

Heat Wave Action Plan-2019

**Revenue & Disaster Management Department
Govt. of Haryana**

Contents

	Page No.
Chapter-1	1-3
Introduction	
Chapter-2	4-5
Institutional Mechanism	
Chapter-3	6-12
Departments/Civil Societies/ Organizations: Roles & Responsibilities	
Chapter-4	13-16
Mitigation Measures	
Chapter-5	17-21
Important Checklists for District Administration/DDMA/GDMA	
Annexure	

List of abbreviations

ACS & FCR	Additional Chief Secretary and Financial Commissioner to Government of Haryana, Revenue and Disaster Management
ANM	Auxiliary Nurse Midwife
ASHA	Accredited Social Health Activist
CDM	Centre for Disaster Management
CHC	Community Health Center
DDMA	District Disaster Management Authority
EWS	Early Warning System
GMDA	Gurugram Metropolitan Development Authority
HARSAC	Haryana Space Applications Centre
HAU	Haryana Agriculture University
HIPA	Haryana Institute of Public Administration
HWAP	Heat Wave Action Plan
HWD	Heat Wave Day
HSDMA	Haryana State Disaster Management Authority
HSVP	Haryana Shahri Vikas Pradhikaran
IEC	Information, Education and Communication
IMD	India Meteorological Department
LUVAS	Lala Lajpat Rai University of Veterinary and Animal Sciences
MCs	Municipal Corporations
MHU	Mobile Health Units
PHED	Public Health Engineering Department
PHC	Primary Health Center
PRI	Panchayati Raj Institution
RI	Routine Immunization
SIHFW	State Institute of Health and Family Welfare
SHWD	Severe Heat Wave Day
ULBs	Urban Local Bodies

Introduction

1.1 Background

Heat wave is also called a “silent disaster” as it develops slowly and kills and injures humans and animals worldwide. Higher daily peak temperatures of longer duration and more intense heat waves are becoming increasingly frequent globally due to climate change. Heat -waves typically occur between March to June, and in some rare cases even extend till July.

Heat Wave Action Plan is a Plan intended to provide a framework for the implementation, coordination, and evaluation of extreme heat response activities in the State that reduce the negative health impacts of extreme heat. 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.

1.2 Definition¹

Heat-wave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life. Heat-wave is defined as the condition where maximum temperature at a grid point is 3°C or more than the normal temperature, consecutively for 3 days or more.

World Meteorological Organization defines a heat wave as five or more consecutive days during which the daily maximum temperature exceeds the average maximum temperature by five degrees Celsius. If the maximum temperature of any place continues to be more than 45°C consecutively for two days, it is called a heat wave condition.

Criteria for Heat Wave
(As defined by Indian Meteorological Department)

Situation	Normal Temperature	Heat Wave	Moderate Heat Wave	Severe Heat Wave
I	If normal temperature is < 40° C.	Any increase from the normal temperature is called a Heat Wave.	+ (5 or 6) ° C : Moderate Heat Wave/Heat Wave Days (HWD)	+7° C or more: Severe Heat Wave Day (SHWD)
II	If normal temperature is ≥ 40° C.	Any increase from the normal temperature is called Heat Wave.	+ (3 or 4) ° C: Moderate Heat Wave (or HWD)	+5° C or more: Severe Heat Wave Day (SHWD)
III	If the maximum temperature of any place continues to be 45° C consecutively for two days, it is also called a Heat Wave condition or HWD.			

Heat wave is considered only after the maximum temperature of a station reaches at least 40°C (for plains region).

Warm Night is declared if actual maximum temperature of a station is more than or equal to

¹ Heat-wave defines by Indian Meteorological Department (IMD) on <http://www.imd.gov.in/doc/termglossary.pdf>.

40°C and minimum temperature departure is more than or equal to 5°C.

Very Warm Night is declared if actual maximum temperature of a station is more than or equal to 40°C and minimum temperature departure is more than or equal to 7°C.

1.3 Vulnerabilities

The combination of exceptional heat stress and a predominantly rural population makes the State, vulnerable to heat waves. Vegetable vendors, auto repair mechanics, cab drivers, construction workers, police personnel, road side kiosk operators and mostly weaker sections of the society have to work in the extreme heat to make their ends meet and are extremely vulnerable to the adverse impacts of heat waves such as dehydration, heat and sun strokes. Homeless people and elderly also vulnerable for heat wave.

1.3.1 Impact on Life, Livelihood, Agricultural and Livestock

The human thermoregulatory system has limits. Our muscles generate heat, which must be shed to the environment to maintain our core temperature of about 36.7°C. Evaporation of sweat helps human bodies to keep cool when it is hot, however, when there is excessive sweating it leads to dehydration with consequent rise in internal body temperature which is fatal. When temperature soars beyond the tolerance limit, precautionary measures like avoiding the sun and physical exertion, maintaining hydration, and resting in a cool place are suggested.

