

Health Adaptation plan for Cardio-Pulmonary Diseases

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Purpose of this document

This is a guiding document for State Nodal Officer- Climate Change for development of their State Level Climate and Health Action Plan. This covers What actions needs to be undertaken; When to initiate the actions and Who all shall be involved.

It is also recognized that **disease specific guidance must be feed into a larger generic Health Action Plan. Overall approach for all** diseases is similar. This document provides only those inputs which are specific to Cardio-pulmonary Diseases.

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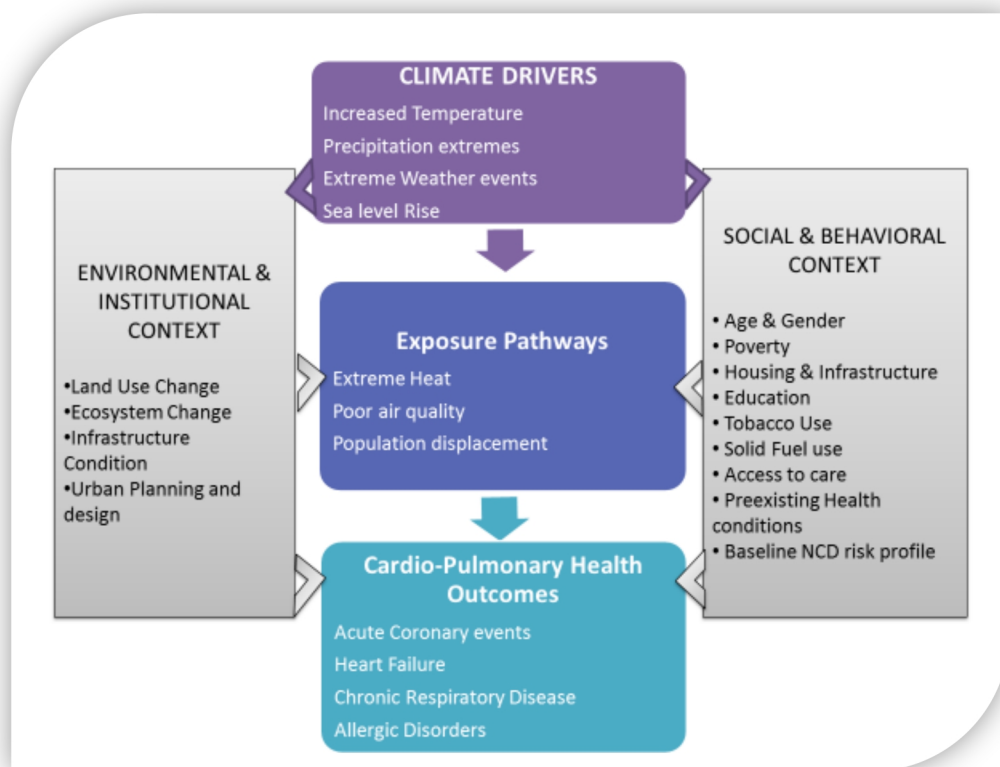
1. Introduction

Changes in climate and climate variability affect the environment that provides us with our basic needs - clean air, food, water, shelter, and security. As climate change is likely to worsen over the next century, certain existing health threats will intensify, and new health threats would emerge. An understanding of how climate is changing and how those changes would affect human health could inform decisions about addressing climate change, prioritize actions for protecting public health, and help identify research needs.

Impact of Climate change on Cardio-pulmonary Health

Climate change can affect human health in two main ways:

1. By changing the severity or frequency of health problems that are known to be affected by climate or weather factors; and
2. By creating unprecedented or unanticipated health problems or health threats in places where they have not previously occurred.



Comment: In the figure – under the section Cardio-pulmonary health outcomes, we may also add – “Acute respiratory conditions like Acute respiratory infections and Asthma exacerbations”

Figure 1: Pathways for cardio-pulmonary outcomes of climate change (Modified from ¹)

The pathways and context of occurrence of CPDs is shown in Fig 1. Various scientific studies have reported impact of climate change on cardio-pulmonary health^{2,3,4,5}.which are summarized in Table 1.

