INDIA HEALTH FUND

A **TATA TRUSTS** INITIATIVE

2024-2025
Annual Update

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Message from the CEO

At India Health Fund, we have learned that the changing dynamics of public health require us to be agile and adaptable to evolving challenges. From our early focus on TB and malaria, India Health Fund has now expanded the scope of our work to also address other pressing public health challenges. These include the health impacts of climate change, lung diseases (which are often misdiagnosed as tuberculosis) and antimicrobial resistance. What hasn't changed is our founding thesis that catalytic funding for science-led innovation, and partnerships can accelerate the lab-to-patient journey of transformative innovation to improve the lives of the most underserved.

As Mr. Ratan Tata had said while launching India Health Fund

> *In order to overcome the challenges associated with this issue (of infectious diseases), we should use innovations to create models that are not geographically bound and can be replicated anywhere in the world. The India Health Fund will endeavour to combine innovation and effort for the implementation of the project at a large scale."*

Our catalytic support for innovation has so far enabled early diagnosis and access to treatment at primary care, with innovation helping primary workers to be better equipped to serve their communities. As we look ahead, we will continue to support innovation that addresses the unmet health-related needs of communities in India and other developing countries. And throughout our journey, one thing has remained clear - real impact is only possible through collaboration and we are deeply grateful to all our partners who continue to support this shared mission.

We invite you to reflect on the milestones of the past year and join us in this journey. Happy reading.

Kind regards

Madhav Joshi
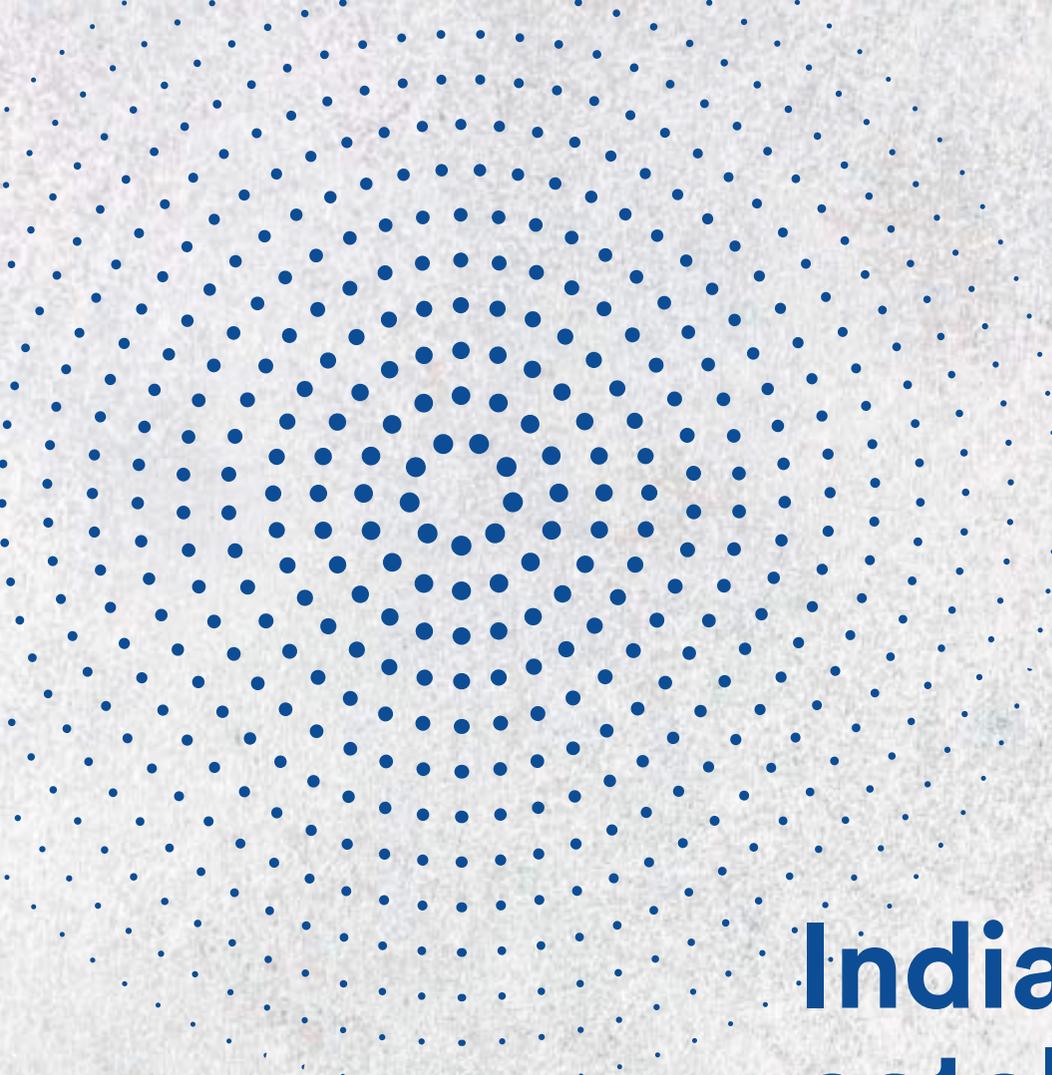
India Health Fund – catalytic funding to de-risk innovation for public health

Our Vision

Enabling innovations for a healthier world

Our Mission

To strengthen health systems and improve access to healthcare by:

1. **A**ccelerating lab to last-mile journey for innovations
2. **B**uilding collaborations
3. **C**atalyzing and aggregating funds

India Health Fund (IHF), set up by the Tata Trusts in 2017, aims to generate a catalytic effect on the financing of India's progress towards the elimination of infectious diseases and other public health risks, with a particular focus on improving access to healthcare, equity, and preventing mortality. IHF funds the development and de-risking of frontier science and technology-based innovations, bridging the gap created by the lack of patient capital particularly for early-stage innovations. IHF also develops partnerships for collaborative financing to fund product development, evidence generation, and knowledge sharing to catalyze the lab-to-market journey of these solutions in India and other developing countries. This is done in close collaboration with the government and the private sector to strengthen health systems and improve health equity with scalable and sustainable approaches.

