National Biomonitoring Programme for Chemical Toxicants
Inception, progress, and way forward

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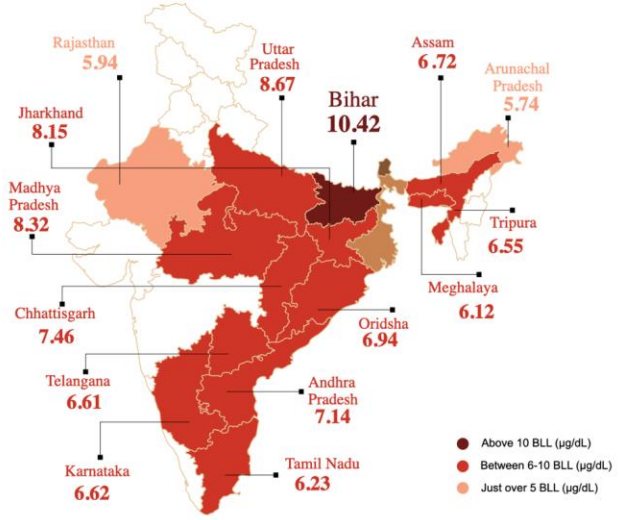
India Country Background

320 locations were identified as high probability of contamination with heavy metals (Cr, Pb, Hg, As, and Cu) and pesticides (MoEF& CC 2015).
Environment Contamination: Industrial activities like smelting, informal battery recycling etc. cause contamination of ground water, soil and air.

Economic Impact: India loses $237 billion (~5% of its GDP) to lead exposure alone due to lower productivity and reduced lifetime earnings

Public Health Challenge India faces significant risks from exposure to heavy metals such as Lead, Arsenic, and Mercury, with over 275 million children affected[1]Causes **1 million cardiovascular deaths** in India annually (2023). [2]

To prevent contamination and exposure, there is a need to expand scope
Global Inspiration- The programme draws from successful biomonitoring programmes of other countries around the world.



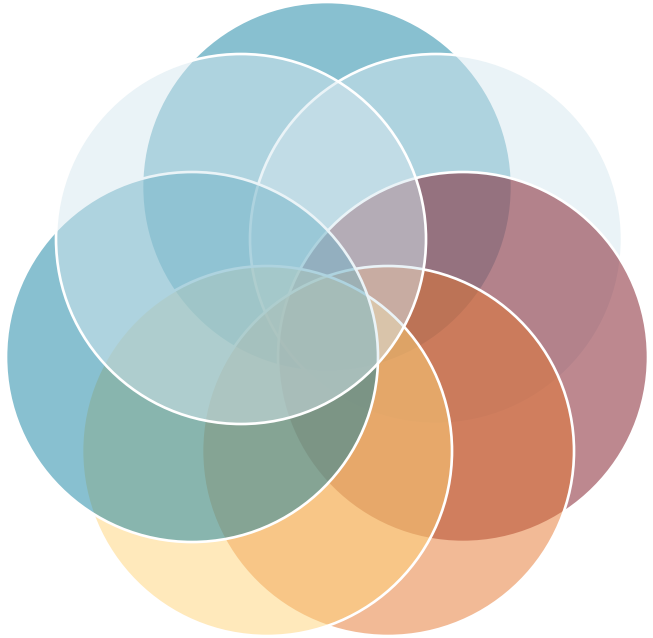
Average blood levels have been found to be **6.2 µg/dl** making India **one of the most lead polluted countries.**[1]

1. 2020 UNICEF and Pure Earth report - The Toxic Truth: Children's Exposure to Lead Pollution Undermines a Generation of Future Potential
2. The Lancet Report 2023

Requires Inter-sectoral Collaboration

Clinicians

International organisations like UNICEF, USAID, WHO etc.