Table1: Impact of Climate change on cardio-pulmonary health

Exposures	Cardiac conditions	Pulmonary disorders
Temperature changes – Extreme Heat	Heat Stroke (Death/morbidity)	
	Dehydration	
Temperature changes Extreme cold exposures	Chronic Kidney Disease	
	Heart failure	
Outdoor-air quality	Rise in blood pressure Trigger for Acute Coronary Syndrome	
	Trigger for Acute Coronary Syndrome	Asthma Asthma exacerbations Acute respiratory infections Irritative rhino-ocular symptoms COPD
Extreme Weather Events – Floods	Trigger for Heart Failure decompensation	Acute Asthmatic attack, Allergies
	Impact drug compliance	
Changing Rainfall patterns		Respiratory infections
IHD		
Chronic changes– Migration, changing crop patterns		

¹USGCRP, 2016: The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. Crimmins, A., J. Balbus, J.L. Gamble, C.B. Beard, J.E. Bell, D. Dodgen, R.J. Eisen, N. Fann, M.D. Hawkins, S.C. Herring, L. Jantarasami, D.M. Mills, S. Saha, M.C. Sarofim, J. Trtanj, and L. Ziska, Eds. U.S. Global Change Research Program, Washington, DC, 312 pp. <http://dx.doi.org/10.7930/J0R49NQX>

²Curriero FC, Heiner KS, Samet JM, Zeger SL, Strug L, Patz JA: Temperature and mortality in 11 cities of the eastern United States. *Am J Epidemiol*2002;155:80–87.

³Keatinge WR, Donaldson GC, Cordioli E, et al: Heat-related mortality in warm and cold regions of Europe: observational study. *BMJ* 2000;321:670–673

⁴ Pan WH, Li LA, Tsai MJ: Temperature extremes and mortality from coronary heart disease and cerebral infarction in elderly Chinese. *Lancet* 1995;345:353–355

⁵Sun S, Laden F, Hart JE et al Seasonal temperature variability and emergency hospital admissions for respiratory diseases: a population-based cohort study. *Thorax*. 2018 Apr 5. pii: thoraxjnl-2017-211333.

2. Action Plan for Addressing Cardio- Pulmonary Disorders (CPD)

The actions are divided into following five major pillars. (Figure 2) The detailed action plan is given below. Each of the five pillars is described briefly.



Figure 2 – Pillars for implementation of action plan

2.1 Situational Analysis

Situation analysis includes three components - Burden, Risk and Vulnerability Mapping; Resource Mapping; Stakeholder Analysis. Situation analysis includes regular mapping of burden risk, manpower, material and finances. This also includes assessment of burden of cardio-pulmonary diseases in the State as part of routine health related surveys and health system reporting. A draft template for situation analysis of climate resilient health system is described in Annexure 1. The concept of “Who’s Doing What, Where, and When (4W)” is useful for identification of potential overlaps or gaps in response. These mapping exercises need to account for the often severely reduced capacity of local providers in emergency settings. With respect to cardio-pulmonary diseases characteristics of vulnerable population is described in Box 1. These vulnerable groups should be focused during situation analysis.

Box 1. The vulnerable population to climate change/pollution

Vulnerable Population Groups

- Elderly (> 60 years of age)
- **Can consider adding young children as they bear the brunt of the harmful effects of air pollution (especially related to development of asthma, worsening asthma and poor lung function development)**

- People living in disaster prone area
- Workers in occupations requiring heavy physical work

Vulnerable Individuals

- Patients with pre-existing Ischemic Heart Disease, chronic respiratory diseases
- Heart Failure patients
- Patients on diuretic (vulnerable to Heat Stroke)

Some guidance in vulnerability mapping specific to CPDs is given below. After vulnerability assessment at State level, respective State can be categorized as high, medium and low vulnerability for effect of climate change on Cardio-pulmonary Health. The indicators given below are indicatives, States can decide with wider consultation the cut-offs of the indicators in each category.

	Vulnerability Level		
Indicator	High	Moderate	Low
Geographical location	Desert, Coastal region	Heavy rainfall or drought prone	Plain
Tobacco use (adults)	> 35 %	25 – 10 %	< 10 %
Health system preparedness	Good	Fair	Poor
Obesity prevalence	> 10	10 – 5	< 5
Air Quality zone (SAFAR)	Red	Yellow	Green
Any other indicator can be added with expert consultation at State level			

As regards to air quality, a large majority of states shall be in High vulnerability level.

