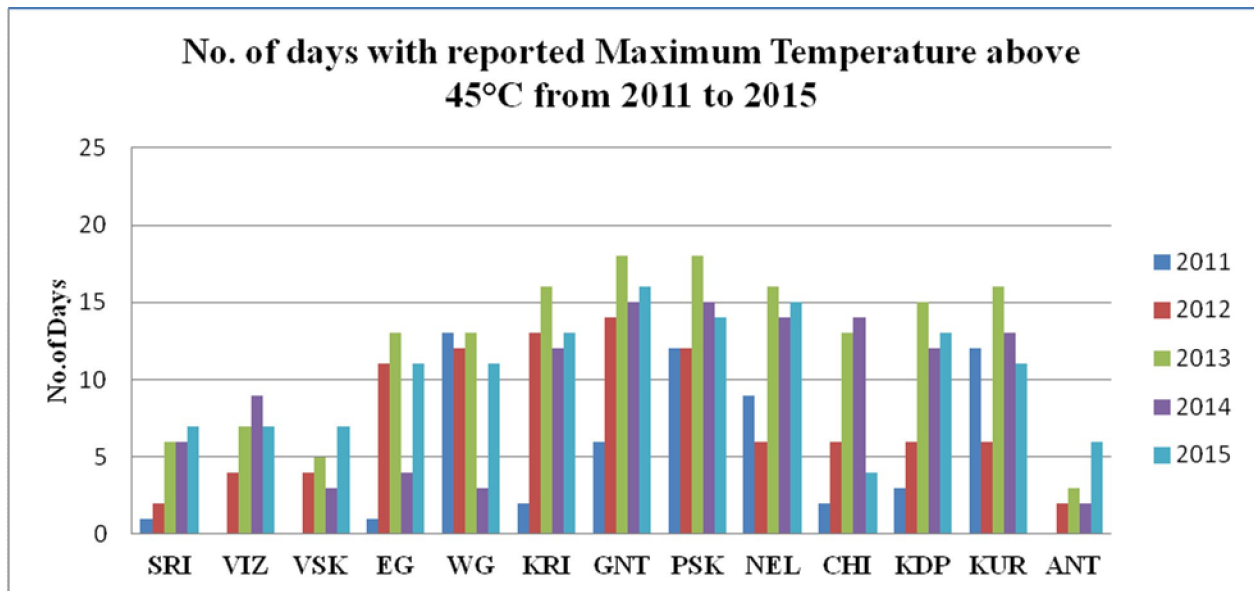


Figure.3

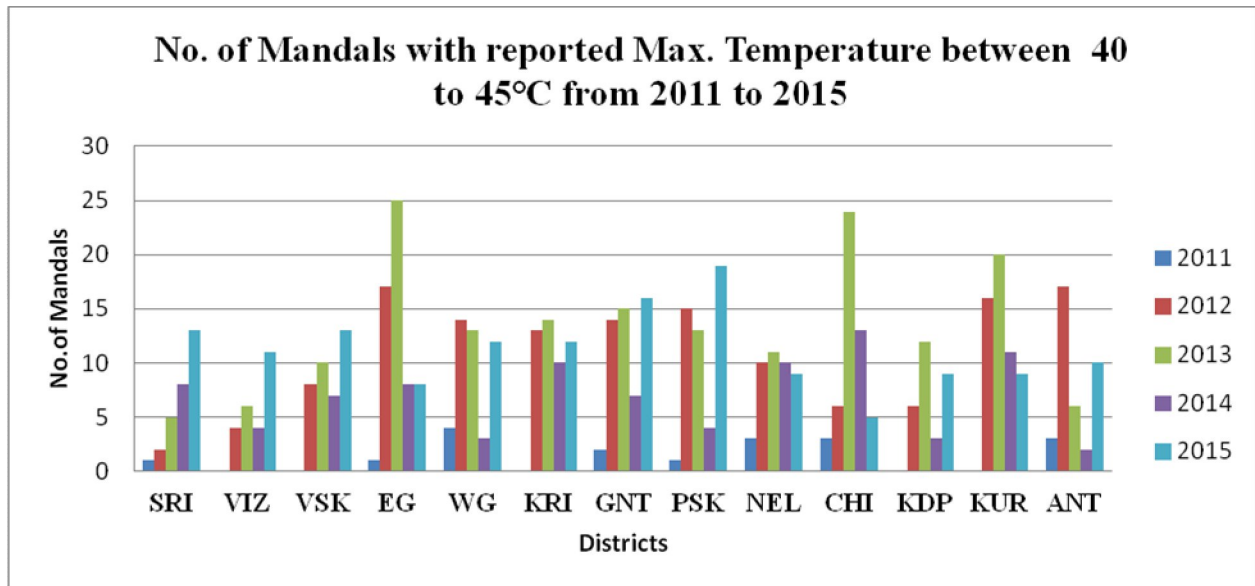


Figure. 4

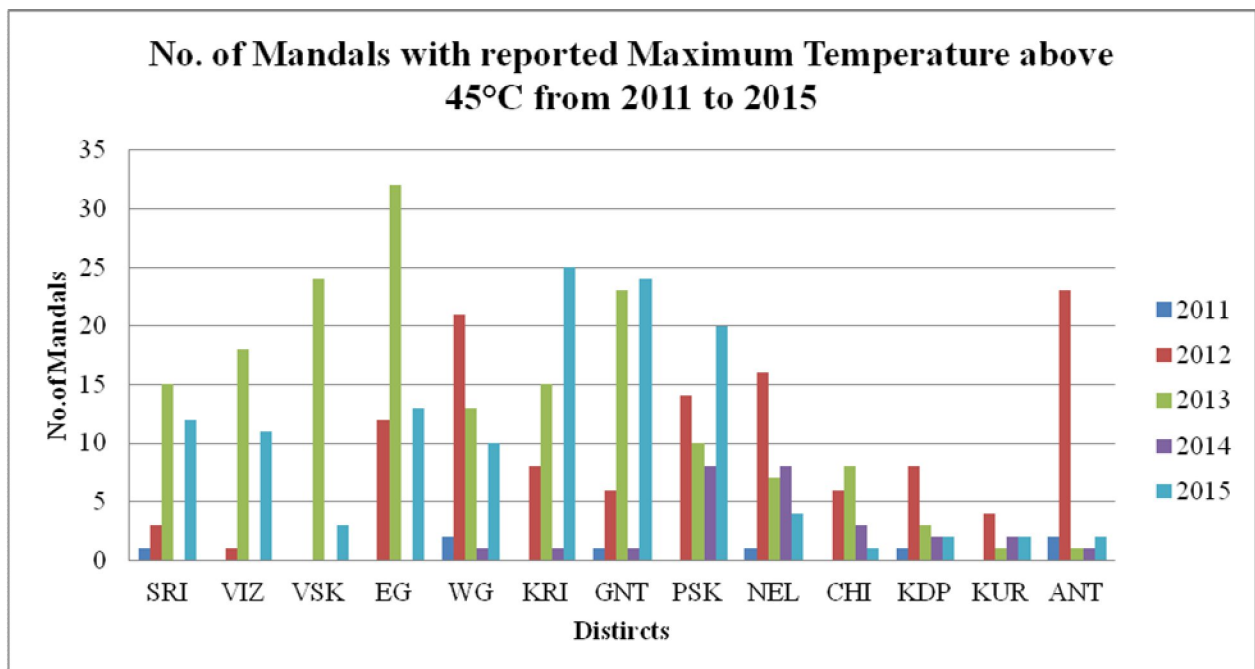
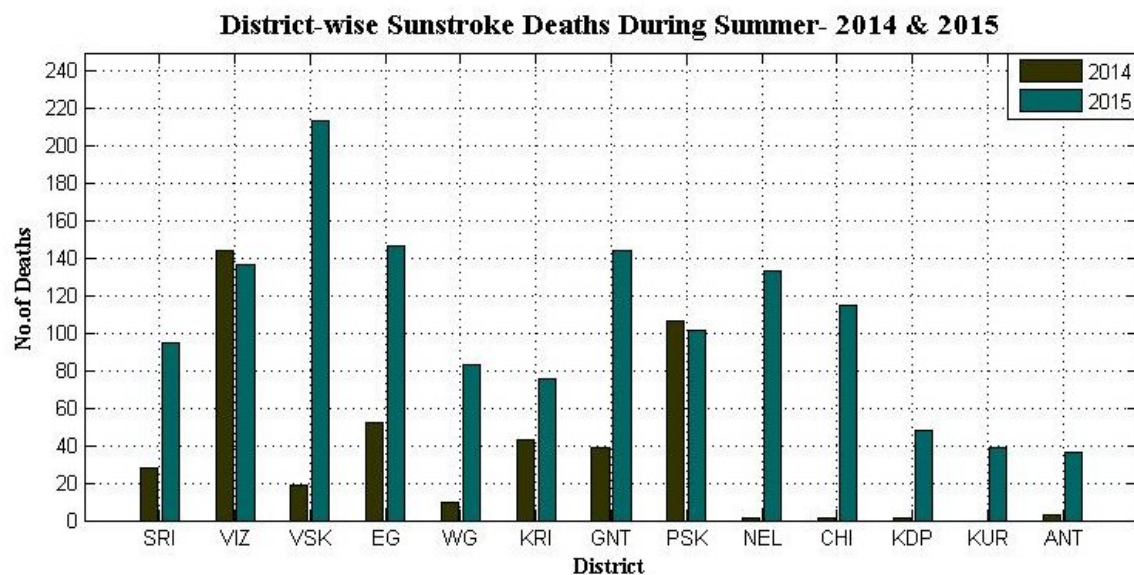


Figure.5



4. Necessity of Heat Wave Action Plan

4.1 There is a need of a coordinated multi-agency approach to the state's management of heat waves. At present, the problem of heat waves is being managed at an operational level but it needs to be managed at a strategic level. There is the need for clear roles and responsibilities in the management of heat waves, sufficient strategic monitoring, and greater clarity around triggers for activation and sharing of data across multiple systems and mapping or analysis of the extreme heat impacts across the community.

4.2 Earlier efforts of the State Government to reduce mortality and mitigate the suffering of general Public due to Heat waves even after implementing some of the recommendations of the State Level Committee headed by Director General, TERI, New Delhi, (Early Warning System, Public Awareness Campaigning etc.) have not proved sufficient. This may be seen from the fact that 448 deaths were reported due to Heat Wave / Sun Stroke during summer-2014 which increased to 1369 in Summer-2015.

4.3 Taking cognizance of the serious situation arising out of the intense Heat Waves on general public leading to high fatalities, the Government have issued Orders constituting a Committee with eleven (11) Principal Secretaries/Director rank officers as members under the Chairmanship of the Principal Secretary to Government, Revenue (Land & DM) to prepare a Comprehensive Heat Wave Action Plan for Andhra Pradesh State vide G.O. Ms. No.14, Revenue (DM.II) Department, dt.03.12.2015.

4.4 The Committee, after deliberations on studying the Heat wave Action Plans of other states and best practices worldwide, prepared a Comprehensive 'The Andhra Pradesh State Heat wave Action Plan' .

5. Objective of the Plan

The primary objective of the Plan is to reduce heat-related morbidity and deaths through issuing heat-health warnings, with particular emphasis on the most vulnerable population groups, provide timely advice and announcements of upcoming heat-waves, raise awareness amongst the public and health workers to take appropriate precautions and coordinate and mobilize all available resources in a timely manner to prevent and reduce the negative health consequences of heat-waves. It aims to achieve this objective by providing a framework for implementation, coordination of an integrated response and continuous evaluation of extreme heat response activities.

