Dr. Anil Kumar

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MEMORANDUM OF UNDERSTANDING

Between

The Bihar State Disaster Management Authority, Patna, Bihar

and

Indian Institute of Public Health Gandhinagar (IIPHG), Gujarat

MEMORANDUM OF UNDERSTANDING

between

The Bihar State Disaster Management Authority, Patna, Bihar

and

The Indian Institute of Public Health Gandhinagar, Gujarat

THIS MEMORANDUM OF UNDERSTANDING (MOU) is executed at Gandhinagar, Gujarat on 05th October 2023 (hereinafter "the Execution Date") by and

BETWEEN

The Bihar State Disaster Management Authority (BSDMA), a statutory body created under the provisions of Disaster Management Act, 2005 passed by the Parliament. Its Head Office is located at Pant Bhawan, Ram Charitra Singh Path, Sri Krishna Puri, Patna, Bihar.

AND

Indian Institute of Public Health Gandhinagar (IIPHG) is India's first Public Health University, having its principal office at Opp. Air Force Head Quarters, Nr. Lekawada Bus Stop, Chiloda Road, Lekawada CRPF P.O Gandhinagar, Gujarat India – 382042. It offers degree and diploma courses in the discipline of Public Health. The institute also offers both On-campus Programs and E-learning Programs along with Training Programs. Many courses have been offered by IIPHG, like Master of Public Health, Master of Hospital Administration, Post Graduate Diploma in Public Health Management etc. IIPHG has now been recognised as ICMR Collaborating Centre of Excellence 2023-28.

BSDMA and **IIPHG** are hereinafter collectively referred to as **"Parties"** and individually as **"Party".**

1. Duration of this MoU:

This MoU will be effective for a period of 06 months from the date of its signing by both parties.

2. Scope of the MoU

BSDMA and **IIPHG** developed this Memorandum of Understanding (MOU) aiming for the following strategies and activities (details as Annexure-1):

5/10/23 5/10/23

1. Use of secondary data for calculating the heat vulnerability index (HVI) for the Bihar state and revising the heat action plan by identifying the higher-risk geographies, updating based on futuristic studies.
2. Interviewing the key personnel for developing the Cold Action Plan strategies and Co-creation (state level) workshops for CAP preparedness and prioritising the implementation of CAP
3. Strengthening inter-department coordination by establishing proper communication channels for the sustainability of HAP & CAP.

Based on the scope of the work, both BSDMA & IIPHG have agreed upon the below-mentioned deliverables.

Deliverables	Items	Timeline
D1	Inception Report	On or before 31st Oct 2023
D2	Draft CAP (English copy)	On or before 31st Dec 2023
D3	HVI mapping of the Bihar State; Revised HAP (Draft and Final)	On or before 31st Jan 2024
D4	Technical Guidebook for CAP capacity building (English copy)	On or before 29th Feb 2024
D5	Final submission of CAP & guidebook (English copy)	On or before 31st Mar 2024

3. Financial involvement

The total proposed amount for this activity is INR 39,60,000 (Thirty-Nine Lakh Sixty Thousand Only) excluding the tax as indicated below-

Item	Unit	Cost (INR)	Total (INR)
Human Resource			
Technical Support (Faculty)	2	50,000	6,00,000
Consultant	1	1,00,000	6,00,000
Research Associate	1	50,000	3,00,000
Travel			
Inter-state	Lumpsum	2,00,000	2,00,000
Intra state	Lumpsum	1,00,000	1,00,000
Upgrading Heat Action Plan (based on futuristic studies & by HVI calculation)	Lumpsum	3,00,000	3,00,000
Cold Action Plan			
CAP Development	Lumpsum	5,00,000	5,00,000
Module Development	Lumpsum	5,00,000	5,00,000
State-Level Workshops	Lumpsum	3,00,000	3,00,000
Report Writing	Lumpsum	2,00,000	2,00,000
Sub-Total			36,00,000
Overhead (10%)			3,60,000
Total (INR) excluding Taxes			**39,60,000**