Laboratories

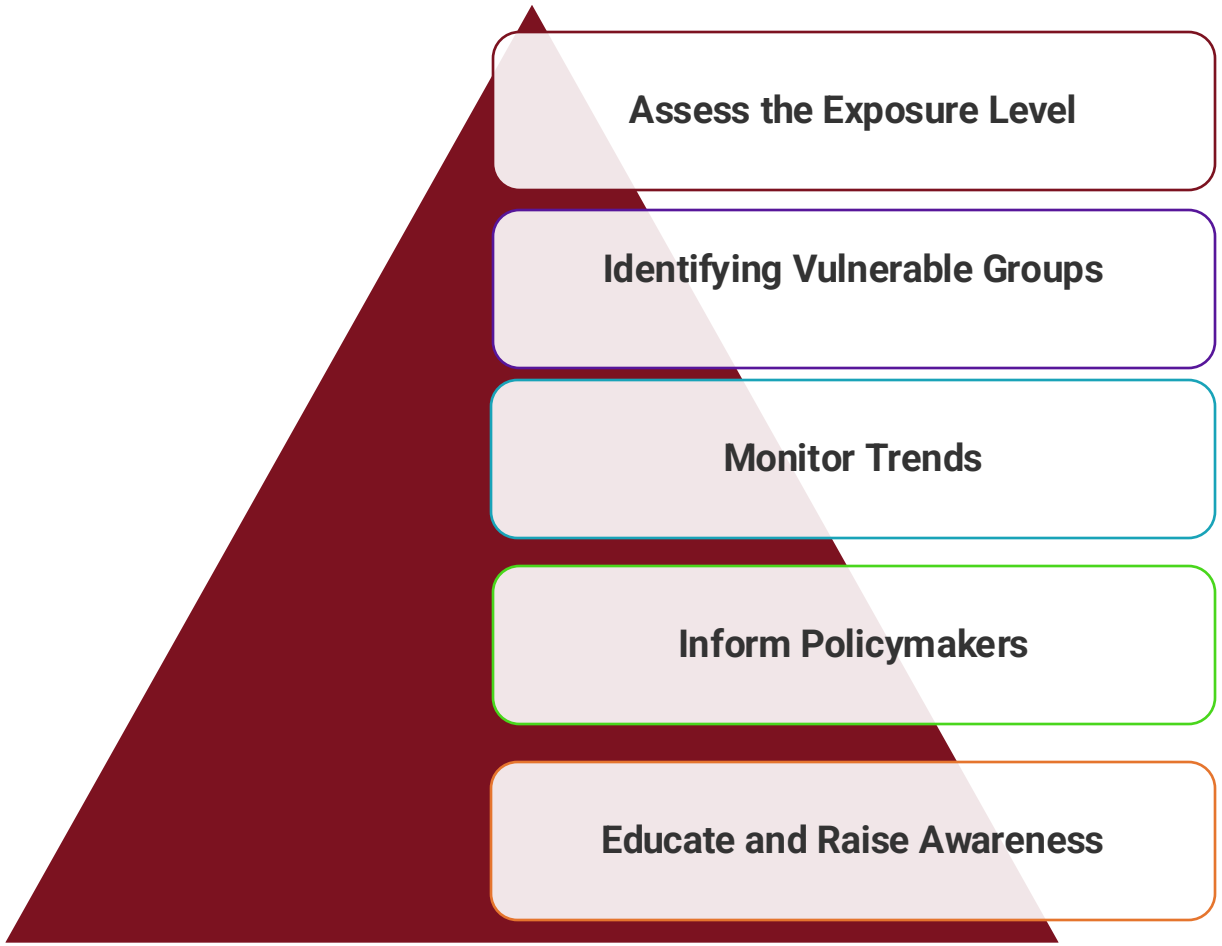
Academic institutes and researchers

Food, drug, water and pollution regulators

NGOs, Civil Society Organisations, Professional bodies

Non Health Ministries- Environment, Mines, Drinking water and sanitation, Commerce and Industry, Chemicals and fertilizers etc.

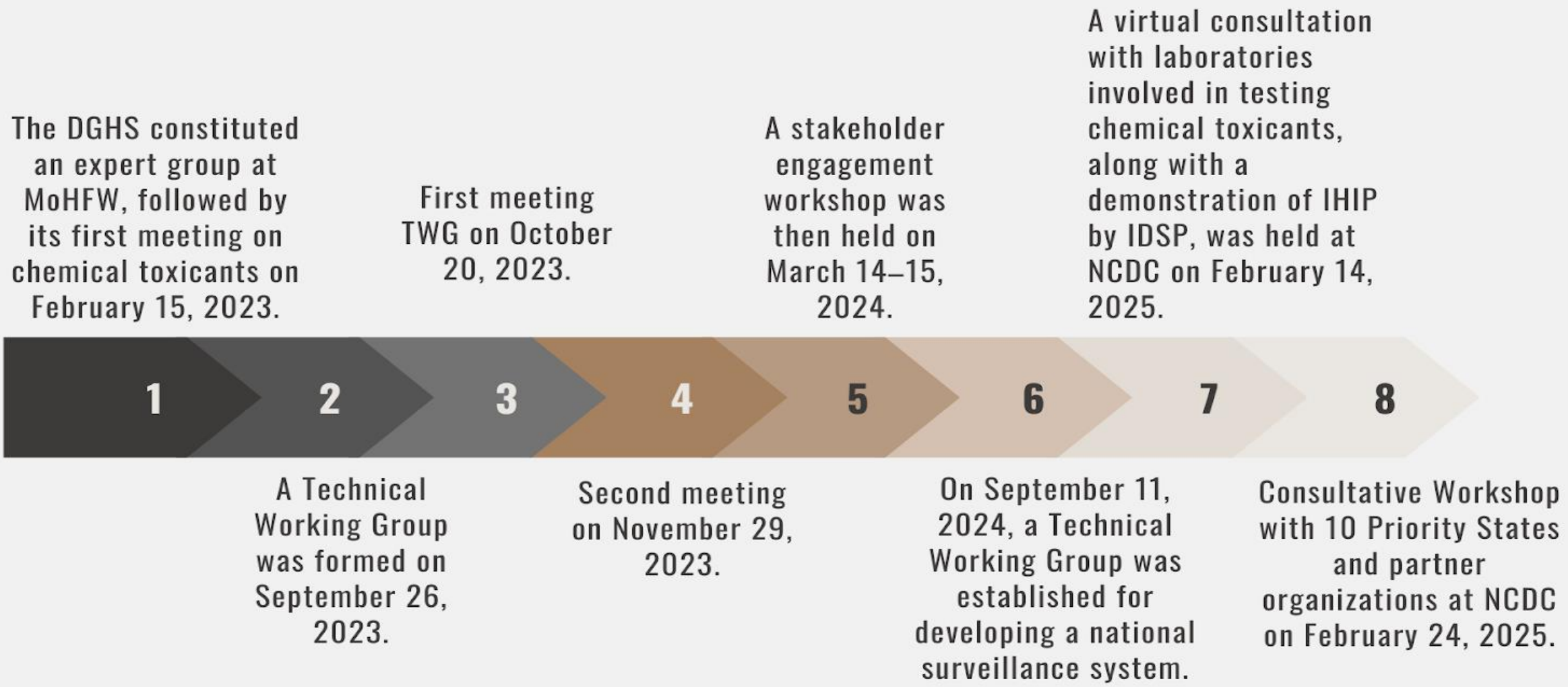
National Biomonitoring Programme for Chemical Toxicants