Since inception, IHF has continuously adapted to meet the evolving landscape of public health challenges. What began as a catalytic effort focused on tuberculosis (TB) and malaria has now expanded to also address other pressing challenges like the health impacts of climate change, antimicrobial resistance (AMR), lung health, and women's health, all while retaining a strong focus on communicable diseases. Throughout this journey, one thing has remained constant is the commitment to leverage cutting-edge technologies to improve early diagnosis and access to primary care, reduce infection transmission, bridge skill gap in healthcare workers and ensure scalability – all towards strengthening health systems and improving outcomes for those most in need.

Priority Areas for Innovation funding

Climate and Health Adaptation

Tuberculosis and Lung Health

Antimicrobial Resistance

Screening and Diagnostics:
Minimally Invasive and non-invasive tools for TB, lung health, climate-sensitive infectious diseases and AMR

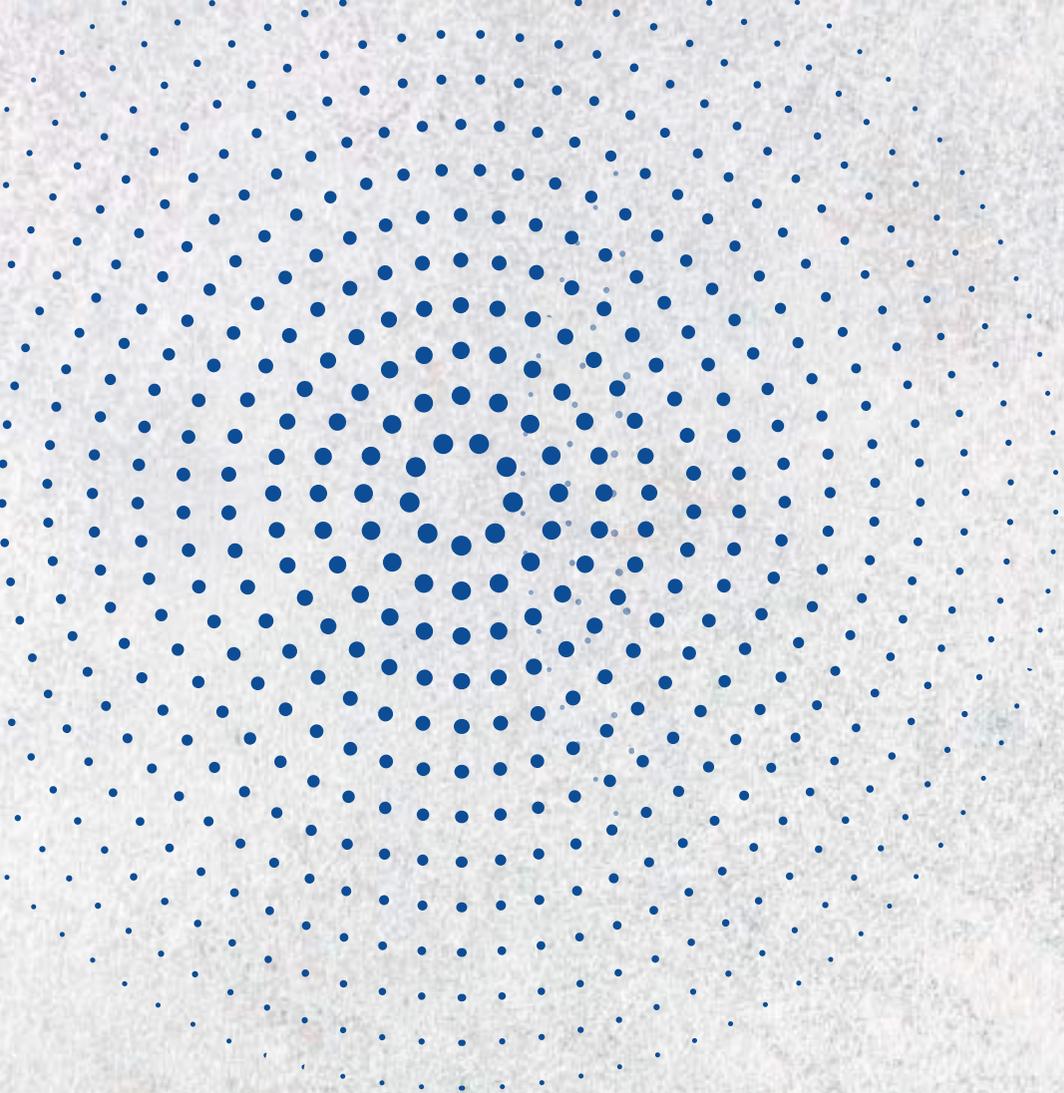**Data-based Decision Support and Surveillance:**
Tools for effective response to climate-sensitive diseases

Supply Chain:
Solutions to optimize the supply chain of samples, consumables, vaccines and drugs

Implementation Research:
Evidence generation, deployment and pilot studies

Climate and Health Adaptation

Why do we work in adaptation to the impact of climate change on human health?

The climate is changing. India is one of the most climate-vulnerable nations globally, with 17 out of 20 Indians falling under the "vulnerable" category and 5 out of 20 being "highly vulnerable" to climate change[1]. By 2030, between 160-200 million people are expected to face deadly heat exposure[2], 1.3 billion people will continue breathing hazardous levels of air pollution[3], and about 3.5 billion people could potentially be exposed to the pathogens coming from animals[4]. Vector-borne diseases like malaria, dengue, zika, and chikungunya are expanding into new regions as changing weather patterns create favourable conditions for mosquito proliferation[5]. Antimicrobial resistance is worsening due to climate-driven shifts in bacterial growth, increased antibiotic use in response to climate-related infections, and disruptions in healthcare access. Similarly, waterborne infections such as cholera and typhoid are surging due to extreme rainfall events and floods[6].