6. Key Components of the Plan

- i. To monitor climate conditions and Initiating an Early Warning System and Inter-Agency Coordination to alert stakeholders of predicted high and extreme temperatures.
- ii. Building Public Awareness and increasing Community Outreach to communicate the risks of heat waves and implement practices to prevent heat-related deaths and illnesses. Special efforts will be made to reach vulnerable populations through inter-personal communication as well as other outreach methods which include posters, brochures and information sheets etc.
- iii. Identifying vulnerable populations and the health risks specific to each group.
- iv. Developing effective strategies, agency coordination and response planning that addresses heat-health risks.
- v. Heat Health Information Surveillance System—to monitor and assess the impact of heat waves on human health.
- vi. Capacity Building among Health Care Professionals to recognize and respond to heat-related illnesses, particularly during extreme heat events.
- vii. Reducing Heat Exposure and Promoting Adaptive Measures by launching new efforts including mapping of high-risk areas, access to potable drinking water and cooling spaces during extreme heat days.

- viii. Collaboration with non-governmental organizations as a means to expand outreach and communication with the most vulnerable communities.
- ix. Evaluating and updating the Heat Action Plan regularly.

7. Heat Alert Warning Systems (HAWS)

7.1 Accurate and timely alert systems are essential. Collaboration with India Meteorological Department (IMD) is needed to develop heat warning systems (HWS), trigger a warning, determine the threshold for action and communicate the risks. It is important that a HHWS is targeted to the local needs and is accurate and timely.

7.2 India Meteorological Department (IMD) is forecasting Heat Waves, as defined by forecasts of day and night temperatures and their duration well in advance and communicating the details of forecasts, in addition to posting them on their web site (www.imdhyderabad.gov.in).

7.3 Also Governments of Andhra Pradesh have installed Automated Weather Stations (AWS) across the state. These weather stations report temperature and Relative Humidity on hourly basis. The data from these stations are uploaded on real-time on www.apsdps.gov.in web portal. The real time data from AWS shall be used to monitor heat wave conditions in respective areas.

7.4 In addition Possible 'Heat Wave' impact maps generated by India Meteorological Department (IMD) / Andhra Pradesh State Development Planning Society (APSDPS) based on the simulations made shall be used as guidance maps for taking precautionary measures by various departments.

7.5 Three target groups were suggested to receive different, but coherent messages:

- People (individuals) at risk (general population)
- The voluntary care takers of the people at risk
- The professional care and health system

7.6 Public information services are necessary for disseminating information to the population in a timely and adequate manner. Communication with the media needs to be ongoing and aimed at providing enough coverage in informative programmes for topics related to protection from heat-waves.

7.7 During heat-waves, daily announcements will be contain information on the daily temperatures, the consequences for the population's health of the same, the activities undertaken, recommendations for the public, and recommendations.

8. Color Signals for Heat Alert

The Heat alerts based on thresholds determined by the IMD using the following color signal system shall be issued

Red Alert	Extreme Heat Alert Day
Orange Alert	Heat Alert Day
Yellow Alert	Hot Day
White	No Alert

9. Roles and Responsibilities of Departments / Agencies in responding to Heat Waves

9.1 There needs to be greater clarity around the roles and responsibilities in the management of Heat wave, for that matter any disaster. Preparation and response to Heat wave is to be managed in an integrated manner for which clear leadership to anchor the process is necessary. A control agency leads the response to a particular type of emergency. Support agencies provide resources, such as personnel, essential services and materials, to support or assist a control agency or affected person.

9.2 Disaster Management Department is the control agency for the response to heat wave, and that other agencies, including the Department of Health, have a support role.

9.3 Commissioner / Director, Disaster Management as the Incident Controller and Nodal Officer for heat waves—is responsible for strategic management of the incident at the State Level. The District Collector is the Incident Controller and Nodal Officer at District Level.

9.4 Generally the Responsibilities of Incident Controller and Nodal Officer include:

- managing all response activities
- notifying support agencies
- establishing incident and emergency management teams
- collecting, analyzing and disseminating information regarding the emergency
- leading multi-agency response planning
- issuing timely information and warnings to the community
- developing incident action plans.

10. Implementation of Heat Action Plan

10.1 Successful implementation of a Heat Action Plan requires coordinated action between many diverse stakeholders, including Government Departments / Agencies, health care professionals including emergency medical personnel, health center staff, and hospital staff; and community groups.

10.2 Following the forecasting of an heat event, immediate notification of the public and all those participating in the response is critical to ensure the plan is activated.

10.3 The Heat Action Plan shall be implemented in 3 Phases annually.

Phase-I: – Pre -Heat Season (January to February)

Pre-Heat Season is devoted to develop early warning systems, communication plan of alerts to the general public, health care professionals and voluntary groups (care givers) with emphasis on training and capacity building of these groups.

Phase-II: - During the Heat Season (March to July)

High alert, continuous monitoring of the situation, coordination with all the departments / agencies concerned on one hand and general public & media on the other hand is the focus of this phase.

Phase-III: – Post -Heat Season (August to December)

In Phase – III concentration is on evaluation and updation of the plan. It is important at the end of the summer to evaluate whether the heat health action plan has worked. Continuous updation of plan is a necessity. Global climate change is projected to further increase the frequency, intensity and duration of heat-waves and attributable deaths. Public health prevention measures need to take into consideration the additional threat from climate change and be adjusted over time. Measures that are effective now, might not be effective anymore in future decades to come. Development of appropriate Heat Index suitable for Andhra Pradesh by analyzing temperature and mortality data by involving IMD, APSDPS and Medical & Health Department is necessary to evaluate and update the plan.