5/10/23

5/10/23

4. **Financial Disbursement**

The disbursement of the amount of INR 39,60,000 to IIPHG will be based on the terms mentioned below:

a. **First instalment**: 10% of the total amount on submission of the inception report (INR 3,96,000/-) + taxes (Deliverable 1 on or before 31st Oct 2023)
b. **Second instalment**: 30% of the total amount on submission of draft CAP (INR 11,88,000/-) + taxes (Deliverable 2 on or before 31st Dec 2023)
c. **Third instalment**: 20% of the total amount on submission of draft revised HAP with HVI analysis (INR 7,92,000/-) + taxes (Deliverable 3 on or before 31st Jan 2024)
d. **Fourth instalment**: 30% of the total amount on submission of draft guidebook (INR 11,88,000/-) + taxes (Deliverable 4 on or before 29th Feb 2024)
e. **Fifth instalment**: 10% of the total amount on submission of the final guidebook and CAP (INR 3,96,000/-) + taxes (Deliverable 5 on or before 31st Mar 2024)

5. **Termination of MoU**

a) Either Party may terminate this Agreement by giving not less than 30 days' prior written notice to the other Party.

b) At the receipt of notice of termination from either party, the other party shall be liable to work till the termination period only and not beyond that.

c) Termination shall become effective in fifteen (15) working days after receipt of written notice from either party.

6. **Partnership**

Nothing contained in this Agreement shall constitute or be deemed to constitute a partnership between the Parties, and no Party shall hold himself out as an agent for the other Party or any of them, except with the express prior written consent of the other Parties. The rights, duties, obligations and liabilities of **BSDMA,** on the one hand and of **IIPHG,** on the other hand, under this Agreement shall be individual, not joint or collective, unless specifically provided for herein this Agreement.

7. **Conflict of Interest**

Each of **BSDMA** and **IIPHG** warrants that this Agreement is not likely to have any conflict of interest with any of their organizational, financial, contractual or other interests relating to the work under this Agreement.

5/10/23

5/10/23

8. **Resolution of Disputes**

If any disputes or differences arise in connection with this MOU then, the Parties shall negotiate in good faith using their best endeavours to resolve the disputes or differences through mutual discussions.

9. **Governing Law**

This MOU shall be governed by and construed in accordance with the laws of India, and the parties are to submit to the jurisdiction of Courts at Patna only.

5/10/23

5/10/23.

IN WITNESS WHEREOF, BSDMA & IIPHG have caused this Agreement to be executed by their duly authorised officers as of the date first above written.

The Bihar State Disaster Management Authority

Authorised Signatory
Name: Shri Mahendra Kumar
Designation: Secretary, Bihar State Disaster Management Authority, Patna

Witness No. 1

05/10/2023

Name: Dr. Anil Kumar
Designation: Senior Advisor, BSDMA

Witness No. 2

05/10/2023

Name: Dr. Jeevan Kumar
Designation: Project Officer, BSDMA

The Indian Institute of Public Health, Gandhinagar

5/10/2023.

