

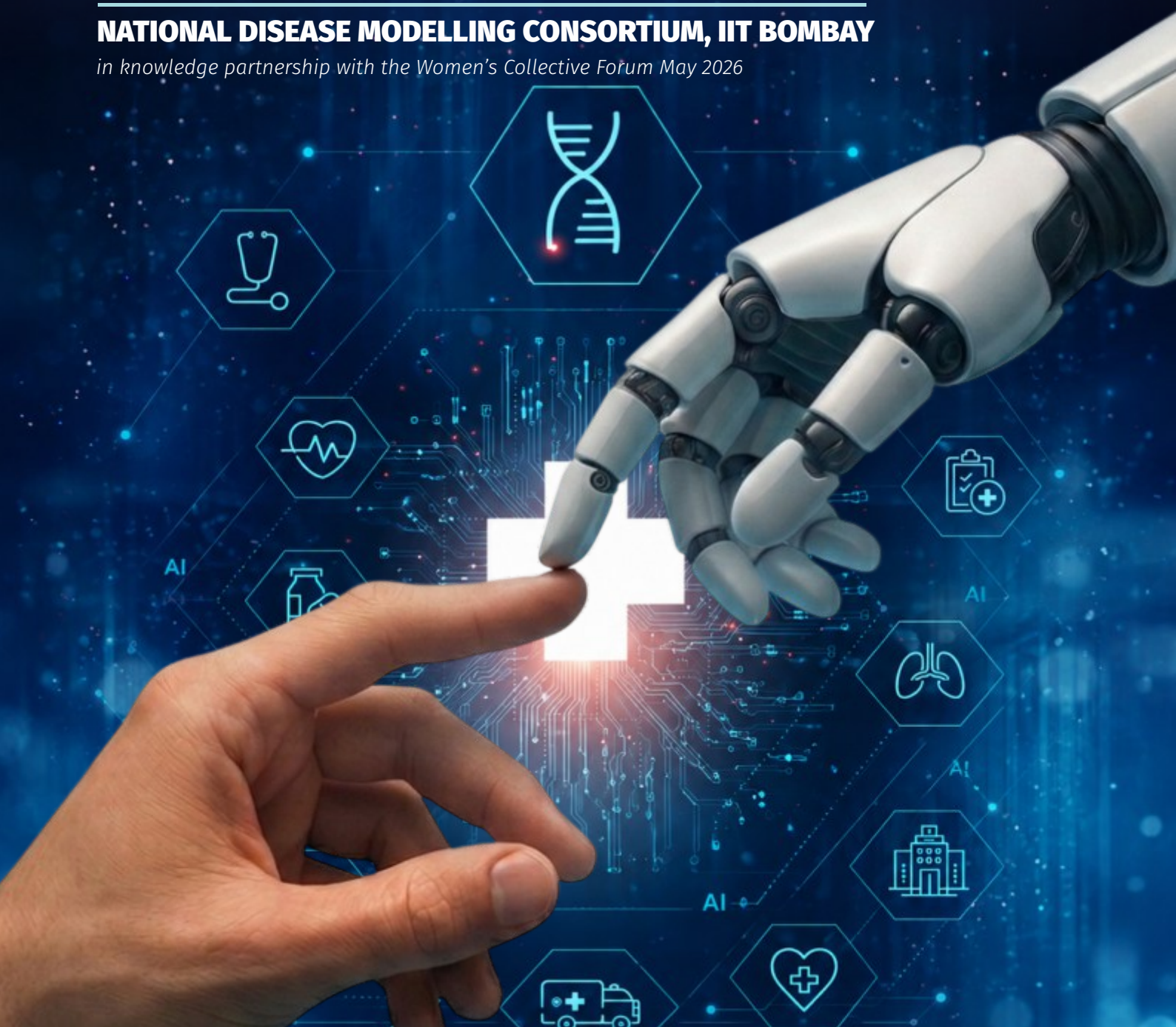
TECHNOLOGY_{for} HEALTHCARE

INDIA'S MANTRA FOR UNIVERSAL HEALTH COVERAGE

*A synthesis of six national stakeholder consultations on the role of
digital technology and artificial intelligence in advancing Universal Health Coverage*

NATIONAL DISEASE MODELLING CONSORTIUM, IIT BOMBAY

in knowledge partnership with the Women's Collective Forum May 2026



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Foreword

A nation's commitment to its people is measured, finally, at the point of care — in whether a woman in a remote district receives a timely diagnosis, whether a child in a hard-to-reach village is reached by the vaccine meant for her, and whether the most vulnerable are spared the impossible choice between treatment and financial ruin. Universal Health Coverage is the promise that this commitment will be kept for every citizen, without exception and without hardship. It is among the defining aspirations of our time, and India has placed itself firmly on the path toward it.



The question before us is no longer whether that promise is worth making, but how it is to be kept at the scale of a continent. It is here that technology becomes decisive. India has demonstrated, in domain after domain, that digital public infrastructure can carry the benefits of the state to a billion people with a speed and reach the world had thought impossible. The same conviction must now be brought to health — to ensure that the instruments of modern medicine, from AI-enabled screening to interoperable health records, serve not only those who live near a city or a specialist, but every woman and every family, wherever they are.

It was with this conviction that the Women's Collective Forum identified the role of technology in advancing Universal Health Coverage as a priority for national deliberation, and sought a knowledge partnership with institutions equal to the task. The collaboration with the National Disease Modelling Consortium at IIT Bombay, and with the network of distinguished research institutions that joined this effort, reflects a deliberate choice: that the answers to India's health challenges must be drawn from India's own scientific and academic excellence, grounded in the realities of our diverse states and regions.

This report is the product of that partnership. Across consultations spanning neglected tropical diseases, vector-borne and vaccine-preventable diseases, women's and child health, and the rising burden of non-communicable disease, it brings together the considered judgment of those who work closest to these problems. Its conclusion is one I welcome: that India already possesses, in working form, much of the technology that Universal Health Coverage requires, and that the task ahead is to connect, govern and scale these capabilities with purpose and equity.

I am particularly heartened that the question of women's health runs through every chapter of this report rather than standing apart from it. The health of women is not a sector of the health system; it is the measure of its conscience and the foundation of family and national wellbeing. A health system that reaches women reaches everyone.

I commend the National Disease Modelling Consortium, the partner institutions, and every expert who lent their insight to this work. It is my hope that this report serves not as a record of deliberation but as an instrument of action — a contribution to the larger national endeavour of building a healthcare system that is equitable, resilient, and worthy of the people it serves.

Ms. Smriti Z. Irani

Founder & Chairperson

The Alliance for Global Good: Gender Equity & Equality

Advisor – Women's Collective Forum

Foreword

India stands at a pivotal moment in its journey towards Universal Health Coverage. Over the past decade, the country has made investments in public health infrastructure, digital platforms, disease surveillance systems, and healthcare innovation. From the Ayushman Bharat Digital Mission to advances in diagnostics, disease modelling, and telemedicine, India has demonstrated that technology can play a transformative role in strengthening health systems and expanding access to care. Yet the question before us is no longer whether technology can contribute to healthcare improvement, but how it can be deployed responsibly, equitably, and at scale to deliver meaningful health outcomes for all.



The National Disease Modelling Consortium (NDMC) was established with the vision of bringing together expertise from across disciplines to support evidence-informed decision-making in public health. We believe that effective health policy must be informed not only by data and scientific evidence but also by the experiences of practitioners, programme managers, innovators, and communities. It was in this spirit that NDMC, in partnership with the Women's Collective Forum, convened a series of national stakeholder consultations under the theme Technology for Healthcare: India's Mantra for Universal Health Coverage.

Between January 2025 and March 2026, six consultations were organised across different regions of the country, bringing together experts from government, academia, healthcare institutions, industry, and civil society. The consultations focused on neglected tropical diseases, digital health and data science, vaccine-preventable diseases, vector-borne diseases, women's and child health, and digital health and artificial intelligence for non-communicable diseases. While each consultation addressed distinct challenges and opportunities, a remarkable convergence emerged across discussions.

Participants consistently highlighted that India already possesses many of the technological building blocks required to strengthen healthcare delivery. Digital public infrastructure, AI-enabled diagnostics, advanced surveillance systems, innovative vaccines, disease modelling platforms, and frontline digital tools are no longer aspirational concepts; many are already demonstrating impact in real-world settings. The challenge now lies in creating the institutional conditions that enable these innovations to function as an integrated system rather than as isolated successes.

A recurring message throughout the consultations was that technology alone cannot achieve Universal Health Coverage. Sustainable progress requires interoperability, trusted data governance, ethical and accountable use of artificial intelligence, workforce readiness, strong public-private collaboration, and a steadfast commitment to equity. Technologies that fail to reach underserved populations, support frontline workers, or integrate into existing health systems will struggle to realise their full potential, regardless of their technical sophistication.

This report captures the insights, recommendations, and collective wisdom generated through these consultations. More importantly, it seeks to contribute to a broader national conversation about how India can harness technology not merely to digitise healthcare, but to strengthen healthcare systems themselves. The recommendations presented herein are intended to support policymakers, researchers, healthcare providers, innovators, and development partners as they work towards a common objective: ensuring that every individual has access to quality healthcare without financial hardship.

I extend my sincere gratitude to the Women's Collective Forum for its partnership and vision, to our host institutions and collaborators across the country, and to the distinguished experts who generously shared their knowledge and experience. Their contributions have enriched this dialogue and strengthened the evidence base for future action.

As India advances towards the goal of Universal Health Coverage, technology will undoubtedly remain a powerful enabler. However, its true value will be measured not by the sophistication of the tools we develop, but by our ability to translate innovation into better health, greater equity, and improved quality of life for all citizens.