The **Technical Working Group** under the Ministry of Health and Family Welfare (MoHFW), proposed in 2023:

- Chemical toxicants to be prioritized
- A **National Biomonitoring Programme for Chemical Toxicants**
- Establishment of a **National Surveillance System** to assess and report exposure to environmental chemicals, including heavy metals

Progress on Program



Chemical Toxicants being considered for the Program

Lead	Arsenic	Mercury	Polychlorinated Biphenyls (PCBs)	Columbium
Pesticides	Benzene	Chromium	PFAS (Per and Poly Fluoro Alkyl Substances)	Lithium
Microplastics	Cadmium	Phthalates	Magnesium	Beryllium
Asbestos	Selenium	Manganese	Dioxins and dioxin-like substances	Aluminium
Titanium	Zinc	Uranium	Cobalt	Barium
Vanadium	Antimony	Nickel	Thalium	Iron

Any other chemical toxicants with a significant impact on health; pesticides and insecticides

Learnings from Stakeholder Workshops

Key Insights from Stakeholder Workshop (62 participants from government ministries, medical colleges and NGOs)

- **Strengthen surveillance and monitoring**, especially for lead and other chemical toxicants in high-risk groups such as children and pregnant women.
- **Enhance capacity building** by upgrading laboratory infrastructure, adopting advanced technologies, and developing training modules for healthcare professionals.
- **Intensify risk communication and community engagement** through public awareness campaigns and targeted behavior change interventions.
- **Implement stronger policies and regulations** to control chemical contamination, focusing on informal recycling sectors and consumer products.
- **Promote cross-sectoral collaboration and data integration** among government, academia, research institutions, and international bodies to share best practices and resources effectively.

First consultative workshop- March 2024

Second consultative workshop- February 2025

Strategic Priorities

1. Knowledge Management and Information Sharing

2. Establish Surveillance

3. Build Capacity

4. Risk Communication and Community Engagement

5. Research and Development

6. Establish Institutional Mechanisms

7. Collaborate with Sectors and Partners

Action Tracks and Activities envisioned under the programme

Action track	Activities	On-going	Mid term	Long term
1	**Knowledge Management and Information Sharing Responsible organisation/s**: NCDC			
1.1	Establish Technical Working Group responsible for developing a repository of chemical toxicants by pooling data from various sources.	✓		
1.2	Develop a **repository** of existing resources and information related to chemical toxicants in India.	✓		
1.3	The collaborative group to conduct or foster research and compile information as an input to the assessments or **horizon scanning.**		✓	
1.4	Map institutions and ongoing activities being undertaken for identification and estimation of chemical toxicants in various specimens (biological and environmental).	✓		
1.5	Develop SOPs for collation of data from various sources and integration with Integrated Health Information Platform.		✓	
1.6	Map high-risk regions for exposure to chemical toxicants.		✓	
2	**Establish Surveillance:** Establish a national-level bio-monitoring programme/ surveillance system for various chemical toxicants in India **Responsible organisation/s**: NCDC, NFHS			
2.1	Establish technical working group for setting up surveillance for chemical toxicants in India (*Lead surveillance to be taken up as first step*).		✓	
2.2	Establish surveillance mechanisms for estimation of chemical toxicants (especially elevated Blood Lead Level) in children, pregnant women, and high-risk occupational groups.		✓	
2.3	Establish surveillance mechanisms for estimation of chemical toxicants (including heavy metals, pesticides and microplastics) in biological and environmental reservoirs.			✓
2.4	Develop special surveillance module on Integrated Health Information Platform for chemical toxicants (*focus on Lead and heavy metals which are currently under testing*).		✓	
2.5	Develop SOPs for screening of chemical toxicants using field-based devices.		✓	