11. Phase wise Responsibilities of Various Departments / Agencies

11.1 Phase-I: - Pre Heat season (January to February)

I. Incident Controller / Nodal Officer at State Level and Nodal Officer at District Level

- i. Preparation of a list of High risk areas in the State / District vulnerable to Heat waves for more focus in planning to mitigate adverse affects of Heat wave.
- ii. Identification of vulnerable groups of population.
- iii. Convene meetings with the concerned Departments/ Agencies/ NGOs involved in response mechanism to Heat waves to review the action plan periodically.
- iv. Designation of a single officer as point of contact for each department.
- v. Organize training for health workers, link workers, school children, and the local community in preventive measures and treatment protocol involving the Medical & Health Department
- vi. Distribute pamphlets and posters with tips to prevent heat stress in local language to hospitals, schools, and professional associations.
- vii. Establish Heat Action Web Page on Disaster Management / District Web site.

II. I & PR Department

- i. Identification of areas to post warnings and information during heat season.
- ii. Securing advertisement / scrolling slots for announcements regarding Heat waves.
- iii. Designing information and awareness material in the form of pamphlets, posters etc. on Heat waves in local language for distribution to the general public, especially focusing on identified high risk areas in the State and vulnerable groups of population.

III. Medical & Health Department and Medical Professionals

- i. Designing and initiating targeted training programs, capacity building efforts and communication on heat illness for medical staff at Public Health Centres (PHCs) / local hospitals and Urban Health Centres (UHCs), including nursing staff, paramedics, field staff and link workers (ANMs, ASHA Workers, Aarogya Mitras etc.), while paying special attention to the susceptibility of particular wards.
- ii. Updation of admissions and emergency case records in Hospitals to track heat-related morbidity and mortality and also to create simple, user-friendly means to track daily heat-related data and behavioral change impacts. Train hospitals to record information

on education & communication (IEC) efforts and to ensure recording of cause of death in death certificates.

- iii. Adopt heat-focused examination procedures at local hospitals and urban health centers.
- iv. Developing of SMS facility to reach the field level staff during emergency periods.
- v. Checking of inventories of medical supplies including ORS powder in PHCs and other Local Hospitals.
- vi. Purchase and distribute reusable soft plastic ice packs for the citywide UHCs, 108 emergency centres, ambulances and hospitals.
- vii. Explore creation of ice pack dispensaries to increase access to vulnerable communities in high risk areas.
- viii. To provide following services through 108 / 104 Emergency Service
 - (a) Ensure adequate supply of IV fluids.
 - (b) Prepare handouts for paramedics about heat related illness.
 - (c) Create displays on ambulances to build public awareness during major local events.
 - (d) Identifying routes to high risk areas and to reach vulnerable sections of population in shortest time possible by utilizing the list of high-risk areas.

IV. MA & UD Department / Corporations / Municipalities & Panchayat Raj Department / Panchayats

- i. High Risk Area mapping and identification of vulnerable groups particularly destitute, homeless, beggar homes and old age homes to concentrate on mitigation efforts during heat alert period.
- ii. Identification of areas to provide shelters and drinking water during heat alert period.
- iii. Urban forestry, avenue plantation and encouraging roof gardens to increase the green cover in Urban areas to reduce heat levels.
- iv. Special care in restricting outdoor activities and functions during heat period.
- v. Identification of NGOs / Rotary Clubs / Lions Clubs and Corporate houses (under Corporate Social Responsibility) to provide shelters, drinking water, medical supplies and temporary homes during heat days.

V. Labour & Employment Department

- i. Organize training for employers, outdoor labourers and workers on health impacts of extreme heat and protective measures to be taken during high temperature periods.
- ii. Utilize maps of construction sites and outdoor work spots preferably overlaying with irradiation map from IMD or heat island map to identify more high-risk outdoor workers and to conduct publicity campaigns during high-risk days.
- iii. Preparing a list of factory medical officers, contractors and house side non-factory workers to include in heat alert and action communication.
- iv. Heat illness orientation planning for factory medical officers.

VI. Rural Development Department

- i. Collecting information on the works sanctioned under MGNREGS programme and other schemes in High risk areas to plan for mitigation effort during heat period.
- ii. To ensure shade and supply of adequate drinking water at work spots.

VII. Animal Husbandry Department

- i. Preparation of Posters & pamphlets with tips to take care of cattle and poultry during heat waves.
- ii. Publicity of protective measures to save cattle and poultry during heat periods through District heads and Farmers Training Centers.
- iii. Checking inventory of necessary medicines for treatment of cattle and poultry.
- iv. Preparation of plans to provide drinking water for cattle in case of scarcity.

VIII. Transport Department & APSRTC

- i. Obtaining lists of risk areas and review of Bus timings and available shelters in the high risk areas.
- ii. Planning for shade / shelter, drinking water and fans in the waiting areas of passengers.
- iii. Review plan with cab operator / auto / transport associations and also Highway patrol
- iv. Display of precautionary measures (Do's and don'ts) on busses, autos, in bus stations & auto stands and distribution of pamphlets to passengers.
- v. Planning to provide ORS, Ice packets etc. and medical services in Bus stations.

IX. Information & Technology (IT) Department

- i. Development of Disaster and Emergency Management System which includes Heat waves and prepare a Dash board to monitor heat wave scenario and its impact constantly through e-pragathi .
- ii. Mapping of Risk areas and discrimination of warnings and alerts to all stakeholders automatically through web, IVRS and mobile applications.
- iii. Prepare map on web interface with color coding system.

X. Education Department

- i. Designing child-friendly educational preventative trainings and distribute heat protection materials at local schools.
- ii. Training of school teachers to equip them with knowledge of heat protection tips and activities which they can disseminate in classrooms.
- iii. Scheduling of examinations before starting of Heat period normally.