Despite growing evidence linking climate change to adverse human health outcomes, most actions and investments have focused on emissions reduction, decarbonization of economy, and sustainability. Health remains an underfunded piece of the climate puzzle. There's a critical need to fund:

- Research that deepens understanding of climate-health interactions and informs new solutions Development and validation of these tools

1   https://www.ceew.in/publications/mapping-climate-change-vulnerability-index-of-india-a-district-level-assessment
2   https://www.mckinsey.com/capabilities/sustainability/our-insights/climate-risk-and-response-physical-hazards-and-socioeconomic-impacts
3   https://aqli.epic.uchicago.edu/wp-content/uploads/2023/08/India-FactSheet-2023_Final.pdf
4   https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.70039
5   Bhattacharyya, H., & Agarwalla, R. (2022). Trend of emerging vector borne diseases in India: way forward. International Journal Of Community Medicine And Public Health, 9(6), 2730–2733. https://doi.org/10.18203/2394-6040.ijcmph20221560
6   https://www.nature.com/articles/sdata2017135
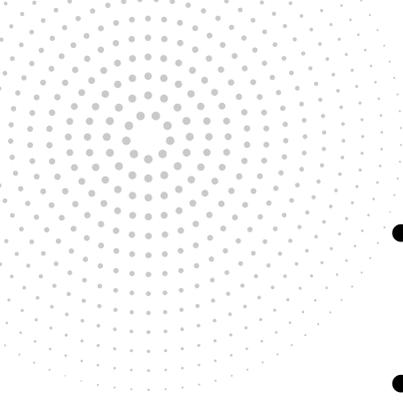
- Pilots that deploy existing tools and build evidence in climate-impacted settings

- Large-scale programmes that demonstrate adaptation and mitigation outcomes of these innovations

To mount a health-centred response to the climate crisis, we need to establish a science-led approach where innovations like strong real-time surveillance tools and effective diagnostics help keep up with the growing spread of climate-sensitive infectious diseases. Early detection of climate-sensitive infectious diseases is key to strengthening disease management strategies and enhancing public health resilience in the face of climate change. However, the large-scale adoption of these solutions will require evidence of their effectiveness, adaptability, and long-term viability in climate-affected situations, with a particular focus on demonstrating improved outcomes for communities at greatest risk. Such evidence, based on robust field data and real-world performance assessments, can then be translated into actionable interventions and scalable approaches.

IHF has been at the forefront of this effort, enabling the development and validation of innovative tools for improved surveillance and diagnosis of climate-sensitive diseases like dengue, malaria, TB, and AMR. These include AI-powered surveillance systems, point-of-care and community-level diagnostics, based on advanced technologies like LAMP, RT-PCR, and telepathology—designed for use in resource-limited, climate-affected environments.

Doubling down, IHF is strengthening its efforts further in climate and health adaptation by extending this experience to develop and validate tools that can help health systems adapt to public health challenges posed by climate change.

As IHF forges ahead in addressing the health impacts of climate change, the aim is to:

- **Build a platform** for collaboration to enable end-to-end development from

bench to bedside, drive broader adoption, increased financing, and rapid scale-up of climate and health solutions.

- **Develop a pool of bankable solutions** for India and other developing countries, supporting the design, development, testing, service delivery, and evaluation of locally led strategies, with technical assistance for governments, nonprofits, social enterprises, and civil society.

- **Mobilize capital** by convening governments, multilateral agencies, philanthropies, and impact investors, while advocating for stronger integration of health within climate finance.

- **Create investment toolkits** offering practical guidance on deploying catalytic capital and matching it with high-impact opportunities.

- **Design collaborative funding mechanisms**, such as pooled funds and fit-for-purpose financial instruments, tailored to diverse use cases and scaling needs.

Innovation Priorities in Climate and Health Adaptation

Diagnostics, Screening and Surveillance solutions for:

1. Climate-Sensitive Infectious Diseases
Water-borne infections
Vector-borne infections
Fungal infections
Antimicrobial Resistance

2. Heat Adaptation

3. Lung Health

India Health Fund's Climate and Health Adaptation Portfolio

01 **Climate and Health Vulnerability Index: an AI-based real-time decision support tool to help assess climate-related health risks and enable proactive public health intervention**

Problem

With millions exposed to the rising effects of climate change, India and many other countries require localized, data-driven insights to guide effective public health interventions. Current methods to assess climate vulnerability rely on time-consuming, error-prone manual data collection methods; with data not available in real-time; and often don't include village-or community-level information. This prevents them from making accurate, localized predictions at the community level (crucial for geographically diverse states); and have limited temporal resolution, with most calculations utilizing data from 2019 or earlier instead of real-time data that accounts for evolving climate and health conditions.

Solution

Climate and Health Vulnerability Index (CHVI) builds on Khushi Baby's flagship platform for maternal and child health, called CHIP, which has transformed healthcare delivery in Rajasthan since 2014, driving improvements in immunization rates and reducing malnutrition for over 45 million people. Today, the platform is used by over 75,000 Community Health Workers (CHWs), reaching 40,000 villages, and is scaled fully within Rajasthan's public health system. Khushi Baby's model focuses on co-developing solutions with the governments and

transitioning implementation responsibilities to them, ensuring the sustainability of innovations.

Building on the successes and lessons from CHIP, CHVI will go a step further and assess climate-sensitive health vulnerability indices, which will help forecast risks such as air pollution spikes, heat-related illnesses, or vector-borne disease outbreaks and enable proactive responses. CHVI holds the potential to function as an early warning system for health officials to deploy targeted interventions and reallocate resources swiftly and appropriately to areas where climate-related health risks are the highest. With the ability to integrate data with state-level health monitoring systems, CHVI promises to enhance state-level early warning capacity and risk management.

CHVI exemplifies a decentralized health systems strengthening approach and delivers granular insights with a high level of accuracy at the village, block, and district levels. It integrates climate science and health data, generating a composite vulnerability score based on several factors like exposure to climate stressors like temperature, air quality, and rainfall; demographic and socio-economic data and data related to access to healthcare.

Support from India Health Fund

IHF's support to Khushi Baby will catalyze the development of CHVI in Rajasthan, involving data engineering, policy inputs and stress testing, followed by a validation phase with pilot testing, training, and feedback loops. A final refinement phase will allow for model adjustments, training, state-wide dissemination in Rajasthan and positioning the open-access digital public good for multi-state adoption.

02 Digitizing national malaria statistics

Problem

Effective monitoring and surveillance of vector-borne diseases like malaria is of paramount importance for the prevention of and timely response to outbreaks. One of the key aspects of surveillance is timely data collection and processing for timely decision making, which goes through different steps from sub-centre level onwards. Current primary care-level surveillance and reporting is based on time-consuming and error-prone manual and paper-based methods that face several systemic and operational challenges such as slow speed and lack of real-time reporting, lack of consistency in reporting across different states, poor data back-up and storage possibilities, as well as lack of proper data analytics for identifying disease trends. A robust real-time and complete surveillance system that addresses these bottlenecks has been identified as a core need.