Prof. Siuli Mukhopadhyay

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Abbreviations

ABDM	Ayushman Bharat Digital Mission
AI / ML	Artificial Intelligence / Machine Learning
AMR	Antimicrobial Resistance
ASHA	Accredited Social Health Activist
CDSCO	Central Drugs Standard Control Organisation
eVIN	Electronic Vaccine Intelligence Network
HTA	Health Technology Assessment
HWC	Health and Wellness Centre
ICMR	Indian Council of Medical Research
JE	Japanese Encephalitis
LF / VL	Lymphatic Filariasis / Visceral Leishmaniasis
MoHFW	Ministry of Health and Family Welfare
NCCMIS	National Cold Chain and Management Information System
NCD	Non-Communicable Disease
NDMC	National Disease Modelling Consortium
NTD	Neglected Tropical Disease
PM-JAY	Pradhan Mantri Jan Arogya Yojana
PPP	Public-Private Partnership
RT-PCR	Reverse Transcription Polymerase Chain Reaction
SDG	Sustainable Development Goal
UHC	Universal Health Coverage
U-WIN	Universal Immunisation Web-enabled Network
VBD / VPD	Vector-Borne Disease / Vaccine-Preventable Disease
WCF	Women's Collective Forum

Executive Summary

The Women's Collective Forum is a national initiative committed to advancing gender equality and equity across health, education and entrepreneurship. As part of a structured national discourse on priority health themes, the Forum established a knowledge partnership with the National Disease Modelling Consortium (NDMC) at IIT Bombay to convene a series of regional consultations under the theme "Technology for Healthcare: India's Mantra for Universal Health Coverage." Drawing on the Consortium's technical and domain expertise, these engagements offered structured platforms for policymakers, researchers, clinicians and institutional stakeholders to deliberate on the role of technology in achieving Universal Health Coverage.

Between January 2025 and March 2026, six regional stakeholder consultations were convened across India, each anchored in a distinct theme and hosted by a partner institution: neglected tropical diseases at VIT Chennai; digital health and data science at ICMR – National Institute for Research in Digital Health and Data Science (ICMR-NIRDHDS), New Delhi; vaccine-preventable diseases at IIT Bombay; vector-borne diseases at ICMR–Regional Medical Research Centre, North-East, Dibrugarh; women's and child health at IIT Madras; and digital health and artificial intelligence for non-communicable diseases at the Koita Centre for Digital Health, IIT Bombay.

Each meeting featured expert presentations, panel discussions, and roundtable deliberations, fostering meaningful dialogue on existing gaps in achieving universal health coverage in India and exploring how technological and data-driven solutions can help bridge these gaps. Collectively, the engagements contributed to a deeper understanding of region and disease-specific challenges and generated actionable insights on leveraging technology to advance equitable and sustainable progress towards Universal Health Coverage.

The deliberations consistently emphasised eight strategic priorities: (a) a unified and interoperable digital-health architecture; (b) robust data governance; (c) the responsible embedding of artificial intelligence; (d) expanded public-private partnership; (e) the integration of mental and women's health into Universal Health Coverage; (f) strengthened pandemic preparedness; (g) the advancement of vector-borne disease control; and (h) capacity building paired with a deliberate focus on equity.

Considered in aggregate, the six consultations converge on a conclusion that reframes the national conversation on health technology. India's constraint is no longer the availability of tools. Across neglected tropical, vector-borne and vaccine-preventable

diseases, women's and child health, and the escalating burden of non-communicable disease, the consultations surfaced interventions that are not merely conceptual but operational — several already deployed at population scale.

The next phase of progress lies in translating demonstrated technological value into system-wide capability. As these solutions move from successful pilots to wider adoption, their impact will depend on the strength of the institutional architecture around them.

Interoperability standards, governance frameworks, validation pathways, workforce readiness, and equity safeguards will determine how effectively proven innovations can be integrated into public systems. These enablers create the conditions for solutions to operate with reliability, trust, and consistency across diverse contexts.

Accordingly, the recommendations in this report focus on the policy, regulatory, and institutional foundations required to support scale, sustainability, and public value.

Introduction & Background

Universal Health Coverage (UHC) is a central pillar of global public health, defined by the World Health Organization as ensuring that all individuals and communities receive the health services they need, when and where they need them, without suffering financial hardship⁽¹⁾. UHC encompasses the full continuum of care, including health promotion, disease prevention, treatment, rehabilitation, and palliative services across the life course⁽²⁾. It is grounded in the principles of equity in access, quality of care, and financial protection, ensuring that healthcare is both accessible and affordable to all segments of the population. The importance of UHC was globally reinforced with its inclusion in the United Nations Sustainable Development Goals in 2015, particularly under SDG 3, which aims to ensure healthy lives and promote well-being for all at all ages⁽³⁾. Since then, UHC has become a key benchmark for assessing health system performance worldwide.



Global progress, enabled by technology

Several countries have demonstrated how digital technologies can accelerate progress toward UHC by improving access, efficiency, and accountability. For instance, Estonia has developed a nationwide digital health system built on electronic health records and digital identity infrastructure since the early 2000s, enabling seamless data exchange and near-universal access to services⁽⁴⁾. In Rwanda, the use of drone technology for medical supply delivery through partnerships with Zipline since 2016 has improved access to essential medicines and blood products in remote areas⁽⁵⁾. Thailand has leveraged integrated health information systems to support its Universal Coverage Scheme (introduced in 2002), improving efficiency in provider payments and service monitoring⁽⁶⁾. In the United Kingdom, the National Health Service has adopted digital tools such as electronic medical records, e-prescriptions, and teleconsultations, particularly accelerated during the COVID-19 pandemic⁽⁷⁾. Similarly, China has expanded telemedicine and digital hospital platforms over the past decade to improve access in rural and underserved regions⁽⁸⁾.

The Indian trajectory

In India, the pursuit of Universal Health Coverage has been shaped by a combination of policy commitments and large-scale public health initiatives aimed at improving access, affordability, and equity in healthcare delivery. The National Health Policy 2017 marked a significant step by emphasizing preventive and promotive care, strengthening primary healthcare systems, and advocating the use of digital technologies⁽⁹⁾. Building on this foundation, the Government of India launched the Ayushman Bharat programme in 2018, which represents a major step toward achieving UHC⁽¹⁰⁾. The programme includes the Pradhan Mantri Jan Arogya Yojana, which provides financial protection for secondary and tertiary care to economically vulnerable populations. Widely regarded as one of the largest government-funded health assurance schemes globally, PM-JAY initially targeted over 500 million beneficiaries⁽¹¹⁾. Despite these advances, challenges such as disparities in access, variations in quality of care, and high out-of-pocket expenditure persist⁽¹²⁾.

Technology as critical enabler

The Ayushman Bharat Digital Mission, launched in 2021, aims to create an integrated digital health ecosystem through unique health IDs, interoperable electronic health records, and digital registries of healthcare providers and facilities⁽¹³⁾. The expansion of telemedicine, particularly through platforms such as eSanjeevani since 2020, has enabled millions of consultations and improved access to care in remote areas⁽¹⁴⁾. Digital health information systems have strengthened disease surveillance, programme monitoring, and evidence-based policymaking, while IT-enabled claims management under PM-JAY has improved efficiency, reduced fraud, and enhanced financial protection⁽¹⁵⁾. Additionally, digital tools at Health and Wellness Centres have supported screening and management of non-communicable diseases, reinforcing preventive and primary healthcare services⁽¹⁶⁾.

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Rationale *for the* Consultations

Achieving Universal Health Coverage (UHC) in India requires strengthening healthcare systems through equitable access, digital innovation, evidence-based policymaking, and integrated public health approaches. While India has made significant progress through national health initiatives and digital health programmes, persistent gaps continue to exist in healthcare accessibility, interoperability, disease surveillance, workforce preparedness, continuity of care, and region-specific implementation capacities.

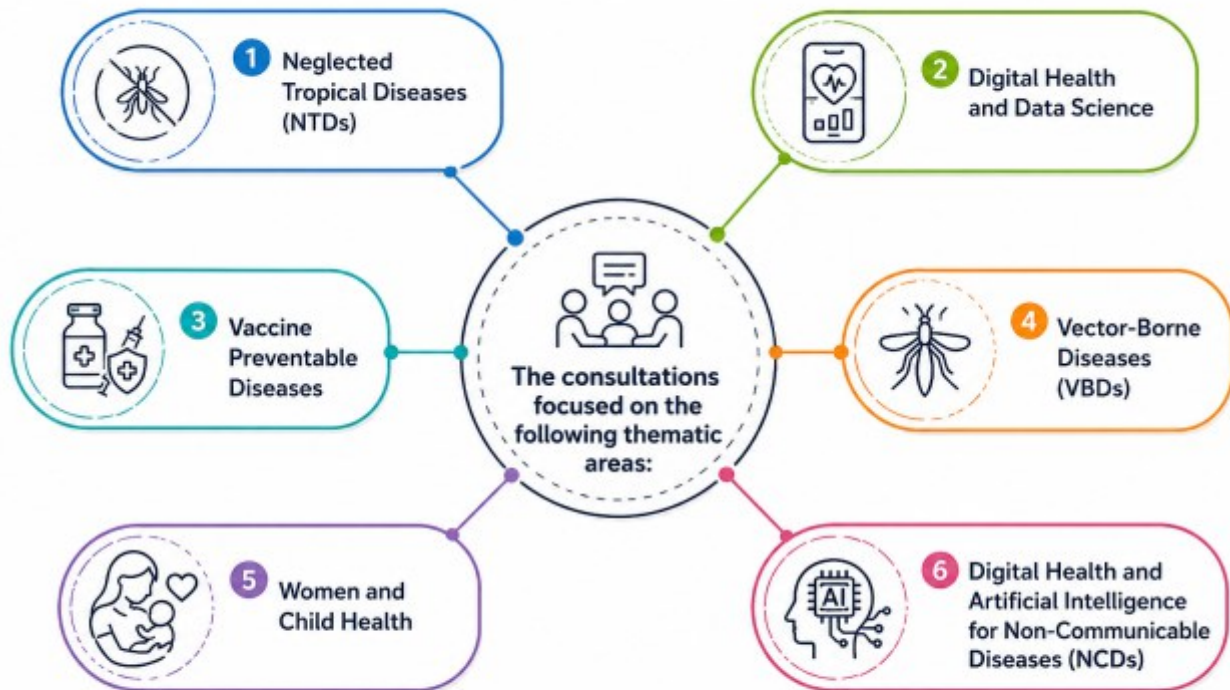
The challenges confronting India's healthcare systems are highly heterogeneous and shaped by epidemiological, geographic, socio-economic, and infrastructural factors. Emerging infectious diseases, neglected tropical diseases, vector-borne diseases, women's health concerns, and the growing burden of non-communicable diseases require tailored, context-sensitive, and technology-enabled approaches that can be implemented across diverse healthcare settings.