XI. Fire Department

- i. To check the readiness of vehicles and fire fighting equipment to face any emergency.

XII. Community groups / Self help groups / ward level committees / NGOs

- i. Conduct training programmes, workshops and outreach sessions with community / Self help groups and mobilizers such as DWACRA groups, Mahila Arogya Samiti, ASHA workers, Anganwadis, and Ward Committees in Municipalities to help inform and get vulnerable communities more actively involved.
- ii. Identification of NGOs, Voluntary Organizations in reaching out to the Public, especially Vulnerable groups.
- iii. Encourage discussions for finding early signs of heat exhaustion with local doctor or Health Centre.
- iv. Inform fellow community members about how to keep cool and protect oneself from heat.

11.2 Phase-II: - During the Heat Season (March to July)

I. Incident Controller / Nodal Officer at State Level and Nodal Officer at District Level

- i. Issue of heat alert when extreme heat events are forecast by IMD and APSDPS. All key Departments / Agencies, SEOC, DEOC etc. in accordance with the Communication Plan may be notified.
- ii. Monitor and increase the heat alert level to match the severity of the forecast and established threshold.
- iii. Hold regular (daily, if necessary) conference to discuss reports and fresh developments during a heat alert. Special meetings with key agencies may be convened.
- iv. To ensure that communication channels with all Stakeholders are functional and operating.
- v. Ensure presence of staff and availability of required supplies with each Department, including fresh drinking water.
- vi. Communicate locations of emergency facilities and cooling centres / shaded areas with each Department / Organization.
- vii. Inform power supply Companies to prioritize maintaining power to critical facilities (such as hospitals and UHCs).
- viii. Notify all the stakeholders when the heat alert is over.

II. I & PR Department

- i. Release of messages to the general public and vulnerable groups about the risks and dangers of heat-related illness by the nodal officer at the State and District levels through press conferences.
- ii. Wide circulation of Heat wave alerts through SMS or WhatsApp in collaboration with private sector Telecom companies in addition to traditional media during a heat alert.
- iii. Circulate heat alerts in bulk to the public via centralized email databases.
- iv. To send SMS alert messages directly to private practitioners in addition to the medical professionals at PHCs and UHCs.
- v. Utilize local radio and FM broadcasts to disseminate heat protection tips and high temperature warnings to the vulnerable sections of populations.
- vi. Using social media like Twitter, Facebook etc. to increase outreach of the messages.

III. Medical & Health Department and Medical Professionals

- i. Display of heat-related illness prevention tips and how to stay cool around hospitals, PHCs and UHCs.
- ii. Equip all hospitals/ PHCS/ UHCs with additional supplies of medicines and material.
- iii. Ensure adoption of Heat illness treatment and prevention protocols.
- iv. Deploy additional staff at hospitals and PHCs/UHCs to attend to the influx of patients during a heat alert, if feasible.
- v. Keep emergency wards ready in all PHCs / UHCs and Hospitals
- vi. Increase outreach of community health workers in at-risk neighbourhoods during a heat alert, if feasible.
- vii. Report Heatstroke patients to Nodal Officer on daily basis and generate weekly reports on public health impacts of Heat wave for Nodal Officer, during a heat alert.
- viii. Expedite recording of cause of death in death certificates.
- ix. Ensure that Regional Health Officers visit PHCs / UHCs to confirm that proper preparation has been made for heat related illness and conduct case audits during heat season.
- x. Ensure that 108 /104 EMERGENCY SERVICE:
 - (a) Activate dynamic strategic deployment plan for ambulances.
 - (b) Adequate supply of ice packs, IV fluids and medicines.
 - (c) Keep accurate records of pre-hospital care.
 - (d) Adequate staff on duty and restrict leave if necessary.

IV. MA & UD Department / Corporations / Municipalities & Panchayat Raj Department / Panchayats

- i. Disseminate SMS text messages to warn residents of high risk areas and vulnerable sections of population during a heat alert.
- ii. Set up electronic scrolling boards to display temperature and forecasts at junctions and other public places.
- iii. Activate "cooling centers," such as public buildings, malls, temples, schools and State Government or Local body, run temporary night shelters for those without house or access to water and/or electricity at home.

- iv. Expand access to shaded areas for outdoor workers, slum communities, and other vulnerable sections of population.
- v. Keep open the parks for a longer duration during evenings.
- vi. All non-essential uses of water (other than drinking, keeping cool) may be suspended, if necessary.
- vii. Distribution of fresh drinking water to the public by opening water centres (Chalivendrams) at people congregation points like market places, labour addas, Buss stations etc. Water may be distributed through pouches to the poor in the identified high-risk areas.
- viii. Actively involve NGOs, Lions Club, Rotary Club and Corporate houses in providing shelter and drinking water facilities.

V. Labour & Employment Department

- i. Encourage employers to shift outdoor workers schedules away from peak afternoon hours (12 – 4pm) during a heat alert.
- ii. To ensure to provide emergency ice packs and heat-illness prevention materials to construction workers.
- iii. Ensure provision of shelters/ cooling areas, water and supply of emergency medicines like ORS, IV fluids etc. at work sites by employers.

VI. Rural Development Department

- i. Reschedule of working hours to avoid intense heat timings in all the works sanctioned under MGNREGS.
- ii. Provision of water and shelters / cooling areas wherever necessary.

VII. Animal Husbandry Department

- i. Display posters and distribute pamphlets on the precautionary measures to be taken to safeguard cattle and poultry birds during heat period in villages and important junctions.
- ii. Ensure adequate stock of medicines in all veterinary hospitals.
- iii. Ensure visit of field staff during heat wave to villages for follow up action in treatment of cattle / poultry birds.