Authorised Signatory
Name: Prof. Deepak Saxena
Designation: Director, IIPHG

Witness No. 1

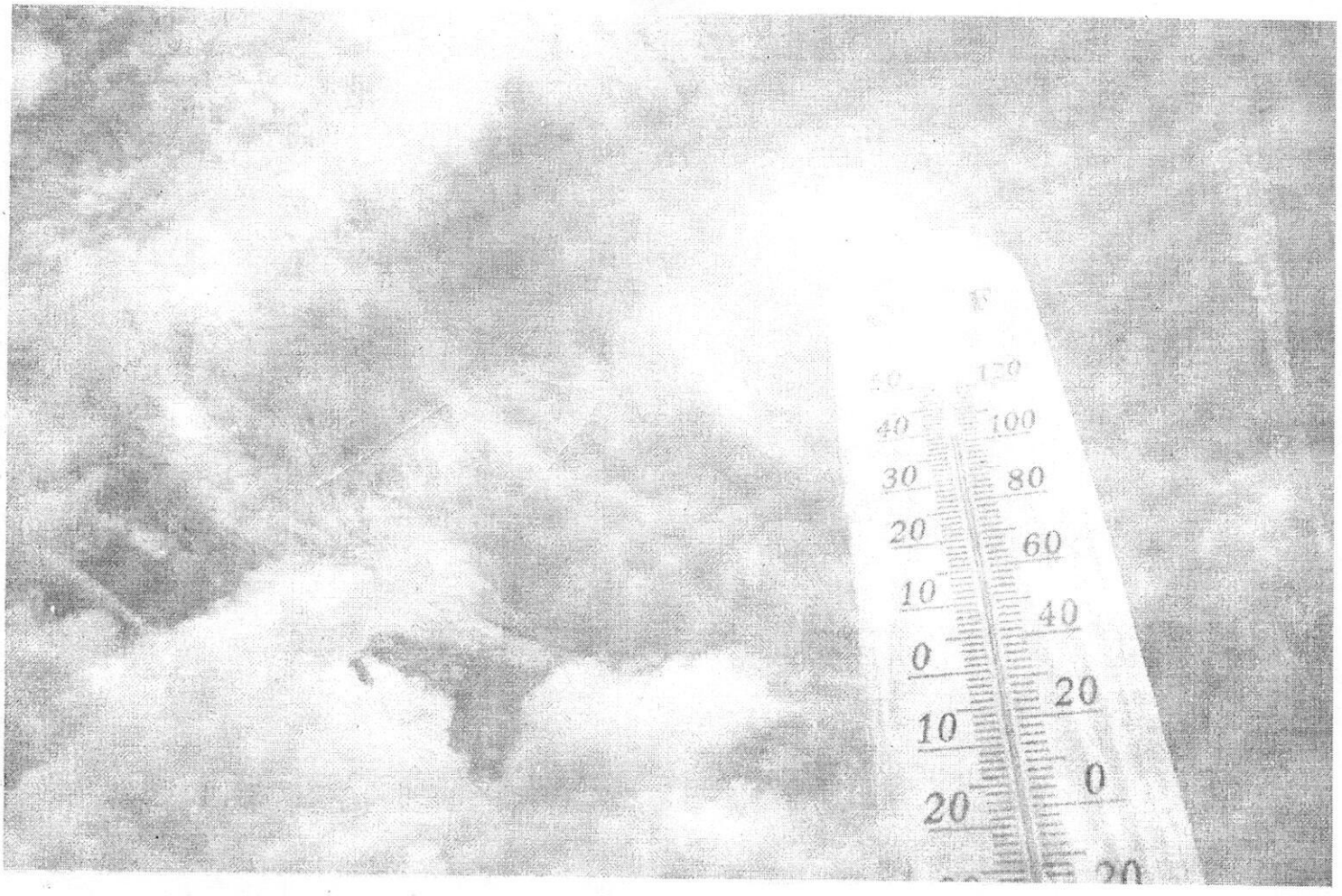
5/10/2023

Name: Prof. Dileep Mavalankar
Designation: Distinguished Professor, IIPHG

Witness No. 2

05/10/23

Name: Dr. S. Yasobant
Designation: Asst. Professor, IIPHG



Proposal

Formulating Cold Action Plan & Upgrading Heat Action Plan Bihar State

Submitted by

Indian Institute of Public Health Gandhinagar

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Introduction

Climate change has a profound and multifaceted impact on human health. It can impact human health in various ways, like rising sea levels, increasing the frequency and intensity of extreme weather events, changing precipitation patterns, and worsening air quality. Increasing frequency and intensity of heat waves and cold waves can significantly impact human health and lead to dangerous health consequences. The extent of these health hazards will be contingent on the effectiveness of public health and safety systems in dealing with or anticipating these evolving dangers, in addition to variables such as individual behaviours, age, gender, and economic circumstances. The consequences will differ depending on a person's geographical location, their susceptibility to health risks, their level of exposure to the effects of climate change, and the adaptability of both the individual and their community[1]. Despite their significant threat to human well-being, heatwaves often do not receive the attention they warrant. Their impact, in terms of casualties and damage, is not always immediately apparent or conspicuous.[2]