Action Tracks and Activities envisioned under the programme

Action track	Activities	On-going	Mid term	Long term
3	**Build capacity:** **Augment laboratory and workforce capacity to prevent, detect and respond to various health issues caused by chemical toxicants** **Responsible organisation/s: MoHFW**			
3.1	Constitute a technical working group for augmentation of laboratory capacity for estimation of heavy metals and other chemical toxicants.		✓	
3.2	Augment the capacities of regional laboratories for comprehensive testing of heavy metals and other chemical toxicants.			✓
3.3	Enhance the capacity for heavy metal estimation at tertiary hospitals by linking ICP-MS facilities from the existing laboratory network.		✓	
3.4	Develop SOPs for sample preparation and establish indigenous matrix standards.		✓	
3.5	Develop training modules for healthcare workers, laboratory professionals and policy makers.		✓	
3.6	Develop SOPs for strengthening poison information centres (visit to Thailand Poison Centres may be planned).		✓	
3.7	Invest in advanced technologies and methodologies for more accurate and efficient heavy metal analysis.	✓		
4	**Risk communication and community engagement:** **Carry out targeted risk communication activities for prevention of exposure to chemical toxicants** **Responsible organisation/s: NCDC, CHEB, CPCB and SPCB, NGOs**			
4.1	Conduct awareness and behaviour change communication activities for general public regarding: • Lead and other heavy metal intoxication • Microplastics • PFAS		✓	
4.2	Conduct awareness and behaviour change communication activities for high-risk groups such as children, pregnant women, workers occupationally exposed to chemical toxicants (*utilize provisions under Corporate Social Responsibility*).		✓	
4.3	Conduct community engagement activities among the battery manufacturers and recyclers to raise awareness regarding battery waste management rules 2022. (*utilize provisions under Corporate Social Responsibility*)		✓	

Action Tracks and Activities envisioned under the programme

Action track	Activities	On-going	Mid term	Long term
4	**Risk communication and community engagement:** **Carry out targeted risk communication activities for prevention of exposure to chemical toxicants** **Responsible organisation/s: NCDC, CHEB, CPCB and SPCB, NGOs**			
4.4	Advocate for prevention of heavy metal pollution with stakeholders: • Promote pollution controlling equipment and processes (novel smelting practices) by Lead recyclers. • Promote adoption of non-Lead composites in paint production. • Encourage investment in Lead-free infrastructure. • Boost Extended Producer Responsibility (EPR) programs. • Recommend policy reforms and stricter regulations for industries involved in production of Lead-containing products.	✓		
4.5	Promote customised agricultural practices and diversification of crops to minimise contamination pathways.	✓		
4.6	Advocate for investment in technologies for monitoring and data analysis to bolster ability of stakeholders to address environmental challenges arising from chemical toxicants.	✓		
4.7	Advocate for remediation of groundwater and food chain pollution with microplastics.	✓		
4.8	Promote investment in development of PFAS alternatives.	✓		
5	**Research & Development:** **Conduct clinico-epidemiological and implementational research pertaining to chemical toxicants** **Responsible organisation/s: NCDC, ICMR-NIN, ICMR-NIOH, AcSIR and academic institutions**			
5.1	Constitute a technical working group to prioritize and oversee research activities in the field of chemical toxicants.		✓	
5.2	Conduct a desk review to prioritize biomarkers for assessment of chemical contamination.		✓	
5.3	Conduct **clinico-epidemiological research** to build evidence on exposure and impact of chemical toxicants on human populations: • Identify sources of Lead exposure in the community and high-risk occupation groups. • Identify long-term effects of heavy metal exposure on humans.		✓	
5.4	Conduct implementation research to understand the most effective methods to prevent and mitigate effects of chemical toxicants: • Challenges in implementation of legislation for minimizing heavy metal exposure in formal and informal recycling industries. • Challenges in setting up air quality parameters for smelting operations.		✓	