Apart from impact on human life, the Heat Wave has also been found to profoundly affect crop production both in terms of quantity and quality. Primarily, crop loss happened due to flower drop and higher mortality in new plantations. Kharif crops are more impacted than Rabi crops owing to variability in rainfall associated with Heat Wave. Since, Kharif crops are sown in May to June and harvested in September to October; any extreme change in temperature would affect the productivity. Within Kharif, particularly rice production is significantly affected with decreased grain yield which is a matter of concern as rice is a staple diet of all Haryana's population.

Similar to humans, instances of high relative air humidity and little wind deteriorate the negative effects of high temperatures on livestock. When this occurs, the animals cannot easily offload excess heat through transpiration. During extremely high temperatures, an animal will struggle to lose excess body heat through evaporation. The situation is exacerbated if humidity is high or there is no breeze. However, when the heat is very high, they are not able to thermo regulate and this affects their respiration process. Thus Salivation increases a great deal and body temperature becomes unmanageable. In such cases, it is very difficult to bring their body

temperature down by placing ice packs and they collapse before treatment actually starts.

In view of the above, there is a need to revisit and strengthen the existing Heat Wave response plan in order to make it more specific and strategic.

1.4 Key strategies

Government agencies will have a critical role to play in preparing and responding to heat-waves at a local level, working closely with health and other related departments on long term strategic plan.

Establish Early Warning System and Inter-Agency Coordination to alert residents on predicted high and extreme temperatures. Who will do what, when, and how is made clear to individuals and units of key departments, especially for health.

Capacity building / training programme for health care professionals at local level to recognize and respond to heat-related illnesses, particularly during extreme heat events. These training programmes should focus on medical officers, paramedical staff and community health staff so that they can effectively prevent and manage heat-related medical issues to reduce mortality and morbidity.



Public Awareness and community outreach Disseminating public awareness messages on how to protect against the extreme heat-wave through print, electronic and social media and Information, Education and Communication (IEC) materials such as pamphlets, posters and advertisements and Television Commercials (TVCs) on Do's and Don'ts and treatment measures for heat related illnesses.

Collaboration with non government and civil society:

Collaboration with non-governmental organizations and civil society organizations to improve bus stands, building temporary shelters, wherever necessary, improved water delivery systems in public areas and other innovative measures to tackle Heat wave conditions.

Institutional Mechanism

2.1 Forecast and Issuance of Heat Wave Alert/ Warning

The India Meteorological Department is mandated to meteorological observations and provides current and forecast meteorological information for optimum operation of weather-sensitive activities. It provides real time data and weather prediction of maximum temperature, Heat-wave warning, Heat-alert for the vulnerable cities/rural area of the severity and frequency. IMD provides following range and validity of time forecast:

Temperature Forecast: Specific Range, Time duration and area

Now casting: (Lead time/validity of 3 to 6 hours)	Short range: (Lead time/validity of 1 to 3 days)	Medium range: (Lead time/validity of 4 to 10 days)	Long/Extended range: (Lead beyond 10 days)	Local range: (Its intensity, frequency and time of occurrence is indicated)
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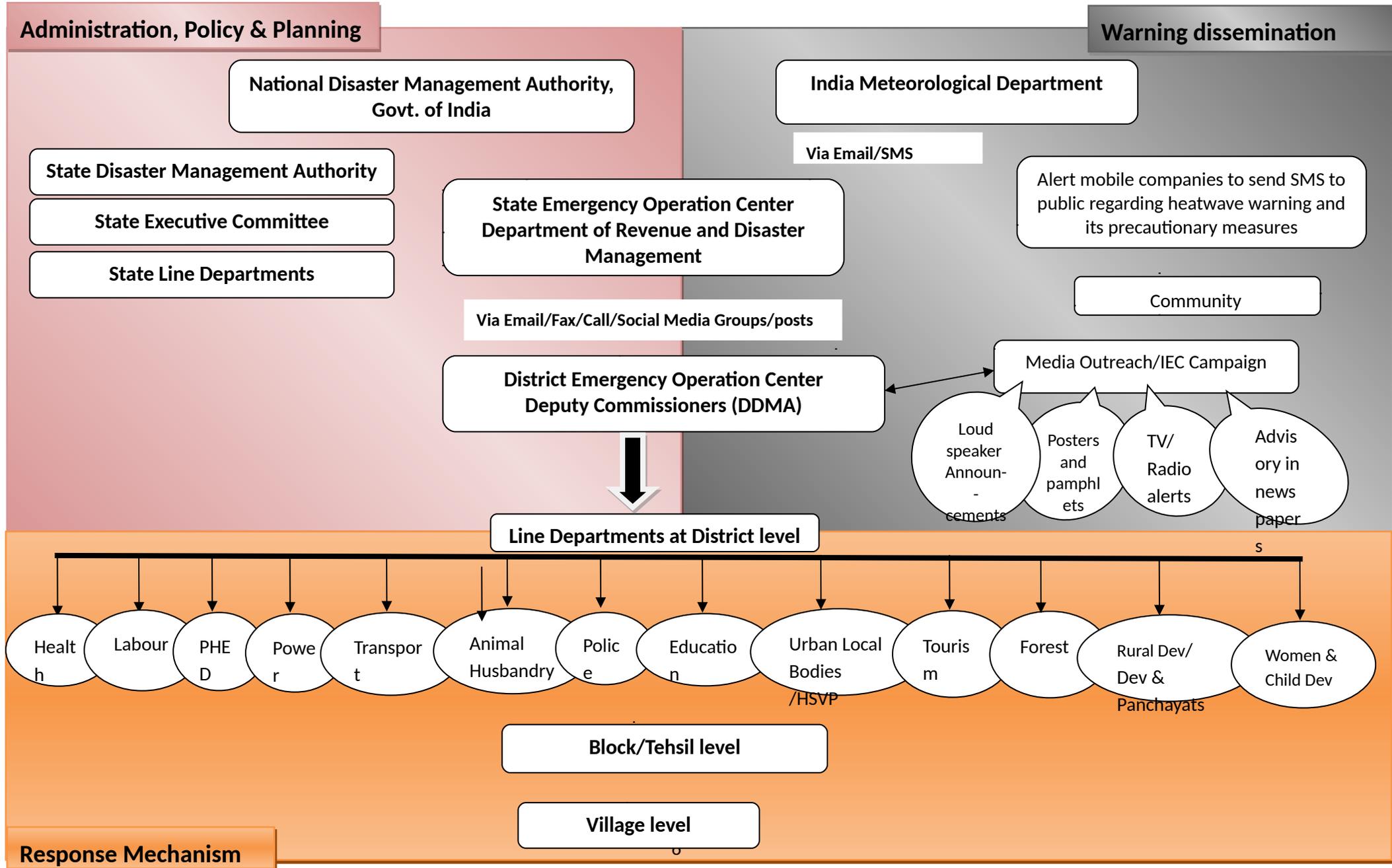
Identification of Color Signals for Heat Alerts:

Red Alert (Severe Condition)	Extreme Heat Alert for the Day	Normal Maximum Temp increase 6° C to more
Orange Alert (Moderate Condition)	Heat Alert Day	Normal Maximum Temp increase 4° C to 5° C
Yellow Alert (Heat-wave Warning)	Hot Day	Nearby Normal Maximum Temp.
White (Normal)	Normal Day	Below Normal Maximum Temp.

2.2 Action Plan for Government of Haryana

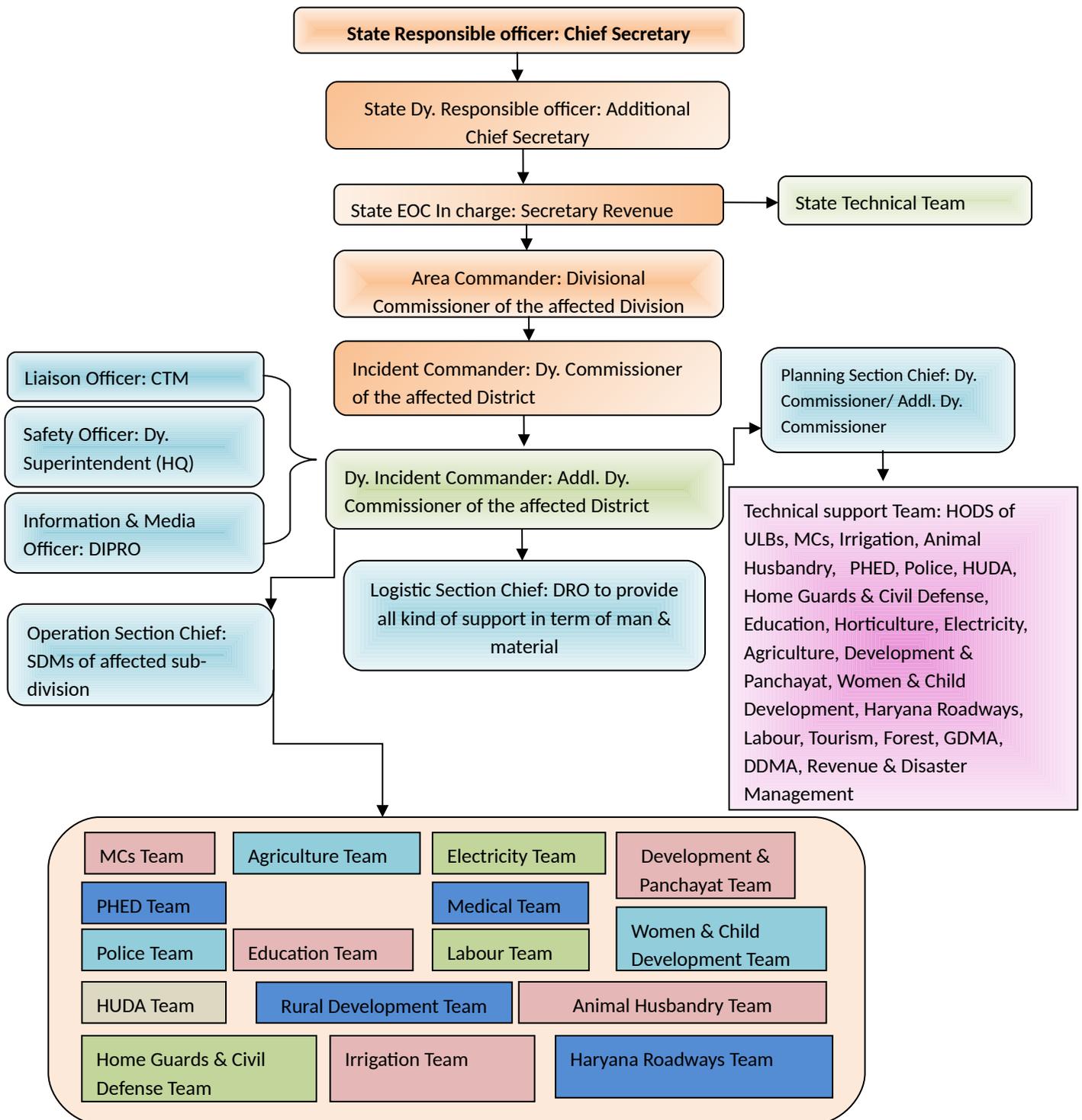
A chart showing Warning Dissemination; Administration, Policy and Planning Mechanism; and Response Mechanism regarding Heat Wave in the State are at Figure 1.