The Intergovernmental Panel on Climate Change (IPCC) report has highlighted concerns about the increase in frequency, duration, and intensity of heat waves with the rise in global climate warming. There will be increasing heat waves, longer warm seasons, and shorter cold seasons with a mere 1.5°C global warming[3]. While the focus is often on warming, the IPCC also recognizes that climate change can have complex effects on cold weather events. The Lancet Commission Report on Health and Climate Change (2015) accentuates the range of threats to human health due to changing climatic conditions[4]. Impacts can be direct (e.g., heat waves and extreme weather events such as a storm, forest fire, flood, or drought) or indirect, mediated by the effects of climate change on ecosystems (e.g., agricultural losses and changing patterns of disease), economies, and social structure (e.g., migration and conflict).

Globally, between 2001-2010, over 3,70,000 lives were lost due to extreme weather and climate changes, of which heat waves alone were responsible for the death of 1,36,000 compared to 6000 deaths from heat waves between 1991-2000[5]. Between 1992 and 2015, India has tragically witnessed 22,562 officially documented fatalities attributed to heatwaves.

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[1] Climate Impacts on Human Health | Climate Change Impacts | US EPA (chicago.gov)
[2] Heatwaves (who.int)
[3] Climate change widespread, rapid, and intensifying – IPCC — IPCC
[4] Health and climate change: policy responses to protect public health - The Lancet
[5] heat_wave_18.pdf (nidm.gov.in)

This grim statistic includes the devastating summer of 2015 when more than 2,500 lives were lost in what stands as one of the deadliest heatwaves in India's history, as the National Disaster Management Authority reported in 2016. The total impact of heat wave events on mortality in India could be even much higher as these figures probably refer to reported deaths from heatstroke only and could be a gross underestimate of overall deaths. Morbidities (Illnesses) due to heat waves are not even captured and counted. Sufficient global evidence exists that heat wave early warning systems and adaptation plans have reduced heat wave-related mortalities and morbidities in various parts of the world.

The frequency of several heatwaves has increased drastically in the last 15 years due to climate change, urban heat islands and other factors. As per the India Meteorological Department, India is experiencing a concerning trend of increasingly frequent and severe heatwaves, with temperatures exceeding 40°C. It underscores the pressing necessity to mitigate the effects of extreme heat and adapt to this shifting temperature landscape by integrating it into our long-term planning and monitoring systems.

In 2013, Ahmedabad became the first city in Southeast Asia to implement a heat wave early warning system and preparedness plan, offering an innovative approach to address rising temperatures. This comprehensive framework, tailored to the unique needs of the state, to safeguard communities from the health risks associated with extreme cold and heat by implementing a Cold and heat Action Plan at the state level is replicable and provides opportunities for other states to protect their citizens from the perilous consequences of extreme heat.

Impressed by these results in reductions in mortality, many states and cities have initiated their state's heat health warning system. In 2016, Maharashtra State implemented HAP in their 6 districts, including Nagpur. Similarly, in 2019 Bihar state introduced the Bihar Heat Action Plan. Followed by, Odisha was also implemented in 4 cities, including Bhubaneswar, with their state disaster management. Other states like Telangana and Andhra Pradesh are in the process of launching their Heat Action Plan in the coming years.

Bihar state is a multi-hazard prone state, it has also been moving towards greater disaster resilience. Bihar State Disaster Management Authority (BSDMA), together with the Disaster Management Department of the Government of Bihar, has been taking various initiatives towards awareness generation and capacity building of various stakeholders and also the

affected population. Emphasis of BSDMA has been towards structural and non-structural strengthening of the system to reduce disaster risks and mitigate their impacts. Safety Weeks (Road Safety, Earthquake Safety, Fire Safety & Flood Safety), training of stakeholders, safe school programmes, safe construction guidelines, Free Earthquake Safety Clinic & Centre, wide circulation of IEC materials etc. are some of the important initiatives of the Authority.

The present proposal aims for upgrading the existing heat action plan and develop a comprehensive Cold Action Plan (CAP) tailored to the state of Bihar, considering the state's distinct requirements and diverse characteristics such as geography, demography, socioeconomic factors etc.