Recognising the need for collaborative and multidisciplinary engagement, the Women's Collective Forum (WCF), in partnership with the National Disease Modelling Consortium (NDMC), initiated a series of stakeholder consultations to examine the role of technology in strengthening healthcare systems and accelerating progress toward Universal Health Coverage.

The consultation exercise was designed to create structured platforms for dialogue among policymakers, researchers, clinicians, public health practitioners, disease modellers, digital health experts, industry representatives, and implementation stakeholders. The objective was to identify operational challenges, technological opportunities, implementation barriers, and policy priorities across different thematic areas relevant to India's public health landscape.

Given the regional diversity of healthcare systems and disease burdens in India, the consultations adopted a thematic and geographically distributed approach. This enabled the incorporation of local experiences, regional priorities, and implementation realities into broader national discussions on healthcare transformation and digital innovation.

The consultations focused on the following thematic areas:



A central rationale underlying the consultations was the recognition that technological innovation alone cannot address healthcare challenges unless integrated with health systems strengthening, workforce development, governance frameworks, community engagement, and equitable access mechanisms. The consultations therefore sought to examine how digital tools, AI-enabled systems, disease modelling approaches, and emerging technologies could be effectively integrated into public health systems in scalable, sustainable, and inclusive ways.

The stakeholder consultations also aimed to foster collaboration between academia, government agencies, healthcare institutions, technology developers, industry partners, and civil society organisations. By facilitating interdisciplinary engagement and collective problem-solving, the initiative sought to generate actionable recommendations that could inform future policy development, implementation strategies, and research priorities for strengthening India's healthcare ecosystem.

Methodology

- To systematically explore the role of technology in strengthening healthcare systems and advancing Universal Health Coverage (UHC), the stakeholder consultation exercise adopted a multidisciplinary, participatory, and evidence-informed approach involving regional and thematic consultations across multiple institutions in India. The process involved structured engagement with stakeholders from academia, healthcare systems, public health programmes, government agencies, industry, and technology sectors.

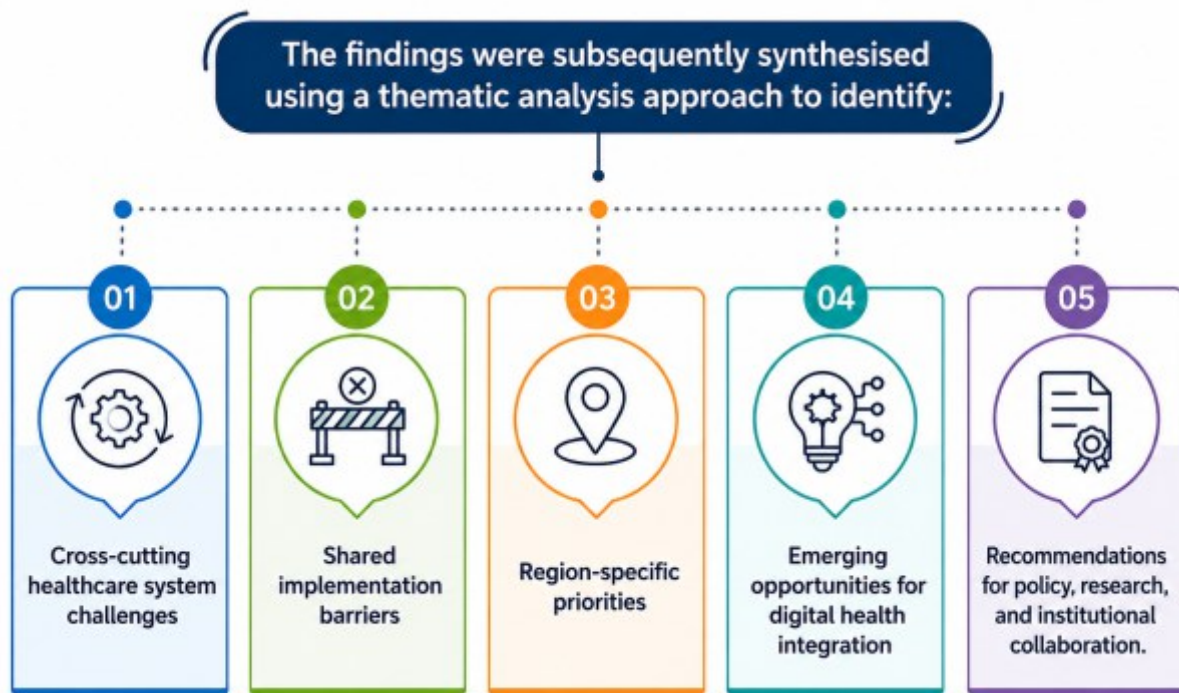
The thematic areas for consultation were identified through preliminary discussions with NDMC collaborators and researchers based on

1. National and regional healthcare priorities;
2. Existing gaps in healthcare delivery and digital health implementation;
3. Emerging opportunities in digital technologies, artificial intelligence, disease modelling, surveillance, and diagnostics;

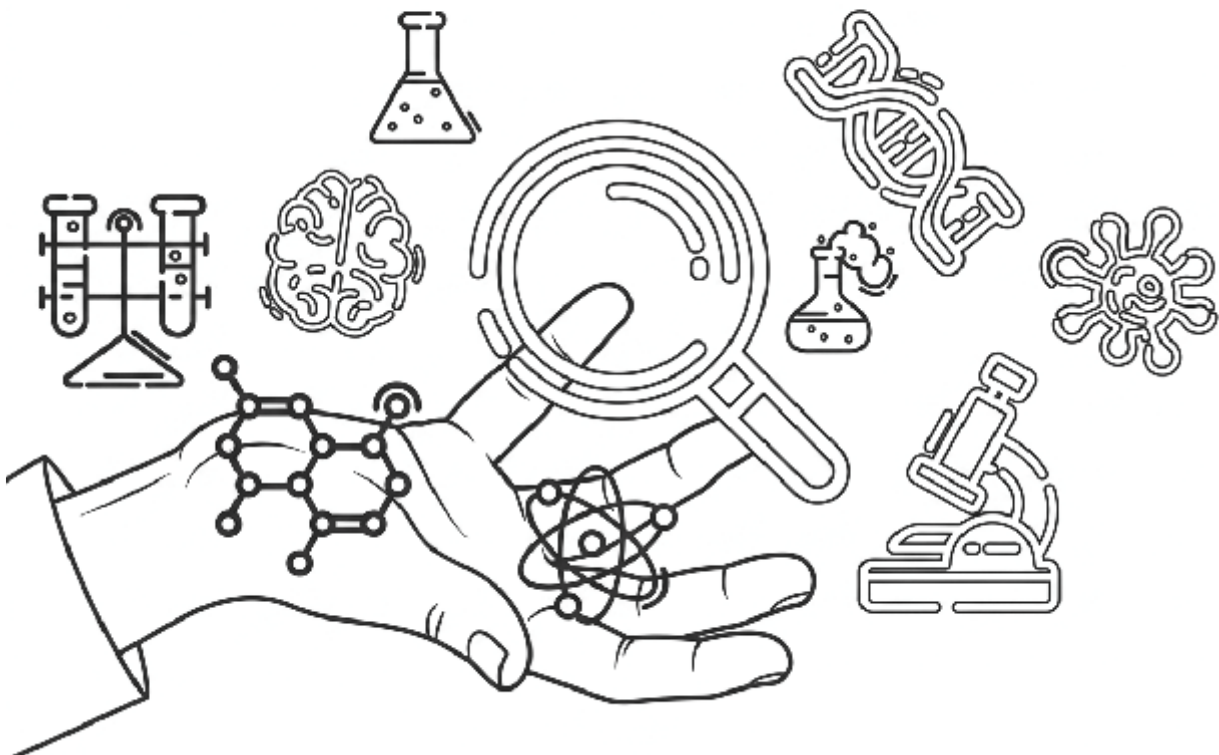
Each consultation followed a structured format comprising keynote addresses, technical presentations, thematic scientific sessions, panel discussions, moderated deliberations, and interactive stakeholder consultations. The discussions focused on identifying key challenges, implementation gaps, emerging technologies, operational barriers, and opportunities for strengthening healthcare systems through technology-enabled interventions.

The consultation process incorporated both thematic and regional perspectives to capture variations in healthcare needs, implementation realities, and technological readiness across different parts of the country. Discussions also examined barriers related to infrastructure, governance, digital access, health equity, and public health coordination.

Proceedings from each consultation were documented through session summaries, stakeholder inputs, thematic notes, and presentation records.



The consolidated findings from the stakeholder consultations were used to develop a broad framework of actionable recommendations aimed at strengthening technology-enabled healthcare systems and supporting India's long-term progress toward Universal Health Coverage.



Consultation Insights

A Current Landscape of Technology Interventions

The consultations indicate that India's technology-enabled Universal Health Coverage agenda is supported by a maturing portfolio of digital infrastructure, diagnostic tools, surveillance systems, data-governance models, and frontline instruments. These interventions can be organised into six mutually reinforcing layers, ranging from national digital public infrastructure to point-of-care tools used by frontline health workers.

1. Foundational digital public infrastructure

India's foundational digital-health architecture is anchored in the Ayushman Bharat Digital Mission, including unique health identifiers, interoperable electronic health records, and digital registries of providers and facilities. This architecture is complemented by eSanjeevani telemedicine and the digitisation of more than 175,000 Health and Wellness Centres. Together, these platforms create the base infrastructure on which higher-order service delivery, continuity of care, and data-enabled decision-making can be built.