Figure 1:- Warning Dissemination; Administration, Policy and Planning Mechanism; and Response Mechanism



Departments/Civil Societies/ Organizations: Roles & Responsibilities

3.1 IRS for management of Heat waves



3.2 Roles & Responsibilities

3.2.1 Revenue and Disaster Management

- Heat wave warning dissemination through all forms of media.
- Issue necessary directions to all the concerned governmental and non-governmental organizations
- Periodic coordination meetings with all the departments towards implementation of heat wave action plan
- Promote research on heat related morbidity, mortality and mitigation measures in collaboration with knowledge partners located in the state.
- Organize capacity building programs on Heat Wave prevention and management for different stakeholders.
- Provide relief and compensation to the victims of Heat wave.
- An intensive IEC campaign to be launched to keep people inform about Do's & Don'ts as regards exposure to Heat Wave, fluid intake, regulation of work, clothing, protective device & work environment during the Heat Wave period.

3.2.2 Health Services

A. Infrastructure and Logistic –

- Pre-position of Drugs Supplies and Logistics –
 - Provision for adequate supply of ORS, IV fluids, life saving medicines at all health institutions and ASHA & Anganwadi workers as per the suitability. Ensure that the essential drugs reach the destination sufficiently ahead.
 - At all health institutions ear marked beds should be kept in readiness at a cool well ventilated space.
 - In the CHC / PHC, wherever A.C & Coolers are available, to be utilized in the heat stroke room.
 - Provision of Ice & Ice cold water at CHC & PHC as per requirement & availability.
 - Cold water should be stored in earthen pots in each health institutions.
 - ORS Booth should be opened at all health institutions.
 - All Ambulances & other PHC vehicle to be kept in roadworthiness for referral of patients.
 - Provision of power back up during summer.
- Sensitization of Medical Officers & Paramedical workers-
 - Meeting of Nodal officers at State / District & Block level to be conducted to

review the preparedness activities and create awareness about the dangers of Heat Wave and to inform individuals how to minimize the risk.

- All categories of health personnel should be sensitized on heat stress disorders, prevention and management.
- Training of 'Mobile Health Units (MHU)' for management of heat related cases.
- Establishment of mobile base alert system through the ASHA/ ANM/ health workers for effective and immediate assessment of heat stroke cases.
- Strengthen the control rooms for providing heat related information.
- Establish a Heat Wave related morbidity and mortality tracking system and updating the data set periodically.
- Maintaining data base and surveillance on heat related morbidity and mortality.
- Coordinate with private hospitals to collect heat related morbidity and mortality data.
- Provision of funds for Heat Wave management.

3.2.3 Haryana Shahari Vikas Pradhikaran

- Give directions to field functionaries to increase access to public parks, water bodies, public libraries for general public.
- Create small, accessible green spaces by using vacant spaces such as side lots, parking medians, spaces between buildings and roads.
- Keep large public parks open during peak hours to provide cool resting spaces for the public.
- Give directives and ensure cool roofs initiative to paint roofs white (albedo paint), create green roofs and walls, and plant trees in neighborhoods to keep them cool.
- Develop a strategy to incorporate the green belt concept in urban planning, evaluate the efficacy of these initiatives and the highest priority locations for intervention.
- Implement building codes that entail passive cooling practices such as increased reflectivity of building roofs, green roofs, increased natural ventilation and rainwater harvesting. Incentive mechanisms (e.g., reduced taxes) can be used to accelerate green infrastructure development.
- Promote green energy technology, energy efficient building promotion, restricted use of heat producing equipment, and increasing use of renewable energy.
- Provision of funds for Heat Wave management.