VIII. Transport Department & APSRTC

- i. Display posters & distribute pamphlets on prevention of heat related illness in bus stands, auto stands etc.
 - ii. Ensure availability of shade / shelters, drinking water, ORS packets etc., in bus stands, auto stands etc.
 - iii. Establish Health teams at major bus stands / Terminals and other public places
 - iv. Ensure availability of water and ORS packets in long distance buses.
 - v. Do not run buses as far as possible during peak hours (12-4 pm) when Heat wave is declared.
- IX. Information and Technology (IT) Department
- i. Send real time information through Dash board/ interface on all activities related to Heat wave.
 - ii. Activate Dash board/ Interface in e-pragathi.
 - iii. Activate Heat Wave APP
 - iv. Generate reports encompassing all activities undertaken during heat wave alert to use for evaluation of systems and action plan.
- X. Education Department
- i. Ensure supply of water for students and teachers if school is functioning.
 - ii. If school is not functioning, permit use of school premises as shelter during day time.
- XI. Fire Department
- i. Ensure presence of staff during heat alert period, if necessary by restricting leaves.
 - ii. Ensure functioning of communication equipment to receive messages / alerts of occurrence of fire.
 - iii. Ensure adequate supply of water and foam to fight fire.
- XII. Community groups / Self help groups / ward level committees / NGOs
- i. Take all precautions to avoid Heat related illness.
 - ii. Keep cool and hydrated during the heat season by drinking water, staying out of the sun, and wearing light clothing.
 - iii. Check on vulnerable neighbours, particularly during a heat alert.
 - iv. Limit heavy work in direct sun or indoors, if poorly ventilated, especially during a heat alert.

11.3 Phase-III: – Post -Heat Season (August to December)

I. Incident Controller / Nodal Officer at State Level and Nodal Officer at District Level

- i. Review of quantitative and qualitative data for process evaluation and improvements.
- ii. Annual evaluation of Heat Action Plan by organizing a meeting with key Departments / agencies and relevant stakeholders.
- iii. Evaluate the Plan process basing on the reach and impact.
- iv. Revision of Plan basing on the performance feedback.
- v. Revision and posting of Revised Action Plan online well ahead of summer season next year for information of all stakeholders.

II. I & PR DEPARTMENT

- i. Evaluate reach of advertising / public messages and other means of communication like social media (face book, twitter etc.) to target groups.
- ii. Participate in annual evaluation in Heat Action Plan.
- iii. Review the revised Heat Action Plan.

III. Medical & Health Department and Medical Professionals

- i. Perform an epidemiological case review of heat-related mortalities during the summer.
- ii. Conduct and gather epidemiological outcomes from the data on heat risk factors, illness and death, based on average daily temperatures.
- iii. Measure mortality and morbidity rates based on data before and after the Plan's interventions.
- iv. Incorporate data and findings into future versions of the Heat Action Plan.
- v. Participate in annual evaluation of Heat Action Plan review the revised Heat Action Plan.
- vi. Review the revised Heat Action Plan.
- vii. To ensure 108 / 104 Emergency Service
 - (a) Provide data to key Agency / Department.
 - (b) Participate in annual evaluation of Heat Action Plan review the revised Heat Action Plan.
 - (c) Review the revised Heat Action Plan.

IV. MA & UD / Panchayat Raj Department/Local bodies, Labour & Employment Department, Rural Development Department, IT Department, School Education Department, Animal Husbandry Department, Transport Department & APSRTC

- i. Collect data related to implementation of Action Plan and provide feedback to key agency / department.
- ii. Participate in annual evaluation of Heat Action Plan.
- iii. Review the revised Heat Action Plan.

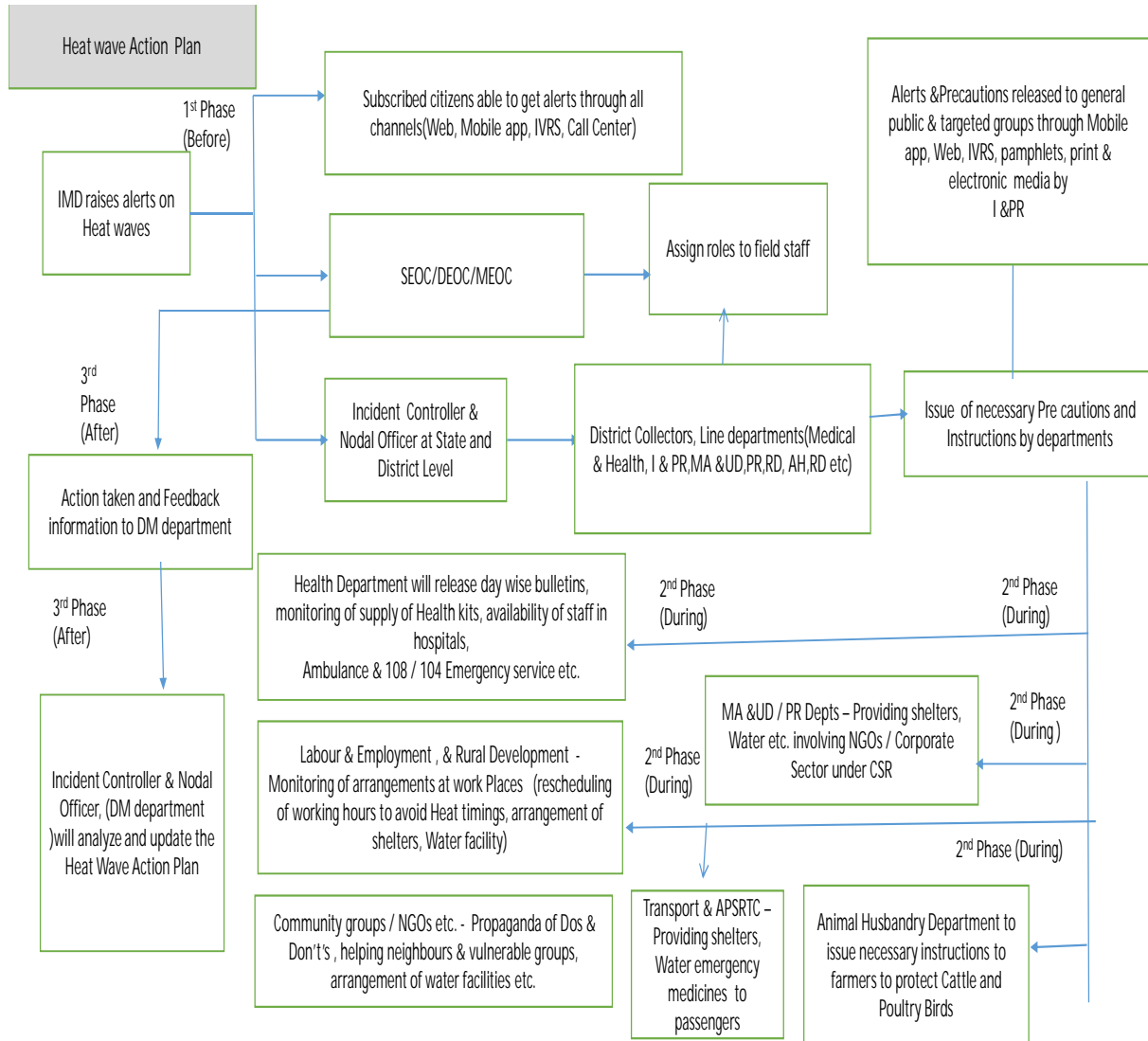
V. Community groups / Self help groups / ward level committees / NGOs