2.2 Risk Reduction Strategies

While the major activities in this domain are related to reduction of climate change risk and mitigation, as this is generic and not specific to CPDs, these are not being mentioned in this action plan. Activities specific to risk reduction are those related to reducing the levels of major risk factors for CPDs namely – tobacco, alcohol, diet and physical inactivity. Thus, health promotion becomes a major activity and this has to be aligned with the National NCD prevention efforts.

2.3 Co-ordination, Advocacy and Communication

Multi-stakeholder approach is key for implementation of prevention activities at State level. State Program Officer has to engage with all counterparts of Ministry of Health, Ministry of Women and Child Development, Ministry of Human Resource Development, Panchayat Raj Institutes in the State. Annexure 2 describes specific roles and responsibilities of different major stakeholders which need to be adapted to the state context.

Advocating the cause of climate change in general and CPDs in specific to policy makers and decision makers is an important activity proposed under the plan. The ultimate stakeholders of this plan are the population and the patients of CPDs. It is important to communicate these messages to them about how to prevent as well as mitigate the diseases.

Box 2: Focus area for awareness generation activities at community level

1. What is climate change?
2. Why climate change is happening?
3. What are the impacts of climate change on health?
4. Steps to be take in day to day life to reduce carbon foot print
5. Preparation/ response during emergency or disaster

2.4 Health System Strengthening

Availability of trained manpower and climate resilient health system are key to successful implantation of climate related actions. Systematic training activity for State Level as well as District level concern officers should be developed. Box 3 describes the focus area training activities at State level. Training on Climate Change and CPD can be held in co-ordination with training under NPCDS programme at State/ District Level. Training of trainers approached should be taken up in the State. District level programme officers, General Duty Medical officers Block Medical Officers, medical officers and Staff Nurses should be trained in batches at State level.

Box 3: Focus area for Training activities

- Burden, risk factors, vulnerability assessment for cardio-pulmonary diseases in the State
- Climate based risk factors such as extreme heat, extreme cold, air pollution for cardio-pulmonary diseases
- Strengthening of health care system on lines with NPCDCS guidelines with respect to cardio-pulmonary diseases.
- Measurement, availability of climate parameters at State level
- Linkages of climate and health data with respect to cardio-pulmonary diseases.
- Monitoring and surveillance
- Communication and advocacy

State Program officer should ensure availability essential medicines and equipments at levels of health care system i.e. primary, secondary and tertiary. Annexure 3 describes the essential medicines, instruments and services that should be made available at all primary care facilities in the State. All these essential medicines and technology will ensure effective management of CPD at primary care level. At secondary and tertiary care level guidelines from Indian Public Health Standards and NPCDCS should be followed for ensuring medicines, equipments and services.

Traditionally, health emergency response has largely been seen within the prism of prevention of communicable diseases. Due to increasing burden of CPDs, there is growing realization that emergencies also impact life of people living with CPD. Annexure 4 describes actions to be taken by State Programme Officer at State level for integration of CPD management during emergency. In order to integrate NCDs into the rapid response it must be ensured that:

At least one person in the rapid assessment team is familiar with the issues of NCDs during emergencies.

Baseline profile of NCDs and health system preparedness is available to the response team.

In the Key Informant module of Community Level Assessment, questions related to burden and access to CPD health care are included. In the key informant interviews should include a person with a chronic condition.

WHO has come out with a detailed guidelines for integration of NCDs into emergency response which can be used by states. During emergency / disaster, public information should be customized and focused. Key IEC messages to be disseminated to the public during emergency / disaster are mentioned in Box 4.

Box 4: Information to be provided to patients for emergency

- Keep an identity card with treatment plan including diagnosis and names of medicine and place of treatment
- Keep a stockpile of seven days of treatment wrapped in water – proof manner in the emergency evacuation kit
- Keep key contact numbers of immediate relatives and health care providers
- Keep record of treatment safe at home in water-proof manner and if possible store digitally

2.5 Monitoring and Surveillance

Actions related monitoring and surveillance are important aspects of climate action plan. It is important to measure what is being done as well as impact of the activities done. The draft action plan defines the key outcome indicators for each of the activity identified. Necessary mechanisms have to be established for regular monitoring of the implementation of action plan.