3.2.4 Urban Local Bodies

- Display heat alerts and precautionary measures at strategic points.
- Providing shelter and shades in open and high congregation places.

- Opening of the parks during peak hours.
- Providing drinking water through water 'Payu' at strategic points.
- Water supply to slums through tankers.
- Public announcements through public address system.
- Restrict plying of city public transport.
- Provision of ice pack, first aid and water at City public transport vehicles plying during peak hours.
- Provision of vats (near tube wells) for drinking water for animals.
- Provision for Water sprinkling to settle down the suspended particles on roads.
- To ensure car wash and other waste water supply should be stopped.
- Issue advisories for Albedo painting of office building /houses/apartment/schools/hospitals and other buildings.

3.2.5 Public Health Engineering

- Identify risk area.
- Provide drinking water to all public places like bus-stand, Railway station, chowk, market hospital, Deputy Commissioner Offices, to all the public dealing department offices with the help of Municipal Corporations, Development and Panchyat/ Rural Development/ Panchayati Raj.
- Preparing list of water tankers to supply drinking water to risk areas mainly in water scarcity prone areas.
- To identify source of potable drinking water and its capacity to the proportion of population.
- Before heat wave ensure that the entire water pump sets either diesel or electricity based should be in good working condition.
- Make sure J.E. of the concerned area be always alert to provide drinking water round the clock at the strategy points.

3.2.6 Rural Development/Development & Panchayat/Panchayati Raj

- Prepare Vulnerability map.
- Sensitize vulnerable population on Heat Wave
- Public announcement about the do's and don'ts issued by Department of Revenue and Disaster Management.
- Provision of water kiosks, tube wells, tankers at strategic locations.
- Encourage for alternative livelihood activities Construction of ponds, artificial lakes for cooling the environment by evaporation

- Provision of funds for Heat Wave management.
- HREDA ensure for solar energy during power cut.

3.2.7 Labour

- Issue directives for flexible working hours to restrict heat exposure.
- Guideline for workers to protect from heat exposure and provision of First Aid, drinking water and cooling space at work site.
- Awareness activities for construction workers, factory laborers, manual laborers and workers whose occupations require intensive work outdoors during extreme heat about the risks, signs, and symptoms of heat stress
- Training on heat illness diagnosis and management for factory medical officers.
- Advisory for one A/C relief chamber at factory facilities for emergency
- Ensuring health centers/dispensary are open during peak summer hours
- Ensure overseeing construction sites, quarries, factories and other vulnerable worksites, particularly during high temperature periods, to enforce labor laws related to heat safety.
- Provision of funds for Heat Wave management.

3.2.8 Education

- Restriction of school timings, if necessary
- Ensure Avoidance of physical activities during school hours
- Issue directive for Albedo painting on school roofs
- IEC activities on Heat Wave prevention and management in schools
- Promote School Safety Plan
- Encourage Plantation of trees and promote green campus
- Provision for safe drinking water.
- Training to the teachers and mock drills among students via special workshops and classes on identification, health risks and the subsequent management during Heat Waves.
- Provision of funds for Heat Wave management.

3.2.9 Power

- 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 power back up for life line institute.
- Provision of funds for Heat Wave management.

3.2.10 Transport

- Provision for Creating awareness among drivers and other staffs
- Issue a guidelines for each public transport to address Heat Wave
- Restriction of plying times.
- Provision of safe drinking water, ice pack, ORS in buses and provision of cool resting spaces at bus stops.
- Provision of water kiosk on highways
- Provision of funds for Heat Wave management.

3.2.11 Irrigation and Water Resources

- Release water in canals during summer.
- Promote sprinkle irrigation.

3.2.12 Industrial Commerce

- Issue directives for Heat Wave prevention and management for industries and mines.
- Generate awareness through IEC activities.
- Provision for water sprinkling to settle down the suspended particles.
- Provision of funds for Heat Wave management.

3.2.13 Tourism

- Ensure availability of heat relief measures at tourist places
- Display of Heat Wave precautionary measures for tourists during summer at tourist points and related information in website of department of tourism.
- Ensure the availability of drinking water and cool resting sheds
- Restrict the timing of the visit of tourist places during peak summer days
- Provision of funds for Heat Wave management.

3.2.14 Women and Child Development

- Use the Village Health Nutrition Day (VHND) and RI sessions for creating 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.
- Provision of drinking water and first aid at all the Anganwadi Centers, old age homes, orphanages.

- Provision of funds for Heat Wave management

3.2.15 Forest

- 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.
- Promote rain water harvesting.
- Provision of funds for Heat Wave management.