Reach the unreached and educate the community on a continuous basis, in addition to providing feedback on the outreach and impact of Heat wave Action Plan to the Key Departments / Agencies / Nodal Officers at State and District Levels.

12. Conclusion

All the departments / agencies shall take necessary timely action to implement the Heat Wave action plan to mitigate the adverse effects of heat wave.

i. Heat Wave Action Plan Flow Chart



ii. Health Impact of Heat Waves

Typical presentations and case definition are as follows:

Clinical Entity	Age Range	Cardinal Symptoms	Cardinal Signs	Pertinent Negatives	Prognosis	Case definition
Heat rash	All , mainly Children	Small, red, itchy papules with some times 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	Diffuse, pruritic, maculopapular or vesicular rash in the setting of heat exposure, often with insulating clothing or swaddling.
Heat cramps	All	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	Painful contractions of frequently used muscle groups in the setting of heat exposure, often with exertion
Heat exhaustion	All	Feeling overheated, lightheaded, exhausted and weak unsteady nauseated, sweaty & thirsty, inability to continue activities.	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	Syndrome of generalized weakness & or exhaustion, often with light headedness, limiting functioning in a hot environment without history of recent infection. May or may not be exertional.
Heat syncope	Typically adults	Feeling hot & weak; lightheadedness followed by brief loss of consciousness	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	Brief loss of consciousness in the setting of heat exposure without evidence of heat seizure activity, stroke or medication overdose
Heat stroke	All	Severe overheating; profound weakness; disorientation, obtundation, seizures or other altered mental status.	Flushed, dry skin (not always), core temperature $\geq 40^{\circ}\text{C}$; altered mental status with disorientation, possibly delirium, coma, seizures; tachycardia; +/-	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	Altered mental status (including disorientation, delirium, seizure, obtundation) with elevated core body temperature $\geq 40^{\circ}\text{C}$ in the setting of heat exposure, without signs of stroke, history of infection, or signs of medication

			hypotension			over dose. May or may not be exertional
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- Heat-related illness occurs when the body is unable to adequately cool itself. The setting for Heat illness involves hot environment ; +/- exertion; +/- insulating clothing or swaddling.
- Extreme heat events can also exacerbate / aggravate pre-existing conditions, with the risk of heat-related mortality (death) and morbidity (disease, illness) increasing for people with illnesses—including cardiovascular disease, diabetes and cancer.
- Heat-waves characterized by long duration and high intensity have the highest impact on mortality.
- The impact of heat waves characterized by longer duration (more than four days) was 1.5 to 5 times higher than for short heat-waves.
- The health impacts of hot weather and heat-waves depend upon the level of exposure (frequency, intensity and duration) to heat; the size of the exposed population; the characteristics of the population (susceptibility) and the prevention measures in place.
- The adverse health effects of heat-waves are largely preventable.

EMERGENCY TREATMENT

If Heat Stroke is suspected, call 108 immediately. While waiting for the ambulance:

- Take the person’s temperature
- If possible move the affected person to somewhere cooler / shaded area
- Give a cool shower by sprinkling with water or Wrapping in a damp sheet and using a fan to create an air circulation
- Encourage to drink fluids, if they are conscious
- Do not give aspirin or paracetamol

iii. Heat Illness – Treatment Protocol

General Treatment protocol applicable to all patients in any setting, where there is a potential concern for heat illness with slight variations according to the setting (EMS, health center, clinic, hospital emergency department, etc.).

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 in Health Impacts of Heat Waves).
 - b. Patient has one or more of the following risk factors:
 - i. Extremes of age (infants, elderly)
 - ii. Debilitation/physical de-conditioning, 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, ORS can be used but not necessary; cool liquids better than cold)and observe.