2. Immunisation and supply-chain technology.

The electronic Vaccine Intelligence Network, the Universal Immunisation Web-enabled Network, the National Cold Chain and Management Information System and the Universal Immunisation Programme application — augmented by predictive analytics — are improving logistics, coverage and reach to children in hard-to-access geographies, alongside innovations such as needle-free delivery and digital records of vaccine administration.

3. Diagnostic and screening intelligence.

A third layer comprises diagnostic and screening technologies across communicable and non-communicable disease areas. A widening toolkit spans the cancers (breast, via thermal imaging and imageless ultrasound; cervical and HPV; lung; gallbladder), ophthalmology (diabetic retinopathy and cataract), infectious disease (AI-augmented malaria microscopy, scrub-typhus antigens, tuberculosis), maternal and neonatal care (gestational-age prediction and neonatal anthropometry), and non-communicable disease (fatty-liver progression and retinopathy triage). Collectively, these interventions point to a growing shift towards earlier, decentralised, and more cost-effective detection.

4. Surveillance and modelling systems.

Genomic surveillance, pooled testing, geospatial intelligence for vector-borne disease, One Health ecosystems for antimicrobial resistance, and disease-modelling pipelines that forecast transmission and locate hotspots for targeted response. These systems strengthen the ability of public-health institutions to move from retrospective reporting towards anticipatory planning and resource allocation.

5. Data infrastructure and governance models.

Unified health-data stacks, population-scale data-fiduciary models, synthetic data for research, and open-source disease registries provide the institutional and technical foundations for interoperability, research access, privacy protection, and trusted use of health data.

6. Frontline and frugal instruments.

Edge devices, portable diagnostics, and mobile applications designed for accredited social health activists and primary-care workers. These instruments translate national platforms and advanced analytics into practical delivery tools at the point of care. Their effectiveness will depend on usability, workflow integration, training, and alignment with frontline service-delivery realities.

Taken together, these six layers represent an emerging national capability stack for technology-enabled public health. The strategic priority is to integrate them into a coherent, interoperable, and trusted system that can support scale, improve continuity of care, strengthen disease surveillance, and extend high-quality services closer to communities.

B System-Level Findings

The consultations point to a convergent national opportunity: India has moved beyond isolated proof points in health technology and now has a sufficiently mature base of digital infrastructure, diagnostic innovation, disease modelling, and frontline delivery experience to define the next architecture for technology-enabled Universal Health Coverage.

Across disease areas and institutional settings, nine cross-cutting findings emerge.

1. Frugal, AI-enabled diagnostics represent the most mature and immediately scalable category of intervention. The strongest signal across consultations was the maturity of low-cost, AI-enabled diagnostic and screening tools. The digital-health consultation documented radiation-free thermal breast screening already extended to more than fifteen thousand women in Punjab and edge-device diagnostics designed for community deployment; the vector-borne disease symposium presented AI-assisted mosquito-species identification at reported accuracy above ninety-five per cent, alongside convolutional-network malaria microscopy that circumvents the limitations of conventional slide reading; the women's-health workshop advanced cervical, HPV and breast screening, hand-held imageless ultrasound triage, and gestational-age and neonatal models calibrated to the Indian subcontinent; and the non-communicable disease symposium extended the same logic to diabetic retinopathy, tuberculosis and fatty-liver disease.

Their strategic value lies in their shared delivery logic. They shift early detection from specialist facilities to decentralised points of care, allowing screening and triage to move closer to communities at materially lower cost. This makes diagnostics the most immediate category for structured validation, procurement, and scale.

2. India's digital-health infrastructure provides a strong platform; interoperability will determine its system value. Participants observed repeatedly that India operates one of the largest digital-health infrastructures in the world, and identified, with equal regularity, its fragmentation as the decisive limitation. Siloed platforms, non-communicating registries and the absence of reliable denominator data surfaced from the immunisation-systems discussion through to non-communicable disease management. The implication is consequential: incremental investment in new applications yields diminishing returns until the existing estate is rendered interoperable. Shared standards, denominator data, and cross-platform data flows should therefore be treated as core public-health infrastructure.

3. Trusted data governance is a precondition for responsible scale. The consultations consistently located health data at the centre of the next phase of public-health transformation. Unified health-data stacks, population-scale data fiduciaries, synthetic datasets for research, and open-source disease registries all point to the same institutional requirement: data utility and data protection must be designed together.

A trusted governance regime will be essential for clinical legitimacy, citizen confidence, research access, and regulatory acceptance. As AI-enabled diagnostics and surveillance systems mature, stewardship, consent, privacy, validation, explainability, and accountability will become central to scale.

4. Preparedness must be institutionalised as routine capability rather than emergency improvisation. Pooled testing, genomic surveillance, geospatial intelligence, and One Health systems were positioned across consultations as standing capabilities rather than episodic crisis-response tools. The implication is clear: preparedness is strongest when embedded into routine health-system functioning.

India's next preparedness agenda should therefore focus on permanent surveillance capacity, integrated human-animal-environmental monitoring, rapid diagnostics, real-time data flows, and pre-defined coordination protocols across institutions.

5. Equity must be treated as a design requirement for digital health. The consultations repeatedly underlined that technology-enabled delivery will achieve public-health value only if it is designed for populations that are least likely to access mainstream systems. This is especially relevant for neglected tropical diseases, women's cancers, maternal and neonatal care, mental health, ageing-related cognitive decline, and non-communicable disease screening.

Equity requires more than geographic expansion. It requires frugal design, culturally grounded deployment, stigma-sensitive communication, language access, assisted digital use, and measurable inclusion outcomes. In digital health, equity is not a downstream correction; it is a core design parameter.

6. Women's, maternal, child, and mental health should be integrated into mainstream digital-health architecture. These needs surfaced not only in the dedicated women's-health workshop but across every consultation — in the gendered barriers and stigma attending neglected tropical disease, in maternal and neonatal applications designed for frontline workers, and in the identification of depression and cognitive decline as neglected priorities for an ageing population.

The next phase of digital-health development should embed these domains within mainstream systems, registries, workflows, and frontline tools. Doing so would strengthen both equity and system performance.

7. Frontline usability will determine adoption. The consultations highlighted the need for curbing the proliferation of applications, equipping community workers with mobile decision support, and building data and digital literacy across the cadre emerged as preconditions.

8. Partnerships are essential to translating technology into population-level outcomes. Academia–industry–government collaboration was named in every consultation as the vehicle for scaling vaccines, diagnostics and digital tools — from the vaccine industry's account of affordability and supply constraints to practitioner panels convened across leading hospitals and firms. The recurrence is instructive: the consultations treated partnership not as rhetorical aspiration but as operational necessity.

Additionally,

9. Disease modelling is maturing into the connective layer between surveillance data and public-health decision-making. The modelling use cases presented across the consultations indicate a shift from retrospective analysis to operational decision support. Bayesian mapping of visceral leishmaniasis, forecasting for lymphatic filariasis and VL–HIV co-infection, OpenMalaria, climate-linked transmission modelling, and non-communicable disease prioritisation demonstrate the potential of modelling to guide resource allocation.

The strategic role of modelling is to convert surveillance data into forward-looking, spatially precise intelligence. For districts and states, this can improve the targeting of finite resources, strengthen programme timing, and support more adaptive public-health planning.

Taken together, these findings suggest a clear strategic sequence. India's most immediate opportunity lies in validating and scaling mature diagnostic tools. That scale depends on interoperable digital architecture and trusted data governance. Surveillance and modelling can then strengthen planning and preparedness. Equity, workforce readiness, and partnership determine whether these capabilities translate into measurable public-health gains.

© System Enablers for Scale

The consultations identify four system enablers that will shape the next phase of technology-enabled Universal Health Coverage.

1. Architectural integration. India's digital-health assets now need to operate as a connected system. Interoperability across platforms, registries, disease programmes, and frontline tools will be essential to improve continuity of care, reduce duplication, and generate reliable population-level intelligence.

2. Governance and regulatory readiness. The responsible use of AI in public health will require clear frameworks for clinical validation, bias mitigation, explainability, privacy, consent, and accountability. These frameworks will provide the institutional confidence required for adoption across public programmes.

3. Workforce enablement. Frontline workers will remain the decisive interface between technology and citizens. Digital tools must therefore be designed around usability, workflow integration, assisted use, and practical decision support. Training in digital and data literacy should be treated as a core health-system investment.

4. Inclusive deployment. Technology-enabled systems must be designed for populations facing barriers of geography, gender, stigma, language, income, disability, and digital access. Inclusion should be measured directly through uptake, follow-through, and outcome indicators across underserved groups.

In addition, vaccine and device innovation will require alignment across affordability, supply capacity, procurement readiness, and regulatory pathways. These enablers together define the institutional conditions under which proven technologies can move from programme-level success to national public-health capability.

④ Consolidated Recommendations

The recommendations are weighted toward the connective, regulatory, institutional, and delivery conditions required to translate demonstrated technologies into scalable public-health capability. The emphasis is on strengthening the systems through which existing and field-validated interventions can be integrated, governed, adopted, and sustained.

Phase 1: Establish the enabling architecture

The first priority is to strengthen the foundations required for responsible scale. This includes defining interoperability standards across major digital-health platforms, strengthening data-governance arrangements, establishing clinical validation and ethical deployment guidelines for AI-enabled tools, and improving registry and denominator-data systems for population-level planning.

This phase should also identify a shortlist of high-readiness technologies for structured evaluation across priority disease areas, with clear criteria for clinical value, cost-effectiveness, usability, equity, and integration with public-health workflows.

Phase 2: Validate and integrate high-readiness solutions

The second priority is to move mature technologies through rigorous validation and programme integration. High-potential tools in cancer screening, retinopathy, malaria, tuberculosis, maternal and neonatal care, and vector-borne disease surveillance should be evaluated across diverse geographies and delivery settings.