Demographic and weather conditions of Bihar

Bihar, situated in the eastern part of India, shares its borders with Nepal to the north and various Indian states, such as Uttar Pradesh to the west, Jharkhand to the south, and West Bengal to the east. With a population exceeding 122 million, Bihar ranks among India's most densely populated states.

The climate in Bihar is characterized by three distinct seasons that define the year's meteorological pattern. First, there is the hot-weather season, which extends from March to mid-June. During this period, temperatures soar, with May being the hottest month. Following the hot-weather season, monsoon sets last from mid-June to October. The winter starts in November and lasts upto February, with January being the the coolest month of the year.

The maximum temperature in Bihar ranges from 42.5°C in the north to 49.5°C in the southwestern regions of the state. Minimum temperature varies between -1.0°C and 3.9°C, with the lowest temperatures typically occurring in the southwest part of the state. The state of Bihar has witnessed its highest recorded maximum temperature at 49.5°C and the lowest minimum temperature at -1.0°C. These extremes were recorded on the 11th of May 1988 and the 18th of January 1977, respectively, at the Dehri observatory in Rohtas district [6].

[6] Microsoft Word - 1 THE CLIMATE OF JHARKHAND.doc (imdpune.gov.in)

Aim

To assist in upgrading the existing Bihar Heat Action Plan and developing a comprehensive Cold Action Plan (CAP) uniquely tailored to address the specific requirements and diverse geographical, demographical characteristics of the state of Bihar.

Objectives

- **Updating the existing Heat Action Plan (HAP)**: Revisiting the Heat Action Plan of the Bihar state, updating based on futuristic studies, prioritizing the high-risk geographies based on the heat vulnerability index.
- **Conceptualizing and developing the Cold Action Plan (CAP):** Formulating the strategies and preventive action for the cold weather and developing the Cold Action Plan for Bihar state.
- **Developing and ensuring a self-sustainable model**: Create a long-term sustainability strategy to ensure that the CAP remains adaptive and responsive to evolving climate conditions and the needs of Bihar's population.

Key Strategies

1. Use of secondary data for calculating the heat vulnerability index (HVI) for the Bihar state and revising the heat action plan by identifying the higher-risk geographies, updating based on futuristic studies.
2. Interviewing the key personnel for developing the Cold Action Plan strategies and Co-creation (state level) workshops for CAP preparedness and prioritising the implementation of CAP
3. Strengthening inter-department coordination by establishing proper communication channels for the sustainability of HAP & CAP.

Proposed Activities

1. **Activity-1: Updating the HAP based on futuristic studies and through HVI calculation**

   Forecasting and issuing alerts to the target group is essential to the health warning system under the heat action plan. However, this alert system differs across

geographies in varied population. Therefore, a Heat Vulnerability Index (HVI) will be calculated using the demographic data, health mortality data and metrological data (see below). Determining the threshold values which will have a morbid effect on people's health is the bedrock of creating the warning system. The district and region-wise heat weather threshold values will be determined through various statistical tests on the mortality, morbidity, hospital admission and daily temperature data obtained from various sources.

2. **Activity-2: Conceptualizing and developing the Cold Action Plan**

Few Key Informant Interviews (KIIs) will be conducted in order to ensure the differential strategies and experiences adopted by various stakeholders in the conceptualisation phase of CAP development. These interviews will ensure the contextual factors and local practices, which are essentially reflected in the proposed CAP strategies.

Following this, team IIPHG will develop the draft CAP, including the strategies and a consultative co-creation workshop at the state level will be executed to validate and finalise the same. This process will be iterated and convened with relevant state authorities to gain insights into the current state-level mechanisms for managing extreme cold spells. The current ongoing strategies/ mode of action, including the mechanisms, will be discussed as the starting point for the workshop. Additionally, the existing mechanism, a comprehensive strategy, will be formulated to enhance the state preparedness and response measures to extreme cold spells as part of the CAP.