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

iv. VULNERBLE GROUPS OF POPULATION

1	Young children
2	Pregnant Women & Nursing mothers
3	Older people mainly above the age of 60
4	Below Poverty Line (BPL) families with no or poor housing conditions
5	Infirm, isolated, and destitute
6	People with pre existing medical conditions (e.g., cardiovascular and respiratory illness, diabetes), people on certain medications
7	People with limited mobility, impairment of thermoregulatory capacity and reduced ability to perceive changes in temperature
8	People engaged in outdoor occupations

Reasons for inadequate coping

1. Not knowing the issue of heat alerts.
2. Lack of awareness of precautionary measures (Dos & Don'ts).
3. Not knowing Symptoms of Heat related illness and immediate treatment.
4. Lack of proper connectivity to Primary Health Centres (PHCs).
5. Lack of access to urgent medical attention at local levels (in villages).
6. No access to shaded areas and cooling places.
7. Non availability of adequate water.
8. No knowledge of Services available etc.

Special care for vulnerable population groups

- Once people at risk have been identified special care and interventions need to be implemented through the local health care and social services.
- It is important that those who are susceptible can be easily identified for outreach services. Possible methods of identification include local community groups and social services and active registration of individuals with a general practitioner or social services.

v.a. Preparedness at community level- Do's and Dont's

Sl.no	Do's	Don'ts
1	Try to stay in cold places	Expose to direct sun light or hot breeze
2	Use umbrella during hot days	Move under hot sun without umbrella
3	Wear thin loose cotton garments, preferably of white colour.	Use of black and synthetic, thick clothes during summer season
4	Wear a hat of cotton or a turban	Move under the hot sun without a hat or turban
5	Avoid outdoor physical activity from 12 to 3 p.m. if unavoidable attend to only light physical activity under the hot sun.	Attend to strenuous physical activity under the hot sun.
6	Take ample water along with salted butter milk or glucose water.	
7	Take measures to reduce the room temperature like watering, using window shades, fanning and cross ventilation	Allow direct hot air into the living rooms
8	Shift the person with heat stroke symptoms to a cool dwelling	Delay in shifting the person suffering with heat stroke to a cool place
9	The person suffering with heat stroke should have minimum clothing	The person suffering with heat stroke to have thick clothing
10	The person suffering with heat stroke has to be sponged with cold water, indirect application of ice packs.	The person suffering with heat stroke to be sponged with hot water and to be exposed to hot air.
11	The person suffering with heat stroke should be kept in between ice blocks	
12	If the persons affected with heat stroke and are not showing any improvement, he/she should be shifted to a hospital immediately, preferably with cooling facility.	Delay in shifting the person affected with heat stroke whenever there is no improvement in his condition

b. చేయవలసిన? (Do's)

- √ వేడిగా ఉన? రో? లలో తప?? సరిగా గొడుగు వాడా?.
- √ తెలుపురంగు గల పలుచటి కాట? వస్త్రానిను ధరించా?.
- √ నె?కి టోపి, లేదా రుమాలు పెట్టికోవా?.
- √ ఉప్పు? క?పిన మ?శి లేదా గూకొ? క?పిన ?రు తాగవచు?ను, లేదా ఓర? రి హైడ్రేషి? దానిని తాగవచు?ను.
- √ వడదెబ?కు గురి అయినవారి? ?తల పొతా? కి వెంటనే చేరా??.
- √ వడదెబ?కు గురి అయినవారి? తడిగుడతో శరీరం అంతా రుద్దితూ ఉండా?. ఐ? ?టిలో బటసె ముం? శరీరం అంతా తుడవవలెను? శరీర ఉష్ణోగతి 101° F - డిగ్రీ? కంటే లోపునకు వచే?వరకు ఐ? వాట? బటతో శరీరా?? తుడుసు? ఉండా? మరియు ఫా?సు కిరిద ఉండా?.
- √ వడదెబ?కు గురి అయినవారిలో మం? మారు?లు లే? చో ?తల వాతావరణంలో దగతిలో? పొద్ది? క ఆరోగ?కేంద్రా? కి తర?ంచవలెను.
- √ మం? ?రు ఎకు?వ సార్య తాగి?.
- √ ఇంటి నుం? బయటకు వెళ్ళేముందు ఒక గాసిమం? ?రు తాగి?.
- √ ఎండలో బయటి నుం? వ? ?న వెంటనే ఒక మాదిరైన చల? ? మ?రసముగా? , కొబ?రి ?రు లేదా చల? ?రు తాగి?.
- √ ?వమైన ఎండలో బయటికి వె? ?నపు?డు తల?రుగుట ? దలైన అనారోగ? సమస్య? ఏర?డితే దగతిలో వున?వైదు శి?సుంపడిం? పొద్ది? క ? కిత? పొంది వడ దెబ? బారిన పడకుండా కాపాడుకోవచు?ను.

చేయకూడ?? (Don'ts)

- X సూర?కిరణాలకు, వేడి గా?కి గురి కాకుడదు.
- X వేడిగా ఉన? సూర?కాం?లో గొడుగు లేకుండా ? రుగరాదు.
- X వేస? కాలంలో నలుపురంగు దుసళిలు, మందంగా ఉండే దుసళిలు ధరించరాదు.
- X నె?కి టి?పి లేక రుమాలు లేకుండా సూర?కాం?లో ? రుగరాదు.
- X వడదెబ?కు గురి అయిన వారి? వేడి ? టిలో ముం? న బటతో తుడువరాదు.
- X దగళిలో? పాభ? క అరోగ?కేందా?కి చేరు?టలో ఏ మాతరి అలస?ి చేయరాదు.
- X మధాహ్ం తరువాత (అనగా ఉదయం 10.00 గంటల నుండి సాయంతరి 4.00 గంటల మధాకాలంలో) ఆరుబయట ఎకు?వ శారీరక శమితో కూడిన ప? ప? చేయరాదు.
- X ఎండలో బయట నుం? వ? ?న వెంటనే ? పిపదారమిలు మరియు తేనె ? సుకొన కూడదు.
?తలపా? యములు, మంచు ముక?లు ? సుకుంటి గొంతుకు సంబందీ? న అనారోగము ఏర?డుతుంది.