Where evidence supports adoption, these tools should be integrated into public-health workflows, procurement channels, workforce-training systems, and digital reporting platforms. In parallel, data-fiduciary models, disease registries, genomic surveillance, pooled testing, One Health systems, and modelling platforms should be operationalised as standing public-health capabilities.

Phase 3: Embed, optimise, and measure system performance

The final priority is to institutionalise the capabilities that have demonstrated public-health value. A connected digital-health architecture should operate as standing infrastructure; preparedness systems should become routine functions; disease-modelling outputs should inform district and state planning cycles; and vaccine, diagnostic, and vector-control programmes should expand through evidence-backed partnerships.

Lastly, equity should be measured as a core performance indicator, including uptake among underserved populations, continuity of care, frontline usability, and reduction in access gaps across priority groups.

Sl. No	Recommendation	Lead institutions	Strategic Focus
1.	Establish a unified digital-health architecture across ABDM, eVIN, U-WIN, Ayushman Arogya Mandir, disease registries, and programme platforms	NHA, MoHFW, ABDM	Interoperability, continuity of care, reduced duplication, frontline usability
2.	Strengthen health-data governance through data-fiduciary models, open-source disease registries, privacy safeguards, and accountable stewardship	MoHFW, MeitY, NHA	Trust, regulatory confidence, research access, responsible data use
3.	Create a responsible AI adoption pathway for public health, including ethical standards, clinical validation protocols, bias assessment, and deployment guidelines protocols, bias assessment, and deployment guidelines	ICMR, CDSCO, MoHFW	Clinical legitimacy, safety, explainability, responsible scale
4.	Institutionalise academia-industry-government partnerships for diagnostics, vaccines, digital tools, modelling platforms, and implementation research	MoHFW, DBT, industry, academia	Productisation, procurement readiness, evidence generation, last-mile adoption
5.	Integrate women's, maternal, child, and mental health into mainstream digital-health systems, workflows, and frontline tools	MoHFW, State programmes	Equity, inclusion, service integration, population health outcomes
6.	Advance vector-borne disease control through vaccine deployment, AI-enabled diagnostics, biological control, geospatial intelligence, and disease modelling diagnostics, biological control, geospatial intelligence, and disease modelling	NCVBDC, ICMR, States	Targeted disease control, precision surveillance, programme effectiveness
7.	Build workforce capacity and equity safeguards into technology deployment, including digital literacy, data skills, assisted digital use, and inclusion metrics	MoHFW, States, academia	Adoption, usability, access, equity outcomes

*Lead institutions are indicative.

Consultation Summaries

Consultation I — Neglected Tropical Diseases

Host: VIT Chennai (Prof. Mini Ghosh) · Venue: VIT Chennai · Date: 24 January 2025

Convened by VIT Chennai and the National Disease Modelling Consortium and funded by the Women's Collective Forum, this consultation examined technological innovation against the distinctive challenges of neglected tropical diseases, with particular attention to their consequences for women's, maternal and neonatal health. Presentations ranged across advanced modelling, indigenous diagnostics and community-based strategy, and the meeting closed with a panel proposing concrete technological interventions and interdisciplinary collaboration in pursuit of Universal Health Coverage.

Objectives

- *Explore technological advances for addressing neglected tropical diseases in India.*
- *Examine surveillance, modelling and digital-health technologies in resource-limited settings.*
- *Address the burden borne disproportionately by women, mothers and newborns.*
- *Identify scalable, cost-effective strategies for early detection, prevention and treatment.*
- *Promote public-private partnerships and community-based approaches to healthcare improvement.*

Proceedings and key insights

Session 1 — Neglected tropical diseases and their impacts

Chaired by Dr. Kalyani Desikan (VIT Chennai), Dr. K.N. Panicker (Amrita Institute of Medical Sciences, Kochi)

Dr. Shridhar Narayanan (Foundation for Neglected Disease Research, Bengaluru) — Neglected diseases and women's health, with a focus on genital tuberculosis. He drew attention to the prevalence of genital tuberculosis and the barriers to rural healthcare access, arguing for affordable, point-of-care diagnostics deployed alongside community-based awareness programmes.

Dr. Ram Rup Sarkar (CSIR-NCL, Pune) — Systems biology of leishmaniasis, from fundamental to translational research. Integrating experimental and computational models for biomarker identification, he proposed AI-driven simulation of disease progression to identify drug targets and optimise treatment.

Dr. S. Subramanian (ICMR-Vector Control Research Centre, Pondicherry) — Bayesian modelling of the spatiotemporal patterns of visceral leishmaniasis. Demonstrating Bayesian prediction of disease spread and hotspot identification, he recommended coupling geographic information systems with Bayesian frameworks to guide resource allocation and intervention planning.

Dr. K.N. Panicker (Amrita Institute of Medical Sciences, Kochi) — Lymphatic filariasis — the elimination of Brugian filariasis in Kerala. Presenting Kerala's elimination experience, he underscored the decisive role of public-awareness campaigns and community engagement, and called for closer linkage between government initiatives and research outputs.

Session 2 — Advanced research and innovation in healthcare

Chaired Dr. V. Prabhakar (VIT Chennai)

Dr. Kartik Sunagar (Indian Institute of Science, Bengaluru) — The evolutionary ecology of Indian snake venoms and next-generation antivenoms. He examined the evolutionary dynamics that complicate universal antivenom development, proposing pharmaceutical collaboration, molecular tools for targeted therapy, and centralised venom banks.

Dr. Anita Shete (ICMR–National Institute of Virology, Pune) — Clinical validation of an indigenously developed in-vitro diagnostic assay. Highlighting the cost-effectiveness and scalability of indigenous assays, she advocated their adoption across primary healthcare centres to improve early detection and health equity.

Dr. Silpa T. Sasi (Amrita Institute of Medical Sciences, Kochi) — The impact of neglected tropical diseases on women, with emphasis on lymphatic filariasis. She examined the socio-economic consequences of the disease, including stigma and gendered barriers to care, and proposed community-based awareness and multi-stakeholder approaches to reduce both.

NDMC and VIT Chennai (Dr. Rashmi Tiwari and Dr. Ashvini Gupta (NDMC); Dr. Sunil Maity and Ms. S. Nivetha (VIT)) — Modelling and forecasting neglected tropical diseases. The team presented work on modelling lymphatic filariasis and visceral leishmaniasis, including the mathematical modelling of VL-HIV co-infection, and committed to refining the models in light of expert feedback.

Panel Discussion (Moderators: Dr. Atanu Dutta and Dr. G. Santosh, VIT Chennai);

Topic: Recommendations for Technological Interventions in Universal Health Coverage

1. Integrated technology-driven diagnostics.
2. Emphasized public-private partnerships and government support.
3. Advocated policy reforms for equitable access to healthcare technologies.

Key Takeaways

1. Technology-driven diagnostics can revolutionize healthcare delivery in resource-limited settings.
2. Public-private partnerships are essential for scaling innovations.
3. Policy reforms are critical for equitable access to healthcare technologies.

Key Outcomes

1. Actionable Strategies for NTDs: Affordable diagnostic tools, AI-driven prediction models, and awareness campaigns.
2. Scalable Healthcare Solutions: Cost-effective technologies for rural and underserved regions.
3. Strengthened Collaborations: Reinforced academia-industry-government partnerships for healthcare innovation.

Conclusion

The stakeholder meeting underscored the role of technology in addressing healthcare challenges posed by NTDs and other diseases. The event emphasized affordability, scalability, and accessibility of healthcare technologies, while reinforcing the importance of continued collaboration among researchers, policymakers, and industry leaders to develop workable solutions for improved healthcare outcomes nationwide.



Inaugural session and participants — neglected tropical diseases consultation, VIT Chennai, 24 January 2025.

Consultation II — Digital Health and Data Science

Host: ICMR–NIRDHDS (Dr. Vishal Deo) ·

Venue: ICMR Headquarters, New Delhi · Date: 15 February 2025

Bringing together some fifty experts and participants, this consultation examined how digital health and data science can strengthen delivery, improve surveillance and accelerate progress toward Universal Health Coverage. Discussion centred on AI-driven diagnostics, scalable screening, unified health-data ecosystems, antimicrobial-resistance surveillance, and the regulatory frameworks required for responsible digital health. In his address, the Director-General of the Indian Council of Medical Research, **Dr. Rajiv Bahl**, emphasised institutional strengthening and user-centred design; **Dr. Ganesh Ramakrishnan** presented the Consortium's vision and collaborative work; and **Dr. Krithika Rangarajan** moderated the sessions.

Objectives

- Explore digital-health and artificial-intelligence innovations for Universal Health Coverage.
- Address challenges in data governance, interoperability and infrastructure.
- Identify scalable, cost-effective screening and diagnostic solutions.
- Surface the policy gaps that constrain the responsible deployment of AI.
- Foster collaboration among government, academia, and industry.

Proceedings and key insights

Session 1: AI-driven diagnostics and screening

Dr. Karthik Adapa (WHO–SEARO) — Breast-cancer screening with thermal imaging. He presented a low-cost, radiation-free AI screening tool already extended to 15,069 women in Punjab, demonstrating its scalability in low-resource settings.

Dr. Chetan Arora (IIT Delhi) — Edge-device diagnostics. He described AI-driven multimodal detection tools and the digitisation of maternal-and-child-protection records for vaccination reminders, proposing scalable edge devices for community-level healthcare.

Session 2: Building data ecosystems

Dr. Anurag Agarwal (Ashoka University) — Unified health-data stacks. He argued for collaborative medical-technical data ecosystems and the use of synthetic data for research, recommending integration with the Ayushman Bharat Digital Mission and joint oversight of health data.

Session 3: Artificial intelligence in public health

Dr. Sneha Nikam (Wadhwani AI) — AI solutions for tuberculosis and maternal and child health. Presenting vulnerability mapping, cough-based detection and telemedicine integration, she was candid about the constraints of data quality, infrastructure and transparency.