Solution and support from India Health Fund

IHF collaborated with the Ministry of Health and Family Welfare's National Vector Borne Disease Control Program (NVBDCP), Government of India, to strengthen malaria surveillance in India. As part of this effort, IHF supported the development of a digital dashboard integrating 10 years of retrospective malaria case data. This national surveillance tool enhances outbreak preparedness and management by enabling real-time data access, improving decision-making, and facilitating targeted, integrated vector control strategies. With state- and district-level data tracking, the dashboard serves as a critical intervention in advancing India's pursuit of malaria elimination by 2030.

Impact and where it stands today

Today, the dashboard is used to track key metrics such as total cases recorded, total positive cases, the number of rapid diagnostic tests performed, the number of blood slides examined, the distribution of cases by age, and the number of severe cases and deaths at national, state and block/taluka levels. In the future, the dashboard holds potential to integrate malaria case data with climate and other data, and implement analytics to assess disease trends, outbreaks and determine the response, quantify, and forecast resource requirements, assess program performance, and adjust interventions.

03 TrakItnow: An AI-based real-time surveillance tool to detect and predict mosquito-borne disease outbreaks

Problem

Mosquito-borne diseases, including dengue, malaria, and chikungunya, already pose a significant global health threat, accounting for over 17% of infectious diseases and making up for 700,000 deaths annually[7]. Changing weather patterns are exacerbating the burden in endemic and new regions. Mosquito surveillance depends on time-consuming manual processes for larvae collection, analysis and reporting due to the shortage of entomologists. Widely used vector-control methods like fogging are partially effective and not species-specific.

Solution

IHF engaged with TrakItNow to develop Moskeet, the world's first commercially available smart mosquito trap that can autonomously identify and measure concentrations of various mosquito species carrying diseases such as Malaria, Dengue, Chikungunya, Japanese Encephalitis and Zika Virus, in real time. The smart device includes a

7 https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases

trap that captures a broad spectrum of mosquito species using multiple attractants and sensors. Light and audio sensors then detect wing beat frequencies, that are used to decipher mosquito species and gender using AI. Internet of things is then deployed to send the collected data in real time. Owing to its autonomous operation and real-time data transmission capabilities, Moskeet overcomes the challenges of slow manual data collection and the shortage of epidemiologists to analyze and interpret data. Data on climate and epidemiology can be combined with vector surveillance data to predict disease outbreaks and climate change hotspots, making this a powerful Climate and Health innovation.

Support from India Health Fund

With IHF's support, Moskeet has launched pilot field operations in Bhubaneswar in partnership with ICMR-Regional Medical Research Centre. As part of this pilot, data on mosquito species, disease patterns, climate, population density, and socio-economic factors is being collected over two breeding seasons. Additional deployment is currently being explored.

Impact and where it stands today

The innovation has already shown:

- It gathers and interprets disease surveillance data 20 times faster, 3 times more accurately, and at 15% of the current cost of manual methods

- Nearly 85% savings on surveillance with value addition of real-time data

- 20% reduction in fumigation costs through identification of more effective pesticides

- 60% reduction in mosquito populations and 40% decrease in disease burden by focusing resources on high-risk areas

- Additionally, Moskeet was listed in the United Nations Development Program (UNDP) Solution Catalog, accessible by all UNDP country offices, where it can be considered for adoption and scaling up

04 Ameliorate: A single test to simultaneously detect dengue, chikungunya, and malaria

Problem

Over 80% of the global population is at risk from at least one major vector-borne disease, with more than half facing the danger of two or more[8]. The estimated economic burden of these diseases, driven by associated healthcare costs, productivity loss, and long-term impacts, stands at $8 trillion globally. Dengue, with over 100 million cases and 20,000–25,000 deaths annually, often spirals to severe conditions like Dengue Haemorrhagic Fever and Dengue Shock Syndrome, if not promptly managed[9]. Malaria remains life-threatening, with India witnessing over 2 million cases in 2023[10]. Chikungunya continues to surge, with suspected cases exceeding 240,000 annually by 2024[11].

8   Global Vector Control Response 2017-2030. (n.d.). In https://iris.who.int/bitstream/handle/10665/259205/9789241512978-eng.pdf?sequence=1. Retrieved June 20, 2025, from https://iris.who.int/bitstream/handle/10665/259205/9789241512978-eng.pdf?sequence=1

9   Schaefer, T. J., Panda, P. K., & Wolford, R. W. (2024, March 6). Dengue Fever. StatPearls - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK430732/#:~:text=Dengue%20fever%20is%20the%20fastest,Asia%2C%20Africa%2C%20and%20Australia.

10 https://www.pib.gov.in/PressReleasePage.aspx?PRID=2087878

11 Chikungunya Situation in India :: National Center for Vector Borne Diseases Control (NCVBDC)

Malaria, dengue and chikungunya often present similar symptoms -- fever, fatigue, and body aches--at an early stage, which can lead to a misdiagnosis or even delayed diagnosis. Misdiagnosis or delays in treatment can worsen outcomes, while healthcare workers struggle with multiple tests, costly equipment, and time-consuming protocols, especially in resource-limited settings. There is an unmet need for a multiplex rapid diagnostic test (RDT) that is real-time, easy-to-use, affordable, user-friendly and equipment-free.

Solution

Addressing these need gaps, Ameliorate developed an accurate, multiplexed RDT for differential detection of dengue, chikungunya and malaria (with malaria falciparum and vivax differentiation).

Support from India Health Fund

The test, being evaluated for performance and cost-effectiveness with support from IHF, uses a single blood sample and can be easily used by a minimally trained health workers at the primary care level. The process eliminates the need of serum/plasma samples, is instantaneous, doesn't need cold chain facility/ biosafety lab, and ensures minimal medical waste generation.

Where it stands today?

The multi-centric validation of Ameliorate's test with dengue, chikungunya and malaria samples has now been completed, with the test demonstrating near 100% accuracy. The test is now awaiting Central Drugs Standard Control Organisation (CDSCO) license, after which manufacturing at scale and deployment will begin.