3. **Activity-3: Technical Guidebook development for CAP implementation**

To have the state-wide implementation of the CAP, a supportive technical guidebook will be developed by the IIPHG team in the English Language only and will be submitted to BSDMA. This will assist the appropriate authorities in rolling out state-wise capacity building activities pertaining to CAP. The authorities may like to train multidisciplinary teams of workers from various fields to tackle the issues arising from extreme cold waves. Anganwadi (public health care workers), link workers, community health workers, and ASHAs, may be trained to recognize health dangers and offer prevention tips for outreach and community-based tracking for heat illness in slum communities. Medical education department services may also be utilised to train link workers working with groups more vulnerable to extreme cold and heat

weather. IIPHG's scope is only to develop the technical guidebook in the English language and the implementation of CAP relies with appropriate state authority. If needed, IIPHG will provide technical assistance during the same period.

4. **Activity-4: CAP Sustainability Model: Self-sustainable Model through Strengthening inter-department coordination and ensuring timely actions to mitigate heat events.**

   Technical assistance by IIPHG will be provided to establish the formal communication channels among the concerned government agencies, meteorological departments, disaster management authorities, health officials & hospitals, emergency responders, social organizations, non-government organizations, and media agencies to effectively communicate and initiate actions primitively to mitigate extreme cold and heat events in the state of Bihar throughout the agreed period.

Outcomes/ Deliverables with timeline

Deliverables	Items	Timeline
D1	Inception Report	On or before 31st Oct 2023
D2	Draft CAP (English copy)	On or before 31st Dec 2023
D3	HVI mapping of the Bihar State; Revised HAP (Draft and Final)	On or before 31st Jan 2024
D4	Technical Guidebook for CAP capacity building (English copy)	On or before 29th Feb 2024
D5	Final submission of CAP & guidebook (English copy)	On or before 31st Mar 2024

Budget

Item	Unit	Cost (INR)	Total (INR)
Human Resource			
Technical Support (Faculty)	2	50,000	6,00,000
Consultant[$]	1	1,00,000	6,00,000
Research Associate[#]	1	50,000	3,00,000
Travel			
Inter-state	Lumpsum	2,00,000	2,00,000
Intra state	Lumpsum	1,00,000	1,00,000
Upgrading Heat Action Plan (based on futuristic studies & by HVI calculation)	Lumpsum	3,00,000	3,00,000
Cold Action Plan			
CAP Development	Lumpsum	5,00,000	5,00,000
Module Development	Lumpsum	5,00,000	5,00,000
State-Level Workshops	Lumpsum	3,00,000	3,00,000
Report Writing	Lumpsum	2,00,000	2,00,000
Sub-Total			36,00,000
Overhead (10%)			3,60,000
Total (INR) excluding taxes			39,60,000

Human Resource details

[$]Consultant, with a basic qualification of post graduate degree and experience in disaster management or environmental health or climate change or public health will be preferred.

[#]Research Associate, with a basic qualification of post graduate degree in public health or environmental health will be preferred.

Data Requirements

Require data for calculation of CHAP index for Bihar state

Variable	Type of requirements	Duration
Demographic: 1. Elderly 2. Under five 3. Sex ratio	Line listing at the block level	Latest updates as on 2023 (if not Census)
Social class: 1. Schedule caste 2. Schedule tribe	Line listing at the block level	Latest updates as on 2023 (if not Census)
Socioeconomics: 1. Literacy status 2. Workers 3. Wealth quintile	Line listing at the block level	Latest updates as on 2023 (if not Census)
Household Amenities: 1. Drinking water inside the premises 2. Living in a good house 3. Having only mobiles 4. Owning radios 5. Owning TVs	Line listing at the block level	Latest updates as on 2023 (if not Census)
Population Health: 1. Healthcare facility distribution 2. Children (12–23 months) fully immunised 3. Villages having HWC within 3 km	Line listing district-wise/ type of health care facility	Latest updates as on 2023
Land cover: 1. Vegetation fraction 2. Normalised difference vegetation index	Line listing at the block level	Latest updates as on 2023
Metrology factors 1. Temperature records 2. Humidity records 3. PM2.5/PM10 records	Daily Recordings	For the year 2022-23
Health & Mortality Data 1. Registered deaths 2. Health profile	Daily Recordings	For the year 2022-23