Session 4: Specialised digital-health applications

Prof. Radhika Tandon (AIIMS Delhi) — Artificial intelligence in eye care. She demonstrated screening for diabetic retinopathy, cataract and dry eye, and called for regulatory frameworks addressing privacy, bias and ethics.

Dr. Tavpritesh Sethi (IIIT Delhi) — A One Health data ecosystem for antimicrobial resistance. He presented an integrated human, animal and environmental data system for AMR surveillance, and proposed operationalising artificial intelligence in infectious-disease control.

Key Takeaways

1. AI-driven diagnostics can revolutionize screening in low-resource settings.
2. Unified health data ecosystems are critical for interoperability and scalability.
3. Public health AI solutions must prioritize transparency and trust.
4. Regulatory frameworks are essential for ethical deployment of digital health.
5. AMR surveillance requires multisectoral One Health approaches.

Key Outcomes

1. Actionable strategies for scalable AI-driven screening and diagnostics.
2. Strengthened collaborations between ICMR, NDMC, academia, and industry.
3. Commitment to building robust, unified health data stacks.
4. Recognition of AMR as a priority area for digital health innovation.



Consultation III — Vaccine-Preventable Diseases

Host: National Disease Modelling Consortium, IIT Bombay (Prof. Siuli Mukhopadhyay)

Venue: VMCC, IIT Bombay · Date: 10 March 2025

This full-day consultation convened leaders from government, academia, industry and public-health research to consider the transformative role of digital technology in advancing Universal Health Coverage. Opening the proceedings, Prof. Siuli Mukhopadhyay emphasised collaboration across academia, government and industry as the precondition for technology to serve coverage at scale.

Objectives

- Showcase national digital-health platforms and innovations.
- Examine the integration of artificial intelligence and open data into coverage frameworks.
- Strengthen pandemic preparedness and surveillance.
- Foster collaboration across government, academia and industry.

Proceedings and key insights

Keynote

Dr. Rajiv Bahl (Director-General, ICMR) — Technology for Universal Health Coverage. Citing India's COVID-19 vaccination campaign as a model of combined conventional and digital technology, he outlined the Council's initiatives — enhanced research funding, the Patent Mitra and Medtech Mitra programmes, digital-health research centres and gold-standard databases — and stressed the importance of affordable, indigenous health technology and a strengthened innovation ecosystem.

Sessions

Dr. Pawan Kumar (MoHFW) — Digital innovations in immunisation. He presented the eVIN, NCCMIS and Universal Immunisation Programme platforms and showed how AI-driven predictive analytics improve logistics, coverage and reach to children in hard-to-access areas.

Dr. N.K. Arora (INCLIN Trust) — The digitalisation of Health and Wellness Centres. Identifying fragmented data, weak interoperability and telemedicine gaps, he advocated contextual problem-solving across planning, implementation and sustainability, and called for a national outpatient database.

Dr. Sheela Godbole (NITVAR) — Pandemic preparedness. She argued that preparedness must be embedded in everyday health policy — spanning equitable

access, governance, surveillance, workforce readiness and diagnostics — and advanced a One Health approach integrating human, animal and environmental health.

Dr. Viduthalai Virumbi (Honeybee Population Healthcare Foundation) — Population-scale data fiduciary. Tracing the evolution of health-data systems, he proposed a citizen-centric, cloud-agnostic data-fiduciary model for privacy-preserving integration, and the construction of a population health registry to establish denominator data for coverage planning.

Mr. Parag Deshmukh (Serum Institute of India) — Vaccine-industry perspectives. Noting that expanded immunisation has averted some fifty-four million deaths globally, he set out the challenges of affordability, supply and regulatory delay, and pointed to innovations such as needle-free devices and digital administration, calling for faster approvals and additional national control laboratories.

Prof. Souvik Banerjee (IIT Bombay) — Cognitive health and depression. Presenting evidence that depression markedly worsens cognitive functioning in middle-aged and older adults, mediated by daily-living activity and sleep quality, he argued that Universal Health Coverage must encompass mental health, particularly for an ageing population.

Dr. Arup Deb Roy (John Snow India) — Digital tools in new vaccine introduction. He presented digital tools for the post-introduction evaluation of vaccines that improve frontline data retrieval and real-time analysis, with scope to extend to geo-tagging and document upload.

Dr. Priyanki Shah (Pune Knowledge Foundation) — Open-source disease data. She advocated open-source disease databases as instruments of transparency and the democratisation of data access.

Dr. Avinash Supe (KEM Hospital) — The role of artificial intelligence in Universal Health Coverage. Surveying applications in diagnostics, predictive analytics and personalised care, he addressed the ethical concerns of equity and bias and argued for the integration of AI into both care delivery and medical education.

Prof. Ajit Rajwade (IIT Bombay) — Pooled testing for COVID-19. He demonstrated pooled RT-PCR testing as a cost-effective and scalable method, with clear potential beyond the pandemic context.

Dr. Amit Bhondve (KEM Hospital) — Artificial intelligence for health equity. He argued that inclusively designed AI can reduce disparities, with applications in predictive analysis and population-level public-health intervention.

Key Themes and Insights

1. Digital Transformation: Immunization, health centres, insurance, and pandemic preparedness.
2. Data Systems: Population-scale registries and open-source disease databases.
3. AI in Healthcare: Diagnostics, equity, predictive analytics, telemedicine, and mental health.
4. Mental Health: Depression and cognitive decline as critical UHC priorities.
5. Public-Private Collaboration: Vaccine industry perspectives reinforced partnerships.
6. One Health Approach: Integration of human, animal, and environmental health.

Key Takeaways

1. India possesses one of the largest digital health infrastructures globally.
2. Interoperability remains the primary limiting factor.
3. Frontline worker burden must be reduced.
4. AI tools require governance, transparency, and equity safeguards.

Key Outcomes

1. Commitment to building a unified digital health architecture.
2. Strengthened frontline capacity through training and streamlined systems.
3. Enhanced surveillance and preparedness with genomic and One Health approaches.
4. Improved data governance and public trust.
5. Responsible AI deployment with ethical frameworks.
6. Expanded public-private partnerships for scaling innovations.



Consultation IV — Vector-Borne Diseases

Host: ICMR–RMRC North-East, Dibrugarh (Dr. Ipsita Pal Bhowmick) ·

Venue: ICMR–RMRC NE, Dibrugarh · Date: 17 March 2025

This symposium convened experts from across India to consider technological innovation for the control of vector-borne disease, spanning vaccine and drug strategy, vector detection and control, diagnostics, and surveillance modelling. Emerging tools — AI-assisted identification, bacteriophage-mediated larval control, drone-based intervention and predictive modelling — were presented as transformative instruments for India's response. The chief-guest address by Prof. Jagadish Mahanta emphasised artificial intelligence, gene-drive technologies and vaccine strategy, while Dr. Subarna Roy's welcome highlighted AI, mobile surveillance and drone-based intervention.

Objectives

- Explore vaccine and drug strategies for malaria, dengue and Japanese encephalitis.
- Examine innovative vector-control technologies and AI-assisted identification.
- Advance diagnostics for malaria, scrub typhus and other vector-borne diseases.
- Strengthen surveillance and modelling for outbreak prediction.

Proceedings and key insights

Session 1 — Vaccine and drug strategies

Chaired by Dr. Anup Anvikar, Prof. Chimanjita Phukan, Prof. Jagadish Mahanta

Prof. Siraj Ahmed Khan (ICMR–RMRC NE) — Japanese encephalitis vaccines. He underscored the immunogenicity and programmatic importance of JE vaccines and the need for sustained vaccination programmes.

Dr. Pawan Kumar (MoHFW) — The role of vaccines in vector-borne disease control. He surveyed JE (JENVAC, JEEV), malaria (Mosquirix) and dengue (Dengvaxia, Qdenga) vaccines and the case for integrating them into national programmes.

Dr. Arun Sankaradoss (Rajiv Gandhi Centre for Biotechnology) — Dengue vaccine development. He examined the role of ED-III and NS1 proteins and animal models in efficacy testing, advocating genomic sequencing and translational research.

Prof. Dipak Chetia (Dibrugarh University) — Semisynthetic antimalarials. Addressing ADMET challenges and new molecules in clinical study, he argued for continued investigation of novel antimalarial compounds.

Prof. Shailja Singh (Jawaharlal Nehru University) — Molecular mechanisms in malaria. She presented inhibitors that block merozoite invasion and the use of proteomics to map molecular cascades, pointing toward proteomics-driven drug discovery.

Session 2 — Tackling the challenge of vectors

Chaired by Dr. Sarala K. Subbarao, Dr. Kalpana Baruah, Dr. Vanlalhumka

Dr. Dibya Ranjan Bhattacharyya (ICMR–RMRC NE) — Challenges in vector detection and control. He examined vector bionomics, sibling species and insecticide resistance, recommending novel tools such as toxic sugar baits and spatial repellents.

Dr. Sibnarayan Datta (DRDO, Tezpur) — Bacteriophage-mediated larval control. Demonstrating the role of microbiota in larval development — phage-treated larvae showing slower growth — he proposed bacteriophage-based biological control.

Prof. S. Chandrasekaran (Madurai Kamaraj University) — AI-assisted vector identification. He presented a 3D-printed AI device achieving over ninety-five per cent accuracy in mosquito-species identification, advocating the adoption of AI-enabled surveillance tools.

Session 3 — Diagnostics

Chaired by Dr. Neelima Mishra, Dr. Biswa Jyoti Borkakoti, Dr. Aniruddha

Dr. Radhakrishnan R. (Rajiv Gandhi Centre for Biotechnology) — A magnetic-induction cyclor for qPCR. He highlighted the speed, reliability and field applicability of the device, recommending deployment in both laboratory and field settings.

Prof. Partha Pratim Sahoo (Tezpur University) — Biosensing techniques. He presented electronic-nose and electronic-tongue sensors using limonin as a sensing material, proposing biosensors for the rapid detection of pathogens.

Prof. Ravikrishnan Elangovan (IIT Delhi) — AI-driven malaria diagnostics. Using convolutional-network and YOLO models for parasite detection, he showed how AI can overcome the limitations of conventional microscopy.