05 Medprime: AI-based detection, parasitic load calculation, and species differentiation for faster and more accurate diagnosis of malaria

Problem

Traditional analog microscopy—unchanged in decades—remains the mainstay diagnostic tool for malaria, yet it misses up to 25% of cases, especially in hard-to-reach remote regions. The accuracy of analog microscopy and interpretation of its results depends heavily on the skill and training of technicians, leading to subjective interpretations, delayed results, and underreporting. Inaccuracies at this level weaken both diagnosis and surveillance, making disease control harder.

Solution

Medprime Technologies developed an Artificial Intelligence (AI)-powered algorithm for faster, more cost-

medprime

effective and accurate diagnosis of malaria. The algorithm, which is locally trained by machine learning, automatically detects, identifies and differentiates between malarial parasites (P. falciparum and P. vivax). This tool will be particularly useful in identifying infections with low-parasite loads, which are commonly missed by conventional microscopy. The algorithm is microscope, disease (communicable and non-communicable) and sample (blood, urine, stool, pus) agnostic and will slash by one-third the time taken for slide viewing, image processing and result reporting. The algorithm will also overcome the need for trained manpower and will prove important for training and research for medical, paramedical and allied health staff that need remote collaboration and interoperability. The platform algorithm can be used beyond malaria in WBC differentiation, histopathology and cytopathology for cancer, sickle cell disease, etc.

Support from India Health Fund

IHF's support to Medprime is enabling the development and pilot testing of this AI/Machine Learning-led multiplex diagnosis software.

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06 — Gazelle: A 1-minute $2 point-of-care rapid test for differential diagnosis of malaria

Problem

Delayed and inaccurate diagnosis of malaria, especially in remote or resource-limited areas, can be deadly. Existing rapid diagnostic tests often miss 2–4% of cases due to genetic mutations in the parasite, resulting in false negatives and preventable fatalities.

Solution

Gazelle is a handheld, point-of-care diagnostic that delivers results in just one minute, using a single drop of blood. Unlike traditional tests, Gazelle detects Hemozoin, a unique by-product of malaria infection, making it more reliable even in genetically variant cases.

It accurately identifies both Plasmodium falciparum (Pf) and Plasmodium vivax (Pv), the two most common malaria strains, right at the patient's doorstep. With a target cost of just $2 per test, Gazelle is not only faster and smarter—it's twice as affordable as current alternatives. The device also seamlessly captures and transmits patient and case data to

national malaria surveillance systems, enabling real-time reporting and quicker public health response. As a platform solution, Gazelle has also been applied to develop a point-of-care test to detect sickle cell disease.

Support from India Health Fund

IHF supported the validation study of Gazelle for diagnosis of malaria, including species differentiation with a target accuracy of >95%. The comparators used for this study were RDTs and microscopy, while PCR was used as a gold standard. The study was conducted under the guidance of ICMR-National Institute of Research in Tribal Health.

Impact and where it stands today

While still being developed for malaria diagnosis, Gazelle's use for sickle cell disease diagnosis has already advanced, for which it is already being deployed across 27 countries worldwide, including in India.

Stakeholder Engagement Initiatives in Climate and Health Adaptation

15th Annual Conference of the Indian Society for Malaria and Other Communicable Diseases (ISMOCD) [January 2025] in Delhi, where IHF led a panel on "Leveraging Technology and Innovation to Strengthen Health Systems' Adaptation to Climate Change and Combat Vector-Borne Diseases".

IHF joined the National Dialogue on "How can India make its Health sector climate-resilient", Delhi [February 2025], led by Council on Energy, Environment and Water (CEEW).

Heat Conference - India 2047: Building a Climate-Resilient Future, Delhi [March 2025], where IHF was part of the panel on "Resilient Health Infrastructure, Policy & Governance, Equity, Clinical Pathways, and Finance".

Keystone conference on Climate change and Infectious Disease Threats [June 2025] where IHF joined the funder panel on "Funding opportunities and challenges for climate change and infectious disease threats" alongside Bayer Foundation, Science for Africa Foundation and the Wellcome Trust.

Partnerships in Climate and Health Adaptation

Tackling climate-driven health vulnerabilities with AVPN

The intersection of climate and health is an urgent yet under-addressed domain that demands bold multi-sectoral collaboration to drive scalable impact. From tracking climate-sensitive infectious diseases (CSIDs) to enabling heat adaptation and developing robust diagnostics, the scope of this challenge is too vast for any one organization to solve alone.

To accelerate meaningful action, IHF partnered with AVPN, Asia's largest network of social investors, to create a regional platform that advances high-impact, tech-enabled Climate x Health (CxH) solutions across Asia. This partnership mobilizes diverse forms of capital while leveraging IHF's expertise in funding and enabling innovation development and adoption for public health and AVPN's role as an anchor, fund manager, and ecosystem enabler.

A key milestone of the collaboration is the launch of the Climate x Health (CXH): Lighthouse for Asia Fund. For the fund's first call in March 2025, AVPN brought together co-funding from IHF, Bayer Foundation and Prudence Foundation.

The call focused on innovations addressing two critical areas:

- Surveillance and management of climate-sensitive infectious diseases (CSIDs)

- Adaptation to heat-related health impacts, including heat-stable diagnostics

These focus areas were selected due to their disproportionate impact on vulnerable communities across Asia and the untapped potential of innovation in product and service delivery.

> "*Tackling the urgent challenges at the nexus of climate and health requires bold collaboration and catalytic capital. Through this partnership, we aim to surface and scale transformative solutions that not only foster climate resilience but also strengthen health systems across Asia, ensuring vulnerable communities are not left behind.*"

**Madhavika Bajoria,**
Executive Director, Health Impact at AVPN

> "*Climate change is an urgent health crisis that demands a collaborative response. The intersection of climate and health requires robust public-private partnerships to mobilize resources, share knowledge, and foster innovation. By working together, we can leverage diverse strengths to develop sustainable solutions that protect vulnerable populations and ensure equitable access to healthcare in the face of climate challenges.*"

Chitkala Kalidas,
Executive Director of Bayer Foundation

> "*At Prudence Foundation, we believe that technology and innovations have a critical role to play in building community resilience against climate and health risks. Through these partnerships and collaboration, we aim to help find, fund and support these grassroot innovative solutions to unlock capital for them to grow and scale.*"