DRAFT STATE HEALTH ADAPTION PLAN FOR CARDIO-PULMONARY DISORDERS

Pillar 1: Situational Analysis

Activity	Specific actions	Time Line	Agencies involved	Tools/guidance	Key Outcomes
Burden, Risk and Analysis Mapping	<ul style="list-style-type: none"> Identify state level institutions to conduct situation analysis. Contract out the situational analysis of CPDs to the identified institution. It should include burden of CPDs, risk factors for CPD including air pollution Conduct vulnerability assessment of population using climatic conditions, demographic variables 	First Six months	<ul style="list-style-type: none"> State Directorate of Health Services Institutions identified IMD CPCB Medical colleges 	<ul style="list-style-type: none"> Vulnerability Assessment Tool (Annexure 1) Categorization of zones/ districts in the state as per vulnerability to climate change (Annexure2) 	<ul style="list-style-type: none"> State level CPD burden List of vulnerable districts/populations / individuals
Resource Mapping	<ul style="list-style-type: none"> Conduct Health System preparedness Assessment for managing CPDs Mapping of human resource, material and financial resources 	First six months	<ul style="list-style-type: none"> State Directorate of Health Services Institutions identified 	<ul style="list-style-type: none"> WHO Service Availability and Readiness Assessment tool Indian Public Health Standards for health facilities 	<ul style="list-style-type: none"> Report on Health System Preparedness and identification of gaps
Stakeholder Analysis	<ul style="list-style-type: none"> Conduct a stakeholder mapping exercise 	First six months	<ul style="list-style-type: none"> As per list attached 	<ul style="list-style-type: none"> Draft list attached 	<ul style="list-style-type: none"> Stakeholders identified

Pillar 2: Risk Reduction Strategies

Climate change risk reduction	This is generic and not restricted to CPDs and therefore not being elaborated.				
Risk reduction for CPDs	<ul style="list-style-type: none"> Strengthen Tobacco control strategies 	Throughout the period	State Tobacco control Cells, State	NPCDCS guidelines	<ul style="list-style-type: none"> Prevalence of NCD risk factors

	<ul style="list-style-type: none"> Strengthen Health Promotion efforts aimed at other risk factors for NCDs 		NPCDCS program Officer		
Pillar 3: Co-ordination, Advocacy and Communication					
Co-ordination	<ul style="list-style-type: none"> Setting up inter-departmental steering committee for climate actions Setting up a state level expert committee on CPDs Conduct a meeting to finalize the roles and responsibilities of all stakeholder Regular holding of State and District level inter-departmental co-ordination meetings 	<p>Three months</p> <p>Three Months</p> <p>Six months</p> <p>Throughout</p>	<ul style="list-style-type: none"> All identified departments Directorate of Health Services State Nodal Officer Climate Change 		<ul style="list-style-type: none"> Roles and responsibilities of all stakeholders defined and accepted. Inclusion of CPD related actions in State level Disaster Management plan
Advocacy	<ul style="list-style-type: none"> Development of a Policy Brief on CPDs and Climate change Inclusion of agenda of climate change impact on CPD in state level meetings with political leadership and other policy makers 	<p>First six months</p> <p>Throughout</p>	<ul style="list-style-type: none"> State Climate Change Cell State Nodal Officer NPDCCS 		<ul style="list-style-type: none"> Availability of a policy brief Climate change mentioned in minutes of the meeting and activities defined.
Communication	<ul style="list-style-type: none"> Develop CPD specific IEC materials for populations and patients Conduct awareness campaigns for general population about heat alert, 	<p>First six months</p> <p>Throughout</p>	<p>Identified communication agencies</p> <p>Ministry of I & B</p>	<ul style="list-style-type: none"> IEC materials by central MoHFW 	<ul style="list-style-type: none"> Coverage and Recall of IEC campaign

	air pollution alert& risk of CPDs				
Pillar 4: Strengthening Health System					
Ensure the availability of essential health technologies and medicines in all health facilities	<ul style="list-style-type: none"> Develop/Adopt state specific CPDs treatment protocols for different levels of health system Procure/indent essential technologies and medicines at state level and send to health facilities 	First Year	Expert Group State Directorate of Health Services	<ul style="list-style-type: none"> WHO-PEN Package NPCDCS guidelines 	<ul style="list-style-type: none"> Availability of state level STPs protocols for CPDs management % of health facilities at each level which have essential technologies and medicines
Capacity Building of Human Resources	<ul style="list-style-type: none"> Develop a training manual for all HR for management of CPDS Draft and implement a training plan to cover all human resource for management of CPDs 	Two years	<ul style="list-style-type: none"> Directorate of Health Services Medical Colleges State Medical Association 	<ul style="list-style-type: none"> NPCDCS training manuals 	<ul style="list-style-type: none"> % of different HR trained in CPD management
Integrate CPD management into health system response for emergencies	<ul style="list-style-type: none"> Developing SOPs for management of CPDs during emergency situation/ natural disasters (Annexure - 3) Creation of emergency response team 	First Year	<ul style="list-style-type: none"> State Directorate of Health Services State and District Disaster Management Authorities 	<ul style="list-style-type: none"> WHO guidelines on integration of NCDs into Emergency Response 	<ul style="list-style-type: none"> Availability of SOPS for CPD management in emergency response