Dr. Rajesh Chandramohanadas (Rajiv Gandhi Centre for Biotechnology) — AI-assisted reticulocyte detection. Combining optical tomography with machine learning for malaria detection, he proposed AI-assisted surveillance systems.

Dr. Nima D. Namsa (Tezpur University) — A recombinant antigen for scrub typhus. He presented a TSA antigen of improved specificity and sensitivity and recommended reverse-vaccinology approaches.

Session 4 — Surveillance and modelling

Chaired by Dr. CS Aggarwal, Dr. Rina Tilak, Dr. Saurav Patgiri

Dr. Dibyajyoti Chutia (North Eastern Space Applications Centre) — Geo-intelligence for vector-borne disease surveillance. He demonstrated geotagging and integrated surveillance for malaria, advocating geospatial tools for early diagnosis and treatment.

Dr. Harish C. Phuleria (IIT Bombay) — Environmental determinants of malaria transmission. Identifying humidity, vegetation and cultivation practice as drivers and using OpenMalaria simulation, he recommended interventions tailored to high-transmission districts.

Dr. Sagar Pandhare (IIT Bombay) — Climatic variables and malaria trends in Tripura. Through ridge-regression analysis using temperature, vegetation index and humidity as predictors, he argued for continuous environmental monitoring and predictive modelling.

Key Takeaways

1. Vaccines and drug strategies remain central to VBD control.
2. AI-assisted vector identification and bacteriophage-mediated larval control are promising innovations.
3. Advanced diagnostics enhance detection accuracy for malaria and scrub typhus.
4. Surveillance and modelling tools enable predictive interventions tailored to local contexts.

Key Outcomes

1. Strengthened vaccine deployment strategies.
2. Integration of AI-based diagnostics into national frameworks.
3. Investment in biological control and genetic approaches.
4. Enhanced surveillance infrastructure combining geotagging and predictive modelling.



Participants — vector-borne diseases symposium, ICMR–RMRC North-East, Dibrugarh, 17 March 2025.

Consultation V — Women's and Child Health

Host: IIT Madras (Prof. Nirav Bhatt) · Venue: IIT Madras · Date: 26 August 2025

This workshop convened experts, policymakers and practitioners to consider the role of digital technology and artificial intelligence in closing systemic gaps in women's healthcare, with discussion focused on cancer screening, musculoskeletal health, maternal and neonatal care, and health-technology assessment. Throughout, the emphasis fell on frugal innovation, culturally sensitive solutions and evidence-based policy as the conditions for equitable delivery.

Objectives

- Address barriers in women's healthcare, including cancer and maternal and neonatal health.
- Explore AI-enabled diagnostic and screening tools for resource-constrained settings.
- Promote frugal, scalable innovation suitable for population-level deployment.
- Ensure gender-sensitive and culturally appropriate solutions.

Proceedings and key insights

Session 1: Cancer Screening and Management

Prof. Vijayalakshmi Ramshankar (Cancer Institute, Chennai) — Innovations in cervical, HPV, and breast and lung cancer screening. She argued that AI-enabled diagnostics and frugal screening technologies can overcome socio-economic barriers, advocating scalable, low-cost programmes integrated into primary healthcare.

Session 2: Musculoskeletal Health

Prof. Rupsa Bhattacharjee (IIT Madras) — Artificial intelligence in osteoarthritis among ageing women. She showed how predictive analytics can support early detection and personalised treatment, recommending AI-driven models for musculoskeletal health.

Session 3: Breast Cancer Screening

Prof. Krithika Rangarajan (AIIMS Delhi) — Hand-held imageless ultrasound triage. She presented frugal AI solutions enabling population-level screening in resource-constrained settings, proposing portable AI-enabled devices for community-level use.

Session 4: Maternal and Neonatal Health

Dr. Veerendra Gadekar (IIT Madras) — Gestational-age prediction models. He demonstrated models calibrated to the Indian subcontinent that improve maternal-care outcomes, recommending their integration into antenatal programmes.

Dr. Alpan Rawal (Wadhwani AI) — Mobile AI tools for neonatal anthropometry. He showed how mobile tools can empower accredited social health activists to deliver neonatal care in low-resource areas, advocating the scaling of such solutions for frontline workers.

Session 5: Health Technology Assessment

Dr. Oshima Sachin (MoHFW) — Cost-effective solutions and rigorous assessment. She argued that health-technology assessment is essential to ensuring the affordability and scalability of interventions, proposing systematic evaluation frameworks for women's-health technologies.

A roundtable moderated by Dr. Rashmi Tiwari identified critical gaps in delivery and proposed actionable interventions — evidence-based policy, workforce training and the deliberate bridging of the digital divide.

Key Takeaways

1. AI and digital tools can revolutionize screening, diagnosis, and maternal care.
2. Frugal innovations are essential for scalability in resource-constrained settings.
3. Gender-sensitive and culturally appropriate solutions must guide interventions.
4. Bridging the digital divide is critical to equitable healthcare delivery.

Key Outcomes

1. Evidence-based policy development through multi-stakeholder collaboration.
2. Establishment of robust data infrastructure and governance mechanisms.
3. Workforce training in healthcare technology and public health.
4. Deployment of scalable, cost-effective interventions tailored to women's needs.



Workshop session — women's and child health, IIT Madras, 26 August 2025.

Consultation VI — Digital Health and AI for Non-Communicable Diseases

Host: Koita Centre for Digital Health (KCDH), IIT Bombay (Prof. Kalyani Addya).

Venue: IIT Bombay · Date: 24 March 2026

This collaborative symposium brought together clinicians, technologists, researchers and public-health experts to consider how digital health and artificial intelligence can accelerate progress toward Universal Health Coverage and strengthen the management of non-communicable disease. Structured around two thematic sessions — the foundations of coverage and digital health, and non-communicable diseases, digital tools and artificial intelligence — followed by a practitioner panel, the programme drew on case studies in diabetes, hypertension, cardiovascular disease, anaemia, cancer and respiratory disorder, and returned throughout to trust, collaboration and patient-centred design.

Objectives

- Survey global and Indian trends in digital-health innovation.
- Examine the role of digital systems in advancing Universal Health Coverage.
- Address the growing burden of non-communicable disease in India and South-East Asia.
- Highlight AI-enabled tools for screening, risk stratification and population-health monitoring.

Proceedings and key insights

Session 1: Foundations — Universal Health Coverage and digital health

Dr. Richa Singh (KCDH, IIT Bombay) — The concept of Universal Health Coverage. She set out the challenges faced by low- and middle-income countries and introduced the Universal Health Coverage Cube as an analytical framework.

Prof. Kalyani Addya (KCDH, IIT Bombay) — The digital-health building blocks for coverage. She emphasised governance, interoperability and workforce readiness as the foundational requirements for digital health to serve coverage.

Session 2: Non-communicable diseases, digital tools and artificial intelligence

Dr. Richa Singh and Dr. Maitreyi Redkar (KCDH, IIT Bombay) — Field realities and participatory approaches. They examined the dominance of non-communicable disease in South-East Asia and the trust gaps encountered in the field, arguing for participatory approaches to digital health.

Prof. Kshitij Jadhav (IIT Bombay) — AI agents for digital screening. He demonstrated artificial-intelligence agents designed to support digital screening workflows.

Prof. Nirmal Punjabi (IIT Bombay) — The principles of mass screening. He set out the challenges of building AI and machine-learning pipelines, drawing on case studies in diabetic retinopathy, tuberculosis and breast cancer.

Dr. Dev Taneja (KCDH, IIT Bombay) — Machine learning for fatty-liver disease. He presented a model for the prediction and progression of non-alcoholic fatty-liver disease.

Dr. Rashmi Tiwari (NDMC, IIT Bombay) — Disease modelling for prevention and policy. She positioned disease modelling as an instrument for the prevention of non-communicable disease and the prioritisation of policy.

A panel moderated by Dr. Richa Singh — with leaders drawn from Tata Memorial, HN Reliance, LH Hiranandani, Gleneagles and FOGSI — addressed workflow integration, patient-centred design, usability and workforce readiness. In closing, Dr. Mona Duggal of the Indian Council of Medical Research emphasised collaboration and India's leadership in digital health, observing that no patient should ever be reduced to a data point, even as every data point is used to save a patient.

Focus Areas for NCD Case Studies

- Diabetes Mellitus
- Hypertension and Cardiovascular Disease
- Anaemia
- Cancer
- Chronic Respiratory Disorders

Key Takeaways

1. Digital Health as a Foundation for UHC: Infrastructure and governance are essential.
2. AI for Early Detection: ML models show strong potential for triage and decision support.
3. Community-Level Interventions: Digital tools reduce NCD burden when deployed locally.
4. Disease Modelling for Policy: Bridges data and evidence-based prioritisation.
5. Trust and Human Experience: Participatory, human-centred approaches are critical.

Key Outcomes

1. Strengthened understanding of digital health innovations relevant to NCD management.
2. Highlighted potential of AI and digital tools for surveillance and screening.
3. Explored role of health data systems in disease modelling and analytics.
4. Recommended scaling ML models through multisite validation studies.
5. Advocated integration of modelling outputs into district-level NCD policies.
6. Emphasized workforce capacity and digital literacy as enablers.



Participants — digital health and AI for non-communicable diseases symposium, KCDH, IIT Bombay, 24 March 2026.