Nicole Ngeow,
Executive Director, Prudence Foundation

Beyond mobilizing capital, the fund also surfaced critical insights into the CxH innovation landscape, highlighting solution gaps, funding needs, and opportunities to strengthen the ecosystem. These learnings are now shaping the next phase of the Lighthouse Fund's development, ensuring future efforts are informed, inclusive, and impactful.
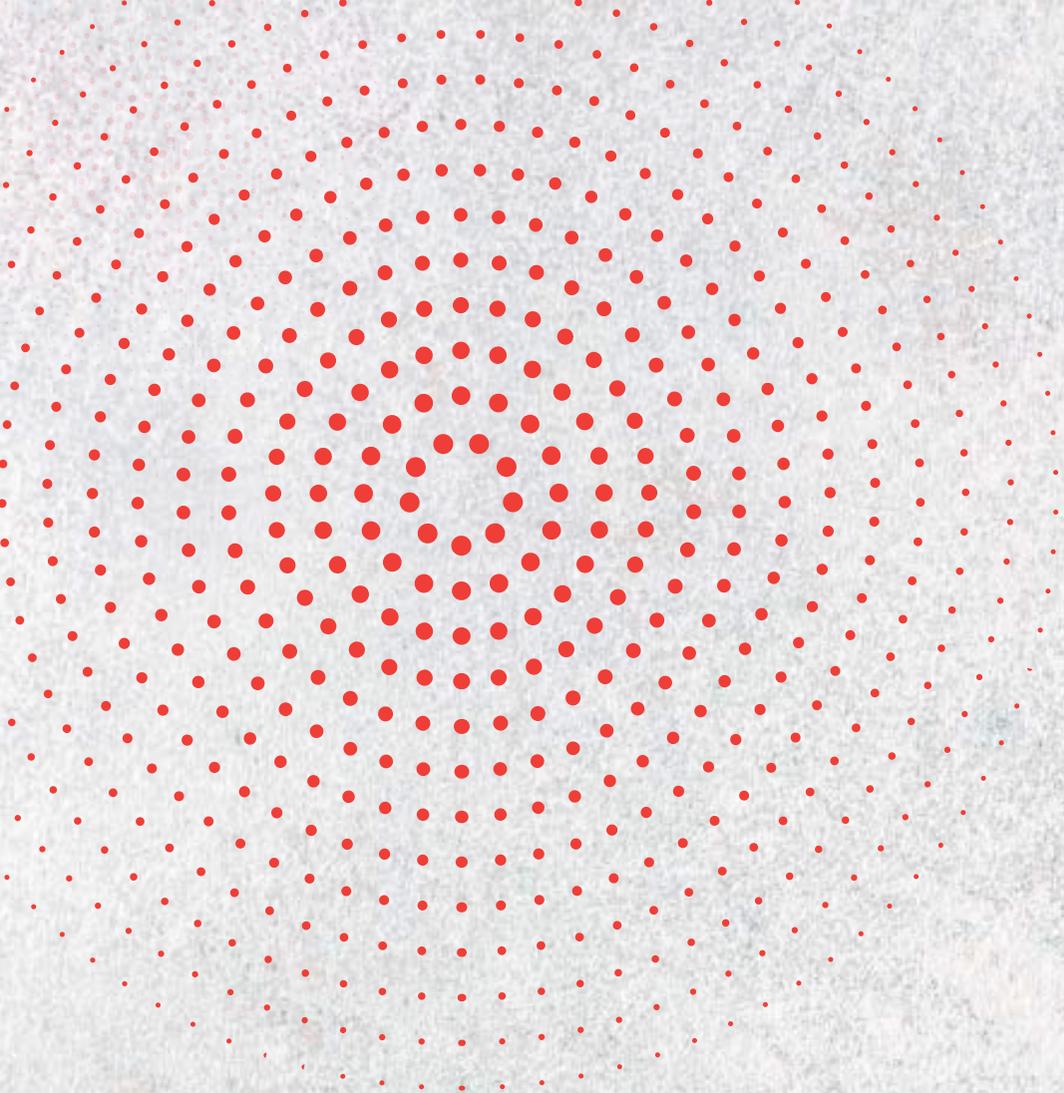
Tuberculosis (TB) and Lung Health

Why do we work in TB and Lung Health?

Tuberculosis (TB) continues to top the chart of the world's deadliest killers, with 10.4 million new infections every year and nearly 1.8 million deaths. A third of these lives are lost in India. Over the years, from 2015-2022, India has seen a 16% drop in TB incidence and an 18% fall in TB deaths, outpacing global averages, but the battle is far from over.[12]

Gaps – old and new – in the TB care pathway persist. TB surveillance needs strengthening. Rapid molecular testing must become the norm, not the exception. Communities need to be placed at the heart of TB responses. New research reveals that TB is far more complex than the traditional binary of latent and active forms. It exists on a spectrum—from latent and incipient TB (likely to progress) to subclinical TB (asymptomatic but infectious) and full-blown active TB. Globally, nearly a quarter of the population carries the TB bacteria, and about 5–10% of these may develop active disease[13]. In India, surveys show that up to 55% of TB cases are subclinical, highlighting a large, often-missed burden[14]. TB also affects more than just the lungs. Extrapulmonary TB (EPTB)— one that impacts organs like lymph nodes, bones, and the brain—accounted for nearly 25% of India's TB cases in 2023[15]. These nuances must inform TB policy, diagnostics, and care.

While the response is trying to keep pace, the TB bacteria (*Mycobacterium tuberculosis*) are also evolving into forms resistant to existing antibiotics. These harder-to-treat multidrug-resistant versions are undermining the progress made in TB control and elimination efforts against the disease. India accounted for ~27% of the global burden of multidrug-resistant TB (MDR-TB) in 2023[16]. The rise of these resistant forms holds

12 Mase, Sundari. (2019). The end TB strategy for India. Indian Journal of Tuberculosis. 66. 10.1016/j.ijtb.2019.02.005.
13 World Health Organization: WHO & World Health Organization: WHO. (2025, March 14). Tuberculosis. https://www.who.int/news-room/fact-sheets/detail/tuberculosis
14 World Health Organization: WHO & World Health Organization: WHO. (2025, March 14). Tuberculosis. https://www.who.int/news-room/fact-sheets/detail/tuberculosis
15 https://tbcindia.mohfw.gov.in/wp-content/uploads/2024/10/TB-Report_for-Web_08_10-2024-1.pdf
16 Global Tuberculosis Report 2024

the potential to complicate TB treatment, prolong illness, worsen outcomes, increase healthcare costs, and even raise the risk of transmission.