Pillar 5: Monitoring and Surveillance					
Monitoring	<ul style="list-style-type: none"> • Develop a monitoring framework with indicators for CPDS • Hold six monthly meetings with all stakeholders to review progress based on identified indicators 	First Six months Throughout	<ul style="list-style-type: none"> • State NCD cell • State Climate Change Cell 	National NCD Monitoring Framework	<ul style="list-style-type: none"> • Regular monitor meetings held
Surveillance	<ul style="list-style-type: none"> • Integrate climate/air quality and CPD surveillance data systems • Provide annual reports on all the three parameters 	Throughout	<ul style="list-style-type: none"> • State NCD cell • State Climate Change Cell • CPCB/IMD 		<ul style="list-style-type: none"> • Annual reports made available • Data on CPDs and climate variables available in public domain

3. Annexures

Annexure – 1: Template for Situation analysis of state level climate resilient health system

Domain	Specific action	Current Status
Leadership and Governance	Climate change and health focal points designated within the health ministry, with specific programme of action and budget allocated.	
	State level strategy on health and climate change is developed	
	State level strategy on health and climate change implemented	
	Responsibilities of various stakeholders are identified by Ministry of Health	
	Health representations in State Climate Action Plan	
	Development of communication strategy for advocacy related climate change and its health impact for capacity building of various stakeholders	
	Forum available for stakeholder engagement	
Health Workforce Development	Conduction of training courses on climate change and health topics targeting health personnel	
	Contingency plans for the deployment of sufficient health personnel in case of acute shocks, such as extreme weather events and outbreaks developed at the relevant level (i.e. state, district).	
Vulnerability Assessment	Assessment and availability of baseline rates, and climate sensitivity of health conditions, allowing selection of priority risks, and continuous monitoring of changing risk conditions and health status	
	Identification of most vulnerable or high risk population in the state	
	Execution of health impact assessment of any mitigation strategy/ plan/ activity	
Health system capacity assessment	Baselines on existing human resources, technical and health service delivery capacity established, with identification of weaknesses.	
	Recommendations made for addressing gaps and building	

	health systems capacity	
Adaptation capacity	Development of plan for prioritization of allocation of resources as per vulnerability assessment	
	Established review mechanism	
Integrated risk monitoring and early warning	Mapping/ tracking of Geographic and seasonal distribution of health risks and outcomes	
	Early warning systems for relevant extreme weather events and climate-sensitive diseases (e.g. heat stress, zoonotic diseases, undernutrition) established.	
Health and climate research	Access to, and linkage of, data on meteorological information, health determinants and outcomes enabled	
	Multidisciplinary research partnerships, knowledge management networks and rosters of local experts established.	
Climate resilient and sustainable technologies and infrastructure	Specifications for siting and construction of health facilities, and energy, water and sanitation provisions revised in line with projected climate risks	
	Training and recommendations for prescription of pharmaceuticals during extreme heat conditions revised.	
	Promotion of new technology in the health system	
Management of environmental determinants of health	Integrated monitoring systems allowing collection and analysis of data on environmental hazards, socioeconomic factors and health outcomes exist	
Climate-informed health programmes	Climate actions identified in the PIP	
Emergency preparedness and management	Mitigation measures to be carried out in the emergency situation in the state are well identified	
	Existence of plan/ strategy for community Participation in case of extreme weather events	
Climate health financing	Budget allocation related to climate actions in the annual PIPs	

Annexure 2 - Roles and Responsibilities of stakeholders

Sr. No	Stakeholder	Task	Roles and actions
1	State Programme Officer (SPO)	Steering/ coordination of climate action plan	Specific actions are mentioned in previous section