3.2.16 Animal Husbandry

- Construction near tube wells/ repair of vats may also be ensured for roaming livestock to provide them with drinking water.
- Public Awareness campaign about the do's and don'ts for live-stocks should also be done. Do's and Don'ts should be prepared by department itself.

3.2.17 Civil Society Organizations/ Corporate Social Sectors

- To support the Govt. departments in generating awareness in community.
- Coordinate with government for implementing the Heat Wave management measures.
- Support in setting up Jal Chhatras (water kiosks) on high ways, remote places.
- Distribute IEC materials duly accredited by the State Government.
- Promoting healthy living style during summer.
- Support the state government in establishing shelter and sheds.

Mitigation Measures

Introduction

Tremendous temperatures have been revealed to result in increased incidences of death and morbidity. Under altering climate circumstances, an increase in incidence of death as a result of severe heat is expected. Short term heat-wave mitigation measure normally take account of improved public services for the period of heat-wave events however, long-term heat-wave mitigation measures include permanent development in passage.

Short-Term Mitigation Measures for Heat Wave Action Plan

The nodal department for the Heat Wave Action Plan implementation is Department of Revenue & Disaster Management.

S. No.	Short Term Mitigation measures	State		District	
		Nodal Departments	Supporting Departments	Nodal Department	Supporting Departments
1.	Prevention of Diseases	Health Services	- PHED - ULBs - Rural Development - Development & Panchayat	District Health Services	- PHED - MCs - Rural Development - Development & Panchayat
2.	Drinking Water Supply	PHED	- ULBs - Panchayati Raj	PHED	- MCs - Panchayati Raj
3.	Artificial Shelter for pedestrian/ barber/ hawker/ vegetable vendors	Revenue and Disaster Management Department	- ULBs - Rural Development - Development & Panchayat	DDMA	- MCs - Rural Development - Development & Panchayat - GDMA
4.	Day-time peak hours Transportation facilities	Haryana Roadways	- Pvt. Bus owners - Transport Department	Haryana Roadways	- Pvt. Bus owners - Transporters
5	Health facilities	Health Services	- ULBs - Panchayati Raj	District Health Services	- ULBs - MCs - Panchayati Raj - GDMA
6	Community awareness	Public Relation & Information	- ULBs - Development & Panchayat	- Information Broadcasting / - Education - Public Relation & Information	- ULBs - Development & Panchayat - GDMA
7	Power Supply management	DHBVN/ UHBVN		DHBVN/ UHBVN	-

S. No.	Short Term Mitigation measures	State		District	
		Nodal Departments	Supporting Departments	Nodal Department	Supporting Departments
8	Sprinkle irrigation	Agriculture	-Horticulture -Irrigation & Water Resources	Agriculture	-Horticulture -Irrigation & Water Resources
9	Strategy for Top floor households	ULBs	-HUDA, Housing Board -Police Housing corporation	ULBs	-HUDA, Housing Board -Police Housing corporation
10	Drinking water facilities for domestic / wild animals	Animal Husbandry	-PHED -ULBs -Development & Panchayat -Forest	Animal Husbandry	-PHED -MCs -Development & Panchayat -Forest
11	Provision for tourist Places during Heat-wave	Tourism	-Transport -ULBs	Tourism	-Transport -MCs

Long-Term Mitigation Measures for Heat Wave Action Plan

S. No.	Long Term Mitigation measures	State		District	
		Nodal Departments	Supporting Departments	Nodal Departments	Supporting Departments
1.	Water harvesting & Conservation	-Rural Development -ULBs	-Development & Panchayat -Forest -Horticulture	-Rural Development -GDMA	-Development & Panchayat -MCs -Forest -Horticulture
2.	Tree shade	Forest Department		Forest Department	-MCs
3.	Water use Management	Irrigation	-PHED -Development & Panchayat -ULBs -Labour	Irrigation	-PHED -Development & Panchayat -MCs -Labour
4.	Roof water harvesting	ULBs	-HUDA -Development & Panchayat	ULBs	- HUDA - MCs - Development & Panchayat
5.	Conservation of rain water or storm water	Irrigation	-Agriculture -Rural Development -Development & Panchayat -ULBs	Irrigation	- Agriculture - Rural development - Development & Panchayat - MCs