IHF has been using the "DEVELOP-DEPLOY-SCALE" model for innovations for TB since its inception. Today, the organization boasts a 10-innovation-strong portfolio in TB that addresses diverse aspects of the disease – from rapid screening and triaging, to more affordable and swift ways of diagnosing TB including drug-resistant TB, to platform tests that can distinguish TB from other lung ailments, to safer ways of handling and transporting sputum samples for TB testing, to testing for zoonotic TB that can easily pass from animals to humans, and more.

India Health Fund's TB and Lung Health Portfolio

Molecular diagnostics

Molecular diagnostics have transformed TB detection by enabling rapid and accurate identification of TB and its drug-resistant forms. However, significant gaps remain in the accessibility of molecular diagnostics, especially in low-resource settings. Current platforms like CBNAAT and TrueNat, while impactful, are limited by high upfront costs, proprietary consumables, operational complexities, and physical infrastructure needs, resulting in only about 21%[17] coverage of molecular diagnostics for TB diagnosis in India, delayed diagnoses and missed cases. There is a pressing need for innovation to bridge these gaps—making molecular testing more affordable, decentralized, and adapted to operating conditions in diverse healthcare settings, particularly for remote, vulnerable and high-risk populations. IHF is enabling this shift by supporting next-generation diagnostic solutions that drive decentralization and expand access to high-quality TB testing at the last mile.

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17   https://tbcindia.mohfw.gov.in/2024/10/11/india-tb-report-2024/

01 TrueNat: Using molecular diagnostics to improve diagnosis of TB, including drug-resistant TB, at point of care

Problem

The absence of specialized testing facilities and skilled technicians to diagnose TB, including drug-resistant TB, results in several cases going undiagnosed, hampering efforts to eliminate the disease around the world. TB patients in low-resource settings lack access to accurate and rapid TB diagnostic tests at the point of care, leading to delays in diagnosis and treatment initiation and furthering antimicrobial resistance.

Solution

The Truelab Real Time Quantitative micro-PCR (TrueNat) from Molbio Diagnostics is a compact, easy-to-use, battery-operated system that provides TB test results at point of care within 90 minutes. It can also rapidly detect resistance to anti-TB drugs – Rifampicin (rpoB gene), Isoniazid (katG and inhA genes), Fluoroquinolone (gyrA/gyrB genes) and Bedaquiline (atpE gene). This enables same-day reporting and initiation of evidence-based treatment for TB with the right antibiotic, reducing the risk of infection spreading while waiting for test results and facilitating faster recovery due to early treatment initiation.

Support from India Health Fund

IHF-supported the deployment of TrueNat in two districts in Uttar Pradesh, which demonstrated significant improvement in testing presumptive TB patients, with 92% of the samples tested reporting results on the same day. Treatment initiation time improved by 45% compared to the baseline, and 96% patients initiated their treatment within seven days of test results. TrueNat was also validated for effectiveness as a TB/COVID-19 diagnostic test at community health centres in Uttar Pradesh with IHF's support.

Impact and where it stands today

Today, over 7000 TrueNat machines are deployed within India through the National TB elimination programme. 50% of total molecular testing for TB in India, a third of drug-resistant cases detected, and 15% of presumptive TB patient case examinations are to the credit of TrueNat.

While currently in use for the detection of TB and specific resistance to TB drugs, it is a versatile platform that can be adapted to other diseases. Molbio is actively advancing its research and development efforts to expand into developing a broader AMR panel using TrueNat, which could test for resistance to multiple antibiotics across key disease areas, including sepsis, urinary tract infections (UTIs), and respiratory infections.

02 Autogene TB: An automated one-stop-shop for TB diagnosis

Problem

Sputum samples for diagnosis of TB are currently collected from patients at healthcare centres in plastic bottles. This process exposes healthcare workers to the risk of infection while collecting samples. Diagnosis of TB with these samples is often done through sputum smear microscopy – a time-consuming process with low accuracy, which also requires skilled lab technicians. These result in delayed diagnosis & initiation of treatment, missed cases of TB and increased risk of infection to healthcare workers.

Solution

To reduce the gap between TB incidence and the notified cases, IHF engaged with Valetude Primus Healthcare to develop Autogene. A one-stop shop for TB diagnosis, Autogene enables safe collection of sputum samples from patients in specially designed capture bottles, which protect the healthcare workers from exposure to highly contagious TB bacteria. Furthermore, it provides rapid (TB diagnosis within 1 hour), accurate and affordable TB diagnosis without the need for skilled technicians at primary healthcare level. The device includes a battery-operated RT-PCR diagnosis capability with an automatic gene detection feature that can be used for a broad range of automated applications including DNA isolation & extraction, enabling faster and error-free detection and allows for usage with minimal training of healthcare workers. It is a one-stop end-to-end detection solution - from sample collection, processing to report generation – that provides a holistic report to clinicians on disease confirmation as well as presence of bacterial resistance. Moreover, Autogene is integrated with National TB program and sends results for surveillance and reporting directly. Finally, it can also be used for the diagnosis of several bacterial and viral diseases including TB, COVID-19, Typhoid and sepsis.

Support from India Health Fund

The potential of Autogene to address the access gap within molecular diagnostics is the main reason for IHF supporting its validation study since it combines safe sample collection with an automated point-of-care RT-PCR based diagnostics. Through IHF's support, Autogene's in-lab validation was completed with 800 samples, deeming the device ready for clinical validation.

Quantiplus®, India's first ICMR-recommended open RT-PCR solution that universalizes affordable access to faster molecular diagnostics for TB

Problem

TB diagnostic delays and under-detection persist, especially among rural and underserved populations. Conventional diagnostic methods (culture, smear microscopy) are limited by poor sensitivity, while advanced molecular diagnostics (CBNAAT / TrueNat), though more accurate, are often costly and out of reach for many patients. A large segment of the population remains undiagnosed due to the limitations of closed diagnostic systems, which require stable electricity, controlled environments, skilled personnel, and well-equipped labs, resources often scarce in remote and rural settings. While RT-PCR platforms are increasingly available across both government and private health systems, their full potential of molecular diagnostics to provide rapid and accurate diagnosis at the point of care remains unfulfilled due to the limitations of current closed systems.