Action Tracks and Activities envisioned under the programme

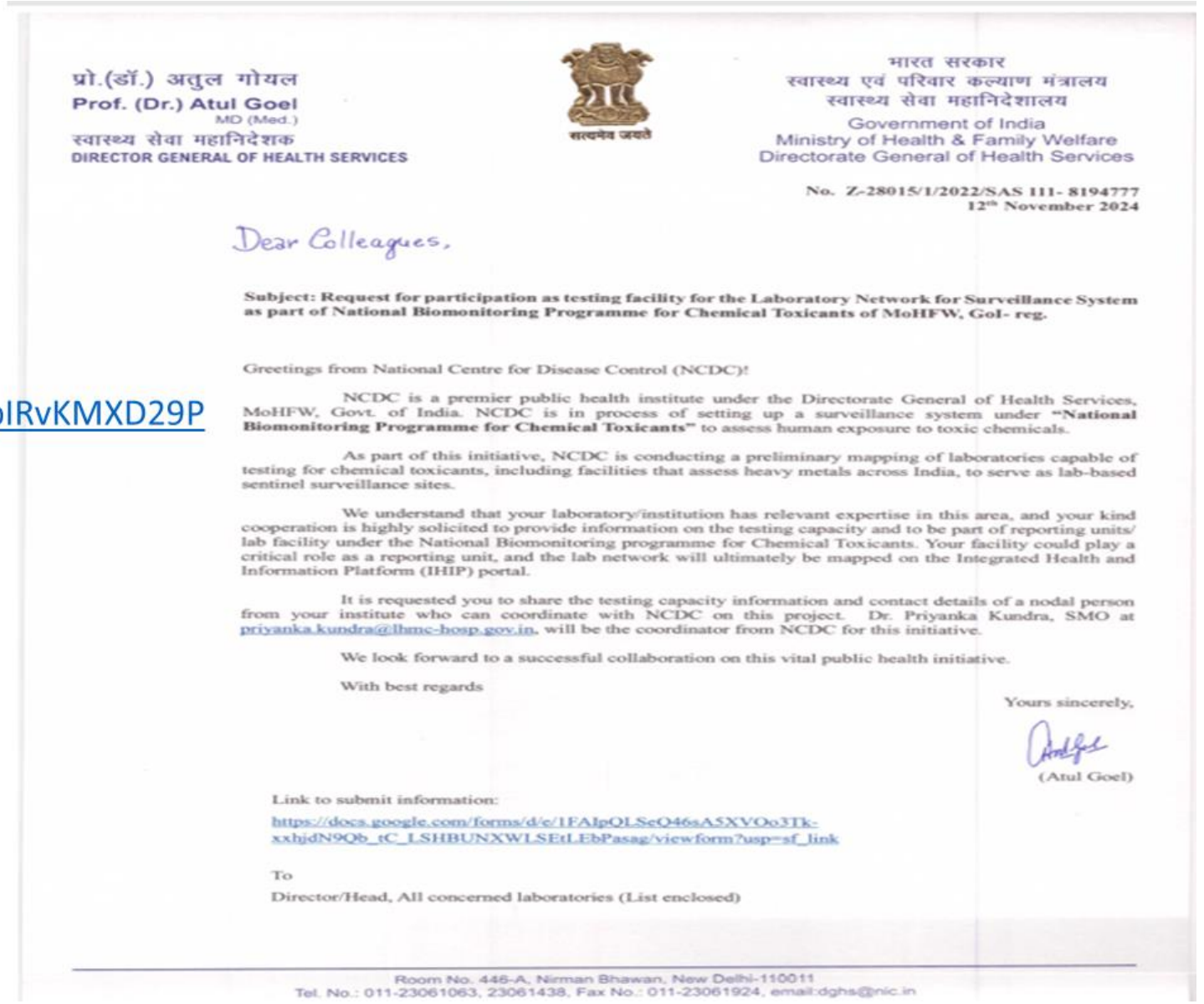
Action track	Activities	On-going	Mid term	Long term
6	**Establish institutional mechanisms:** **Develop policies for the prevention and management of chemical toxicants in India** **Responsible organisation/s: MoHFW, MoLE, MoMSME, MoEFCC, MoRTH, MoHIPE, MoT, MoA, MoFPI, MoJS, MoWR, MoCF, MoCI, NDMA, CPCB, CGWB, DPIIT**			
6.1	Propose draft policies to minimize and regulate the use of chemical toxicants (including heavy metals) in paints and dyes, firecrackers, toys, textiles, cookware, potteries, cosmetics, food, medicine and other commercial products. AND Implement stringent enforcement mechanisms, including inspections and penalties for non-compliance.			✓
6.2	Propose amendment in existing laws and policies for stringent regulation of electronics and battery recycling industries (including unorganised sector) to prevent environmental contamination.	✓		
6.3	Develop mechanisms for collection, recycling and environmentally safe disposal of household, commercial and industrial scraps contaminated with chemical toxicants.			✓
6.4	Define acceptable levels of heavy metal and microplastics contamination under national drinking water quality standards.		✓	
6.5	Abolish sale of toxic chemicals to unauthorized individuals		✓	
6.6	Enhance hospital-based preparedness for management of chemical disasters: • Develop decontamination zones in identified healthcare institutions. • SOPs and mock drills to prepare for disaster events.		✓	
6.7	Include antidotes and chelating agents for heavy metal toxicants in national essential drug list.		✓	
7	**Collaborate with sectors:** **Foster international, multi-sectoral and inter-disciplinary collaborations to consolidate the efforts of various organizations working to reduce health impacts of chemical toxicants** **Responsible organisation/s: All concerned stakeholders with NCDC, MoHFW**			
7.1	Initiate dialogues with academic institutions, research organisations, professional societies and government bodies to collaborate for research, testing and training activities.	✓		
7.2	Develop mechanisms to collate data pertaining to chemical toxicants from various sources.			✓
7.3	Establish channels for dissemination of best practices in the field at national and international level.		✓	
7.4	Dissemination of information among collaborators, Central and State Governments and general public.			✓