S. No	Long Term Mitigation measures	State		District	
		Nodal Departments	Supporting Departments	Nodal Departments	Supporting Departments
6.	Substantive increase of Green Areas/eco-friendly jurisdiction of ULBs/ Panchayat	ULBs	- Development & Panchayat - Horticulture - HUDA - Housing Board -Police Housing Corporation	- MCs	- Development & Panchayat - Horticulture - HUDA - Housing Board - Police Housing Corporation
7	Use of sprinkle/ drip irrigation	Agriculture	-Irrigation/ -Development &Panchayat	Agriculture	-Irrigation/ -Development& Panchayat/
8	Promote eco friendly agro climatic region during heat Wave	Agriculture	-Horticulture -HAU -Forest	Agriculture	- Horticulture - Forest
9	Suggestive Alternate Cropping	Agriculture	CCS HAU Hisar	Agriculture	- Irrigation & Water Resources - State transport - Revenue & Disaster Management - Rural Development - Electricity - Development & Panchayat
10	Livestock Areas	Animal Husbandry	LUVAS, Hisar	- Animal Husbandry	- Irrigation & Water Resources - State transport - Agriculture - MCs - Electricity -Police
11	Afforestation	Forest	- Development &Panchayat - ULBs - Rural Development	Forest	- Development Panchayat - MCs - Rural Development
12	Renewable Energy	-HREDA -Rural Development	- Development &Panchayat - ULBs - Power	-HREDA -Rural Development	- Develop ment & Panchayat - Rural Development - Power
13	Groundwater recharge and management	CGWB, Chandigarh (Western Region)	- Agriculture - PHED - Rural Development - Irrigation and	- Irrigat ion	- Agriculture - PHED - Rural Development

			Water Resources		
S. No	Long Term Mitigation measures	State		District	
		Nodal Departments	Supporting Departments	Nodal Departments	Supporting Departments
14	Control over Migration of human beings and beasts due to Heat wave	Revenue and Disaster Management	- Home Guards - Civil Defence - Police	DDMA	- Home Guards - Civil Defence - Police
15	Promoting the education beware of Heat wave and Climate Change	Revenue and Disaster Management	- Health Services - PHED - Agriculture - Animal Husbandry - ULBs - Development & Panchayat	- DDMA	- Health Services - PHED - Agriculture - Animal Husbandry - MCs - Development & Panchayat
16	To minimize roof-top Heat-Wave Intensity	- ULBs - Panchayati Raj		MCs Panchayati Raj	- GDMA
17	Heat Wave Early Warning System	Revenue and Disaster Management	- Irrigation - Health Services - Irrigation - ULBs - Rural Development - Development & Panchayat	DDMA	- Irrigation - Health Services - Irrigation - MCs - Rural Development - Development & Panchayat

Important Checklists for District Administration/ DDMA/GDMA

1. Checklist for City Magistrate / District Revenue Officers

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
- ☺ Educate school children and send home age-appropriate pamphlets about the heat season
- ☺ Create list of high-risk areas of city heat- wise

During Heat Event

- ☺ Contact point person in each department announcing heat event at least five 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

2. 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 to apply to PULSE areas
- ☺ Report heat stroke's patients to City Magistrate/ DRO on daily basis
- ☺ Expedite recording of cause of death certificates

Post-summer Evaluation

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

3. Checklist for Health Department

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

4. Checklist for Civil Hospitals/CHC/PHC

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

5. Checklist for District Information & Public Relation Department

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 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

6. Checklist for Labor/ Industrial Safety & Health 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, transit staff and construction workers

7. Checklist for Emergency Medical Service (Health Department)

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

8. Checklist for Animal Husbandry

Pre-Summer

- ☞ Adopt heat focus
- ☞ Get additional mobile hospital ready
- ☞ Update surveillance programme and protocol including track daily heat is related to livestock
- ☞ Establish more clinical education to villagers who have animals
- ☞ Continue to trained medical and paramedical staff for this period
- ☞ Identify the areas that are vulnerable for animals
- ☞ Check inventory of medicine supply in animal health centers
- ☞ Prepare handouts for animal paramedical to heat illness
- ☞ Establish dynamic strategic development plan for mobile ambulance for animals
- ☞ Ensure medical supply of medicines & fluids

During the Heat Season

- ☞ Adopt heat related illness and prevention protocol
- ☞ Equip mobile van with additional materials
- ☞ Deploy all animal husbandry staff on duty during heat wave
- ☞ Monitor water born diseases
- ☞ Prepare quick reaction team
- ☞ Prepare Do's and Don'ts and distribute to community
- ☞ Ensure additional annual husbandry van available
- ☞ Ready medicine stocks
- ☞ Sent messages to all employee (Animal Husbandry) Alerting them on heat action plan

Post-Summer Evaluation

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

9. Checklist for Municipal Corporation

Pre-Summer

- ☞ Display heat alerts and precautionary measures at strategy points
- ☞ Arrangement for shelters and sheds in open and consisted places
- ☞ Instruction to open parks during peak hours

- ☪ Arrangements for drinking water specially “Pyau” at all strategic and vulnerable points
- ☪ Arrangements for water supply to slums
- ☪ Fire advisory to be given to fire departments
- ☪ Water conservation for fire tankers

During the Heat Season

- ☪ Develop control room with sufficient staff
- ☪ Arrangement for emergency water supply
- ☪ Maintain contact with Hospital Water Supply department, PWD, HUDA
- ☪ Ensure staff presence
- ☪ Monitor heat alerts and increase level for severe forecast
- ☪ Prepare quick reaction team
- ☪ Distribute Do’s and Don’ts to community
- ☪ Close watch on vulnerable section of society mentioned on page 6.