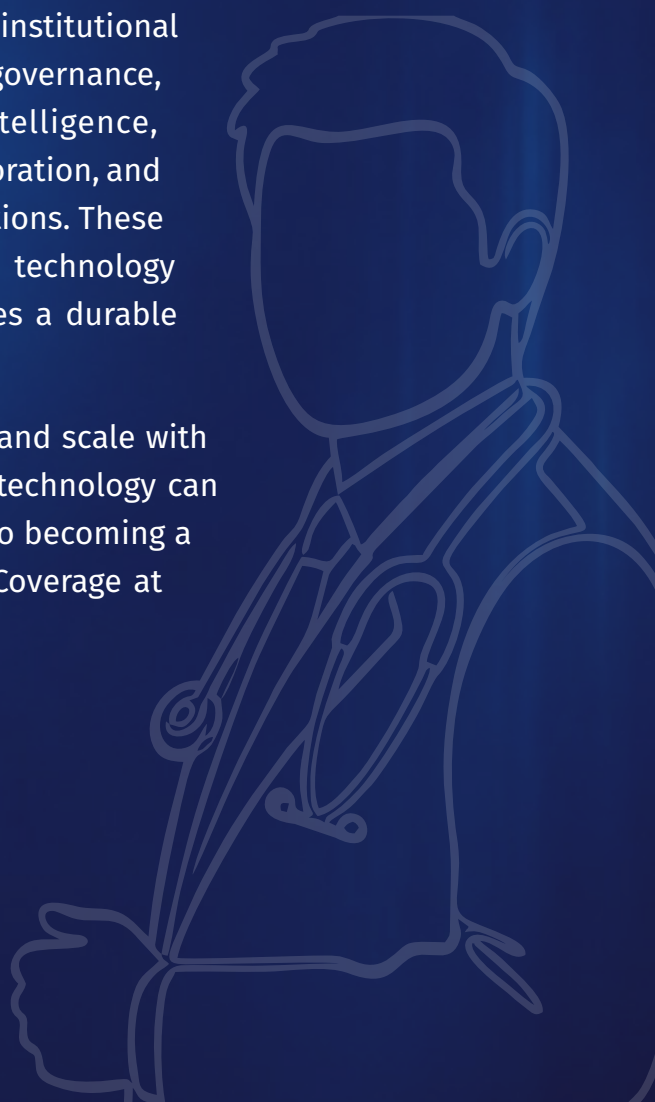
Conclusion

Universal Health Coverage represents one of the most consequential tests of India's public health architecture: the ability to ensure timely, appropriate and affordable care for every citizen, irrespective of geography, income or point of entry into the health system. The six consultations convened under this initiative make clear that technology is no longer peripheral to this mandate. It is now part of the core infrastructure through which access, continuity, surveillance, diagnostics and system responsiveness will be determined.

The consultations also point to a significant strategic advantage. India is not approaching this agenda from a position of institutional or technological scarcity. Across digital public infrastructure, disease surveillance, diagnostics, epidemiological modelling, frontline delivery platforms and data systems, several capabilities already exist and, in many cases, are operating at population scale. The policy task is therefore to convert these capabilities into an integrated, governed and accountable health-system asset.

That conversion will depend on a clear set of institutional choices: interoperable architecture, trusted data governance, validated and responsible use of artificial intelligence, workforce readiness, stronger public-private collaboration, and an explicit design bias toward underserved populations. These are the conditions that will determine whether technology remains a set of discrete interventions or becomes a durable instrument of national health delivery.

The agenda before India is to consolidate, govern and scale with purpose. With the right institutional architecture, technology can move from being an enabler of health innovation to becoming a central mechanism for realising Universal Health Coverage at speed, at scale and with equity.



Acknowledgements

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Organisers and hosts

- VIT Chennai — Prof. Mini Ghosh
- IIT Bombay — Prof. Siuli Mukhopadhyay
- IIT Madras — Prof. Nirav Bhatt
- ICMR–NIRDHDS, New Delhi — Dr. Vishal Deo
- ICMR–RMRC North-East, Dibrugarh — Dr. Ipsita Pal Bhowmick
- KCDH, IIT Bombay — Prof. Kalyani Addya

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This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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The National Disease Modelling Consortium (NDMC) was established in 2022 and is anchored at IIT Bombay. It brings together a nationwide network of modellers, epidemiologists, clinicians, and public-health experts working to strengthen India's indigenous capacity in disease modelling. NDMC's overarching goal is to support evidence-based public-health decision-making by generating robust, India-specific insights on disease burden and the impact of interventions.

Vision and Purpose

NDMC aims to build a national centre of excellence for disease modelling—integrating advanced analytical and numerical methods with public-health needs. The consortium works to develop India-specific models to understand disease dynamics, forecast trends, and evaluate strategies such as vaccination and treatment interventions. Alongside the above objectives, NDMC, with support from the Indian Council of Medical Research (ICMR), has also initiated work on estimating the disease burden of the non-communicable diseases outlined in the scope. A key mission is to ensure that scientific modelling insights translate into actionable recommendations for policymakers at national and state levels. Additionally, NDMC aims to build modelling expertise through teaching and training.

Scope of Work

NDMC covers the following major disease areas:

- Malaria
- Tuberculosis (TB)
- Vaccine-Preventable Diseases (VPDs) such as measles, rubella, human papilloma virus, pneumococcal disease, and others
- Neglected Tropical Diseases (NTDs) including lymphatic filariasis and visceral leishmaniasis
- Non-communicable Diseases (NCDs) such as diabetes, hypertension, cancer and mental health
- Antimicrobial resistance (AMR)

Across these domains, the consortium develops models, conducts spatial analyses, and builds shared data infrastructures and modelling frameworks.

Collaboration and Capacity Building

A core strength of NDMC is its collaborative structure. It works with academic partners, research institutes, and public-health agencies across India. The consortium has also established an Advisory Council and Disease-Specific Advisory Groups to steer its scientific direction.

NDMC regularly conducts training workshops, seminars, and technical exchanges to build a skilled pipeline of disease modellers in the country. These activities support long-term capacity building and foster a vibrant modelling community.

Institutes partnering with NDMC



Key Achievements

- Memorandum of Understanding with the Ministry of Health & Family Welfare (MoHFW) for collaborating in specific disease modelling initiatives to address critical healthcare needs of the country
- Establishing collaborations with Government of India (GoI) stakeholders
- Multiple national workshops focussing on malaria, TB, VPDs, and NTDs—contributing to knowledge exchange and capacity building
- The International Conference on Modelling and Informatics for Public Health, was organised by NDMC in December 2025, bringing together 220 participants from across the country and around the world. The conference featured insightful talks by 41 distinguished national and international speakers.

- Expanding the consortium across the country to build partnerships with more than ten research institutions
- Contribution to national and international scientific forums through presentations and collaborative studies and publications

India faces diverse and evolving health challenges. NDMC addresses policy-relevant questions by leveraging modelling to identify hotspots, prioritise interventions, forecast disease trends, estimate the burden of antimicrobial resistance (AMR) and non-communicable diseases, and provide recommendations for optimising the use of limited resources.



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About The Women's Collective Forum (WCF)

The Women's Collective Forum (WCF) is built on one conviction: India's hardest public health challenges are not solved in silos, but when government, industry, science, philanthropy and communities are brought to the same table and held to the same outcomes. WCF convenes that table — and turns the conversation into measurable change. Our work runs on two tracks: building credible platforms where the whole system can align, and backing evidence-based innovations that save lives at scale.

Advancing Public Health: An Evidence Initiative

In its first phase, WCF aligned with 18 of India's premier research and management institutions — across the IITs, IIMs, AIIMS, ISB and ICMR network — to examine a defined public health challenge and chart India's path forward. The themes span the elimination of tuberculosis, malaria, kala-azar, lymphatic filariasis and other neglected tropical diseases; maternal, child and adolescent health; family planning and women's health innovation; and the systems that carry care to people — immunisation, technology for universal health coverage, Ayushman Aarogya Mandirs, and equitable, affordable access. Together they form an evidence base that turns ambition into geography-specific strategy.

Advancing Public Health Outcomes Forum

Our flagship platform convenes policymakers, scientists, industry and civil society in a single, results-oriented conversation. The inaugural Forum in New Delhi was addressed by Union Health Minister Shri J.P. Nadda and Dr Rajiv Bahl on the theme of Disease Control and Immunisation — designed not to celebrate progress, but to interrogate how it is sustained and scaled.

Engaging Policymakers and Industry

WCF carries its research directly to those who can act on it. A closed-door interaction with Members of Parliament and senior industry leaders, hosted with CII, drew on four white papers on family planning, maternal health, child and adolescent health, and women's health innovation — closing with a commitment to use geography-specific data for constituency-level solutions. These papers were formally launched at the 6th CII Public Health Summit 2025, graced by Ms. Smriti Irani, Founder and Chairperson of the Alliance for Global Good: Gender Equity & Equality and Advisor to WCF, alongside Dr. Randeep Guleria (Medanta), Hari Menon (Gates Foundation) and Dr. V.K. Paul (NITI Aayog).

Innovation in Maternal Health: The PPH Drape Protocol

Postpartum haemorrhage remains a leading cause of preventable maternal death — yet early detection can change the outcome entirely. WCF is leading the development of a standardised PPH drape protocol with ICMR and key clinical partners: a first-of-its-kind, South-led innovation grounded in the maternal-care realities of India and Africa, combining cost-effective design, clinical validation and systemic integration. Clinical training is already underway, including at the Army Hospital, to bring the protocol into mainstream care.

Future Forward: Shaping Global Futures with Indian Solutions

Co-convened with CII and joined by Mr. Bill Gates, Future Forward spotlights India's frugal, scalable innovations on the global stage — across agriculture, fintech, gender equity and public health. In a dedicated dialogue, WCF and ICMR presented a portfolio of low-cost, high-impact Indian health technologies, showcased for their investment potential and adaptability across the Global South — positioning India not as a laboratory of innovation alone, but as a global partner in rethinking how development is delivered and funded.

Our Approach

WCF convenes the whole system, anchors decisions in evidence, and measures success by outcomes rather than activity — placing women and children at the centre of India's public health story not as beneficiaries, but as the measure of whether the system is working.



Connect with Us

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TECHNOLOGY_{for} HEALTHCARE

INDIA'S MANTRA FOR UNIVERSAL HEALTH COVERAGE

A synthesis of six national stakeholder consultations on the role of digital technology and artificial intelligence in advancing Universal Health Coverage

NATIONAL DISEASE MODELLING CONSORTIUM, IIT BOMBAY

in knowledge partnership with the Women's Collective Forum May 2026