Request for Participation in National Biomonitoring Program

A letter from DGHS, Prof. Dr. Atul Goel, was sent to laboratories requesting their participation as testing facilities for the laboratory network for the surveillance system under the National Biomonitoring Programme for Chemical Toxicants by the Ministry of Health and Family Welfare (MoHFW), Government of India.

A Google link was distributed to all potential participants to capture interest and details for joining the testing network.

https://docs.google.com/forms/d/1a8Cv30TxFktiopIRvKMXD29PnGRLzB30zCtuLbtQoKI/edit



प्रो.(डॉ.) अतुल गोयल
Prof. (Dr.) Atul Goel
MD (Med.)
स्वास्थ्य सेवा महानिदेशक
DIRECTOR GENERAL OF HEALTH SERVICES

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
स्वास्थ्य सेवा महानिदेशालय
Government of India
Ministry of Health & Family Welfare
Directorate General of Health Services

No. Z-28015/1/2022/SAS III- 8194777
12th November 2024

Dear Colleagues,

Subject: Request for participation as testing facility for the Laboratory Network for Surveillance System as part of National Biomonitoring Programme for Chemical Toxicants of MoHFW, GoI- reg.

Greetings from National Centre for Disease Control (NCDC)!

NCDC is a premier public health institute under the Directorate General of Health Services, MoHFW, Govt. of India. NCDC is in process of setting up a surveillance system under **"National Biomonitoring Programme for Chemical Toxicants"** to assess human exposure to toxic chemicals.

As part of this initiative, NCDC is conducting a preliminary mapping of laboratories capable of testing for chemical toxicants, including facilities that assess heavy metals across India, to serve as lab-based sentinel surveillance sites.

We understand that your laboratory/institution has relevant expertise in this area, and your kind cooperation is highly solicited to provide information on the testing capacity and to be part of reporting units/ lab facility under the National Biomonitoring programme for Chemical Toxicants. Your facility could play a critical role as a reporting unit, and the lab network will ultimately be mapped on the Integrated Health and Information Platform (IHIP) portal.

It is requested you to share the testing capacity information and contact details of a nodal person from your institute who can coordinate with NCDC on this project. Dr. Priyanka Kundra, SMO at priyanka.kundra@lhmc-hosp.gov.in, will be the coordinator from NCDC for this initiative.

We look forward to a successful collaboration on this vital public health initiative.

With best regards

Yours sincerely,

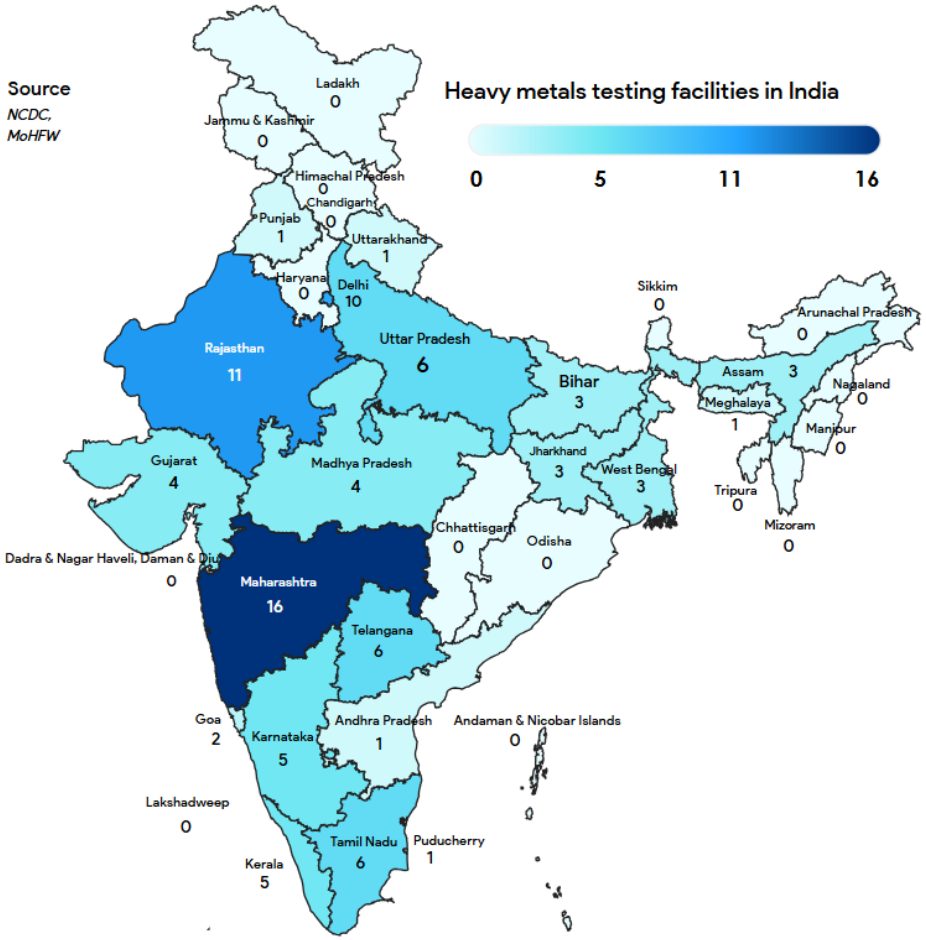
(Atul Goel)