Post-Summer Evaluation

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

Conclusion

The impacts of Heat-Wave events are likely to increase due to changing frequency, severity, and intensity of heat-waves caused by climate change. Long term mitigation measures are designed to deal with the core causes of vulnerability. The effectiveness of heat-wave action plan is improved by their multiple additional benefits – all of which will be required for both mitigation of climate change and variation to predictable impacts of heat-wave. However, the main weaknesses of Long term mitigation measures are their costs and the long time frame required for implementation. Thus, short term mitigation measures have been executed to fill that heat/health risk lessening gap. From an urgent situation management viewpoint, it is significant that communities do not rely exclusively on heat/health warning systems, and slightly work to implement long term mitigation systems in combination with short term mitigation measures.

Annexure

Heat Illness -Treatment Protocol

Recognizing the treatment protocols which may vary slightly according to the setting (EMS, health centre, clinic, hospital emergency department, etc.), the following should apply generally to any setting and to all patients where there is a potential concern for heat illness.

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 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:
 - Sympathomimetic drugs
 - Anticholinergic drugs
 - Barbiturates
 - Diuretics
 - Alcohol
 - 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 40° C or above, initiate IV rehydration and immediately transport to emergency department for stabilization.

Case Definitions							
Heat Illness - Typical Presentations							
Sr. No.	Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal Signs	Pertinent Negatives	Prognosis
1	Heat rash	All, but frequently children	Hot environment ; +/- insulating clothing of swaddling	Itchy rash with small red bumps at pores in setting of heat exposure; bumps can sometimes be filled with clear or white fluid	Diffuse maculopapular rash, occasionally pustular, at hair follicles, pruritic	Not focally distributed like a contact dermatitis; not confluent patchy; not peelechial.	Full recovery with elimination of exposure and supportive care.
2	Heat Cramps	All	Hot environment, typically with exertion, +/- insulating clothing.	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.
3	Heat exhaustion	All	Hot environment ; +/- exertion; +/- insulating clothing or swaddling.	Feeling overheated, lightheaded, exhausted and weak unsteady, nauseated, sweaty and 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.
4	Heat Syncope	Typical adults	Hot environment ; +/- exertion; +/- insulating clothing or swaddling.	Feeling hot and weak; light headedness 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

Sr. No.	Clinical Entity	Age Range	Setting	Cardinal Symptoms	Cardinal Signs	Pertinent Negatives	Prognosis
5	Heat stroke	All	Hot environment, +/- exertion; +/- insulating clothing or swaddling.	Severe overheating; profound weakness; disorientation; obtundation, seizures, or other altered mental status.	Flushed, dry skin (not always) core temp 40°C altered mental status with disorientation, possibly delirium, coma, seizures; tachycardia; +/- hypotension .	No coincidental signs and symptoms of infection ; no focal weakness; no aphasia/dysarthria; no overdose history	25-50% mortality even with aggressive care; significant morbidity of survive
Heat illness - Case Definitions							
Clinical Entity		Case Definition					
Heat rash		Diffuse pruritic, maculopapular or vesicular rash in the setting of heat exposure, often with insulating clothing or swaddling.					
Heat cramps		Painful contractions of frequently used muscle groups in the setting of heat exposure, often with exertion.					
Heat exhaustion		Syndrome of generalized weakness and or exhaustion, often with light-headedness, limiting functioning in a hot environment, without history of recent infection. May or may Not be exceptional.					
Heat Syncope		Brief loss of consciousness in the setting of heat exposure without evidence of seizure activity, stroke, or medication overdose.					
Heat stroke		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 overdose. May or may not be exceptional.					

DO's

- Try to stay in cold places.
- Use umbrella during hot days.
- Wear thin, loose cotton garments, preferably of white colour.
- Wear a hat of cotton or a turban.
- Avoid outdoor physical activity from 12-3 PM. If unavoidable, attend to only light physical activity under the hot sun.
- Take ample water along with salted butter milk or glucose water.
- Take measures to reduce the room temperature like watering, using window shades, fanning, and cross ventilation.
- Shift the person with heat stroke symptoms to cool dwelling.
- The person suffering with heat stroke should have minimum clothing.
- The person suffering with heat stroke has to be sponged with cold water, indirect application of ice-packs.
- The person suffering with heat stroke should be kept in between ice-blocks.
- If the person affected with heat stroke is not showing any improvement, he should be shifted to a hospital immediately preferably with cooling facility.

Don'ts

- Expose to direct sunlight or hot breeze.
- Move under hot sun without umbrella.
- Use of black and synthetic, thick clothes during summer season.
- Move under the hot sun without a hat or turban.
- Attend to strenuous physical activity under the hot sun.
- Allow direct hot air into the living room.
- Delay in shifting the person suffering with heat stroke to a cool place.
- The person suffering with heat stroke to have thick clothing.
- The person suffering with heat stroke to be sponged with hot water and to be exposed to hot air.
- The person suffering with heat stroke to be sponged with hot water and to be exposed to hot air.