2	MOECH State Nodal Officer, NPCDCS	Integration of health action plan with climate action plan	<ul style="list-style-type: none"> • Work closely with SPO (MOECH) for implementation of health related actions. • Training of all health care provider in management of CPD • Ensuring availability of medicines and technologies for management of CPD at health systems • Ensuring guidelines for management of CPD in state • Conduct vulnerability assessment in State in co-ordination with SPO (MOECH) • Ensure availability of IEC material • Co-ordinating advocacy activities with community representatives and policy makers
3	Medical colleges	Provide institutional continuity and scientific rigor	<ul style="list-style-type: none"> • Conduct situation analysis and vulnerability assessment • Conducting operations research/ community based research in climate change and CPD • Conducting capacity building activities
4	Disaster Management Authority	Integration of climate action plan in disaster management plan	<ul style="list-style-type: none"> • Include actions related CPD management in State Disaster management Plan • Vulnerability assessment of State with respect to natural calamity
5	Meteorological Department	Providing Climate data	<ul style="list-style-type: none"> • Sharing climate forecast, alerts with SPO, MOECH, SPO NPCDCS • Contribute in developing climate based early warning system for CPD • Contribute in vulnerability assessment with respect to climatic factors
6	Pollution Control Board	Providing Air quality data	<ul style="list-style-type: none"> • Contribute in vulnerability assessment with respect to air quality • Share alerts with respect to air quality

7	Community Leaders	Ensuring community participation	<ul style="list-style-type: none"> • Carry out community level awareness activities for climate change and its health impacts • Promoting green good deeds for mitigation of impact of climate change
8	Professional organizations	Advocacy with policy makers	<ul style="list-style-type: none"> • Provide scientific content for IEC campaign, programme implementation • Advocacy with policy makers
9	Media – TV, print, Folk, Social Media	Awareness generation in the community	<ul style="list-style-type: none"> • Carry out camping for impact of climate change, mitigation measures in the general community • Publicize climate alerts, air quality alerts in the community • Vigilance on health system for ensuring climate actions
10	District Collector	Starring district level actions	<ul style="list-style-type: none"> • Chairman of District Level Programme steering committee • Ensuring multi-sectoral cordiantion

Annexure 3. List of essential medicines and technologies for implementing essential NCD interventions in primary care

Essential Medicines and Technologies list for management of cardio-pulmonary disorders at

Primary Care level*

Medicines	Technologies
Thiazide diuretic	Thermometer
Calcium channel blocker (amlodipine)	Stethoscope
Beta-blocker	Blood pressure measurement device
Angiotensin converting enzyme inhibitor	Measurement tape
Statin	Weighing machine
Isosorbide dinitrate	Spacers for inhalers
Glyceryl trinitrate	Peak flow meter
Furosemide	Nebulizer
Salbutamol	Pulse oximeter
Ipratropium	Blood cholesterol assay
Amoxicillin	Lipid profile
Hydrocortisone (inj)	Serum creatinine assay
Epinephrine	Troponin test strips
Heparin	Urine microalbuminuria test strips
Diazepam	Electrocardiograph
Magnesium sulphate	Defibrillator
Promethazine	
Dextrose infusion	
Glucose injectable solution	
Prednisolone	
Inhaled Budesonide	
Inhaled Tiotropium	
Aspirin	
Codeine	
Morphine	
Penicillin	
Erythromycin	
Sodium chloride infusion	
Oxygen	
Digoxin tablets/Inj	
Potassium chloride	

Antiarrhythmics

*Adapted from WHO Essential Package of NCD interventions for primary care

Annexure 4: SOPs for management of CPDs during emergency situation

Preparedness phase

1. Identification of priority conditions for inclusion in emergency response.
2. Preparation of pre- emergency profile of NCDs.
3. Assessment of Health Facility Preparedness.
4. Establishment of a health system co-ordination/contingency plan.
5. Ensuring Availability of Essential Medicines and Technologies.
6. Preparation of Individualized Emergency Plans.

Emergency Response Phase

1. Integrating NCDs in Initial Rapid Assessment.
2. Map NCD service provision.
3. Organize NCD services delivery with a focus on primary health care.

Post-emergency phase or in slow-onset emergencies

1. Debrief on lessons learnt from the crises.
2. Strengthen health system response.
3. Strengthen public health response to NCDs.
4. Monitoring and evaluation of Emergency Response to NCDs.