Link to submit information:
https://docs.google.com/forms/d/e/1FAIpQLSeQ46sA5XVOo3Tk-xxhjdN9Qb_tC_LSHBUNXWLSEtLEbPasag/viewform?usp=sf_link

To
Director/Head, All concerned laboratories (List enclosed)

Room No. 446-A, Nirman Bhawan, New Delhi-110011
Tel. No.: 011-23061063, 23061438, Fax No.: 011-23061924, email:dghs@nic.in

92 Laboratories/Testing Facilities mapped across India



[Geotagged Map of Labs with Chemical Toxicants Testing]

Consultative Workshop

on

National Biomonitoring Programme for Chemical Toxicants

24 February 2025

National Centre for Disease Control
Directorate General of Health Services,
Ministry of Health and Family Welfare
22,Sham Nath Marg, Delhi- 110054

Table of Contents

National Biomonitoring Programme on Chemical Toxicants

Strengths

- Technical Expertise (ICMR, Medical Colleges, Development Partners)
- Ownership at the highest level of MoHFW
- Platform for intersectoral coordination
- Existing capacities under IHR, DRR and IDSP's IHIP

Weakness

- Infrastructure and logistics for wider testing
- Lack of affordable, indigenous point of care tests
- Institutional Structures and mechanisms
- Skilled workforce

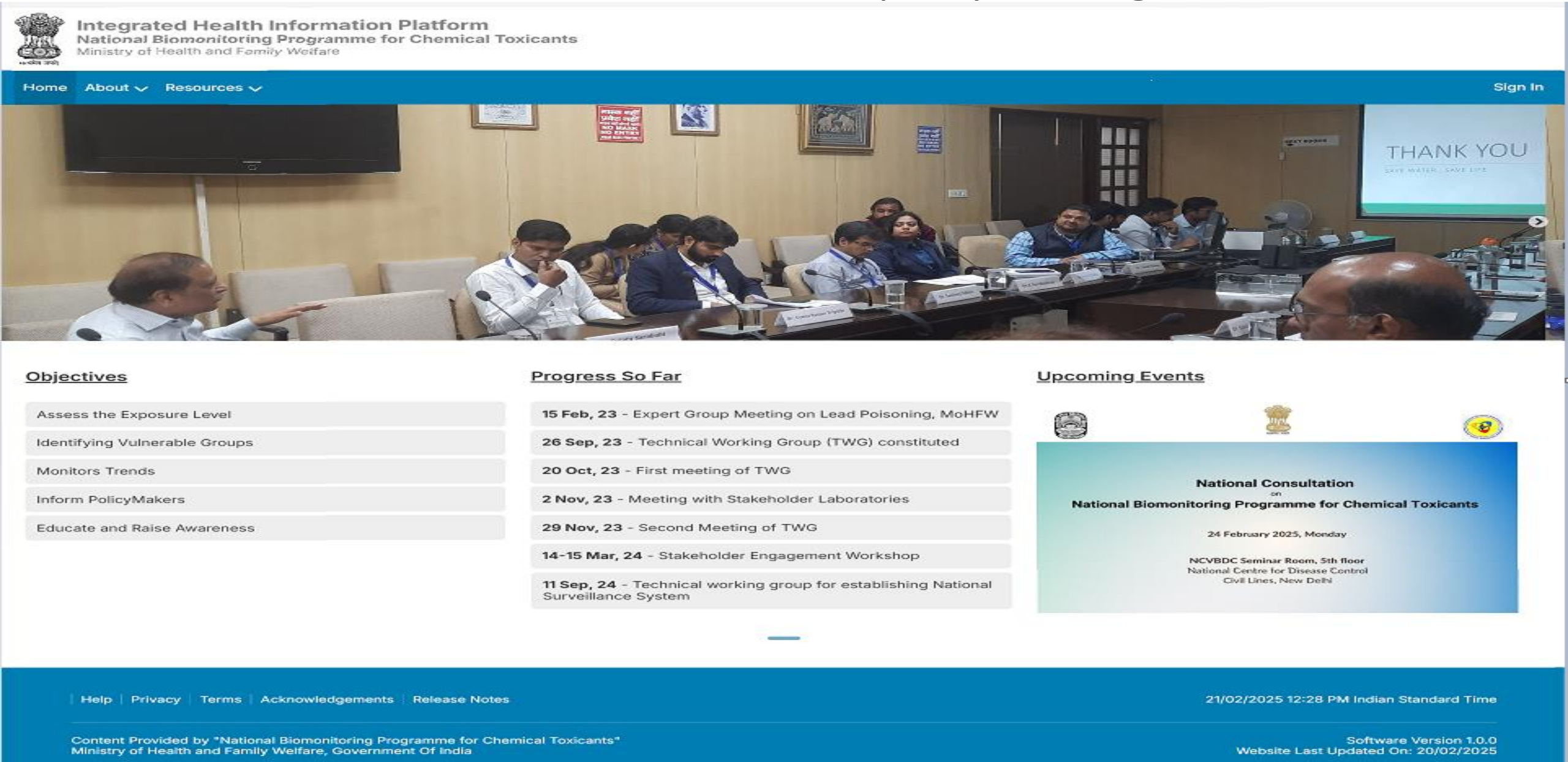
Opportunity

- Develop and showcase successful state level models
- Establish India as leader for Global South
- Review, formulate and strengthen implementation of relevant regulations

Threats

- Financial resources
- Siloed actions and hesitancy in knowledge and data sharing
- Other competing priorities
- Lack of accountability of associated institutions

National Biomonitoring Programme for Chemical Toxicants module on IHIP- For Data collection and capacity building



Laboratory form for National Biomonitoring Programme on Chemical Toxicants

Section 1: Demographic details

1. Participant name: Father's name: Mother's name:
2. If the participant is below 18 years of age, mention Guardian's name:
3. Participant's Date of Birth: ___/___/___ Sex: M/F/O:
4. Religion: Hindu/Muslim/Christian/Buddhist/Other:
5. Village/Mohalla: House No: Setting: Urban/Rural
6. Block: District: State:
7. Contact Number:
8. Does your household have a BPL card: Yes/No
9. Reason for testing: Screening/Symptomatic/Self-referral/Project mode
10. Occupation: Battery industry/paint industry/rubber industry/recycling sites for metals, electronics, automobile parts/cement industry (as per NIOSH, OSHA, USCG and EPA guidelines)
11. If referred by Hospital: Name of hospital: Contact details of the hospital
12. If Collected in projected mode: Name of project: Name of Institution leading the project:
13. Fasting requirement (Patient should avoid eating seafood at least 3 days prior to specimen collection): Yes/No

Section 2: Biological samples

Type of sample collected	Date collected	Date sent to the Lab	Date of Result	Name of toxic chemical tested*	Type of test done**	Unit
Blood Venipuncture/Cord/Finger prick/heel prick	___/___/___	___/___/___	___/___/___			micrograms/mL)
Urine	___/___/___	___/___/___	___/___/___			micrograms/mL)
Hair	___/___/___	___/___/___	___/___/___			micrograms/ml)
Nail	___/___/___	___/___/___	___/___/___			micrograms/ml)
Tissue	___/___/___	___/___/___	___/___/___			micrograms/ml)
Other	___/___/___	___/___/___	___/___/___			

Place of sample collection: In the lab or transported to the lab from a collection centre

Section 3: Environmental Sampling

Material Type	No. of samples collected	Short description of the source of sample	Date of collection	Name of toxic chemical tested*	Type of Test done**	Date of result	Heavy metal Concentration
Water							
Soil							
Paint							
Food particle							
Others:							
Others:							

Multiple options- Lead, Arsenic, Cadmium, Chromium, Mercury, Asbestos, Benzene, Fluoride, Pesticides, Pthalates, Volatile Organic Compounds, dioxins, formaldehyde, PCBs, PAHs, and furans. (Specify)

Multiple options against each chemical- AAS, GFAAS, ICP-MS, ICP-OES, DP-ASV, ISE for Fluoride, Any other

Learning Module for Surveillance under Biomonitoring Programme on IHIP

- Access the surveillance module using the following link: https://ihiplearning.in/bpct/#/home-page
- At present, the module has a 4-level user access; login credentials of the same are shared below for your reference.
  - Field User name - bpctfac001
  - Lab User Name - bpctlab001
  - State User Name - bpcts2901
  - Central User Name – bpctn001
  - *For user password kindly write at* biomonitoringindia@gmail.com

Thank you