Solution

Quantiplus® MTB Fast Detection Kit from Huwel Lifesciences is a rapid, accurate, open-system RT-PCR solution that delivers TB diagnosis in just 40 minutes without the need for complex DNA extraction. Priced at less than INR 200 per test, which is ~1/10th the current test price for closed-system cartridge-based tests, Quantiplus® offers an accessible, affordable, high-impact tool to accelerate access to molecular diagnostics. It doesn't require complex sample preparation, expensive equipment or highly trained personnel. The test helps to reduce diagnostic delays, improve case detection in hard-to-reach populations and deliver performance comparable to high-end closed RT-PCR systems, albeit with simplified workflows that make it ideal for use in decentralized, district-level labs. The solution can scale to 900 tests per day, enabling district-level facilities to diagnose

patients faster. Faster diagnosis and initiation of treatment will also reduce the risk of transmission of infection and enable swifter recovery of patients.

Support from India Health Fund

IHF has supported Huwel in conducting field feasibility studies for Quantiplus® across 10 Central TB Division-approved sites. The test has been approved by CDSCO, validated by the Indian Council of Medical Research (ICMR), and independently benchmarked by Infexn Labs. The feasibility study is enabling the generation of operational and clinical evidence for Quantiplus® in real-world settings and validating the platform's performance across diverse geographies, specimen types, and health system levels. The expected outcome is to inform policy decisions around the inclusion of open RT-PCR platforms in national TB diagnostic frameworks, while also establishing the feasibility of decentralized, high-throughput molecular testing in district-level labs.

04 Breaking the chain of zoonotic TB: cutting TB transmission from cattle to humans

Problem

Bovine TB is chronic among cattle, and represents a key zoonotic transmission threat to humans. There is high risk of transmission of TB from cattle to humans, which is made worse by low diagnosis among cattle owing to the lack of an efficient test for bovine TB[18]. Animal-to-human transmission of TB is estimated to account for up to 10% of global TB cases. The currently available test for diagnosing bovine TB amongst cattle takes 4

18 https://www.sciencedirect.com/science/article/pii/S2666524720300380

days and 2 farm visits by a veterinary doctor, which is time- and labour-intensive, while also increasing the risk of disease transmission.

Solution

CisGEN Biotech has developed a rapid, affordable, and highly accurate bovine TB test kit that delivers results in just 10 minutes, at a cost of INR 50 (~$0.70) per animal. Using a unique combination of antigens, the test not only detects bovine TB with high sensitivity but also distinguishes between TB and environmental mycobacterial infections, minimizing false positives. It requires no specialized containment facilities and can be easily administered by field workers with minimal training.

Support from India Health Fund

IHF supported the product refinement of CisGEN's bovine TB detection test, facilitated its manufacturing and supported its validation through performance evaluation studies.

Impact and where it stands today

In-lab validation for CisGEN kit using samples from India, the UK, and Ethiopia showed 95% sensitivity and 100% specificity, significantly outperforming existing diagnostic kits. The kit is now being adopted across public and private sectors of the dairy industry, and its versatility is proving valuable beyond bovine TB. CisGEN's platform is already being adapted to detect Brucellosis, another major zoonotic disease, and has the potential to diagnose other chronic cattle conditions such as Johne's disease and Bovine Infectious Rhinotracheitis (IBR). Research

is underway to include additional antigens for Bovine Herpesvirus and Brucella LPS in the kit. Notably, the test has also shown strong sensitivity in detecting TB in wild and other domesticated animals, further expanding its use cases. By looking at the interconnectedness between humans, animals and the environment, the kit is truly a "One Health product".

Non-sputum-based screening and diagnostics

Non-sputum-based diagnostic solutions represent an important area of innovation in TB detection. Current sputum-dependent methods, while effective in many cases, face challenges in patients who are unable to produce quality sputum samples, like children, individuals with HIV, and those with extrapulmonary or early-stage disease. Alternative sample types—including blood, urine, breath, or oral swabs hold the potential to expand diagnostic reach and offer additional pathways for case detection, particularly in community and peripheral settings. Continued development and evaluation of these approaches, a core priority for IHF's work in TB, will support more inclusive and accessible TB diagnostic strategies.

05 Stellar Diagnostics: The world's first point-of-care rapid TB triage test

Problem

There is an absence of a point-of-care, effective, fast and affordable TB triage test to narrow down presumptive TB patients. 7-10 presumptive TB suspects have to be tested to identify one TB patient. TB detection using molecular methods is highly accurate but less accessible, expensive, and requires intensive training of technicians. What's urgently needed is an accurate, low-cost triage test which can be used at the point of care to quickly rule out TB suspects before moving to expensive molecular diagnostics.

Solution

Stellar Diagnostics has developed the world's first biomarker and antibody-based point-of-care TB triage test with backing from IHF. This lateral flow assay delivers results in just 20 minutes, with 85% accuracy in lab settings. It requires no lab infrastructure, minimal workforce training, and is priced at a highly affordable INR 125 (~$1.70) – a game-changer for point-of-care TB triaging.

Support from India Health Fund

After years of R&D supported by IHF, Stellar has completed development and successfully concluded in-lab validation with patient samples.

Impact and where it stands today

ICMR, New Delhi, has begun multi-centric clinical validation of the test at three sites: RMRC, Bhubaneshwar, NIMR, Chennai and NITRD, New Delhi, which is expected to be completed within months.. Stellar has also received a test license from CDSCO to conduct the above clinical trials. This crucial phase will determine its effectiveness in real-world settings and pave the way for broader deployment.

Once validation is completed, Molbio Diagnostics will lead commercial, manufacturing and distribution efforts for this test. IHF will continue to support the dissemination of findings of the clinical trial, enabling market access and facilitating stakeholder engagement to fast-track scale-up of this promising test in collaboration with Stellar and Molbio Diagnostics

This collaboration between IHF, Stellar and Molbio Diagnostics represents how IHF is enabling the development of a collaborative, end-to-end ecosystem to enable the development and scale-up of a promising innovation.

06 Healseq: A first-of-its-kind blood-based RT-PCR test designed for early detection of drug-resistant TB, tracking treatment response, confirming treatment completion, and identifying extrapulmonary TB

Problem

- As per protocol, the response to 1st line TB treatment is measured at 8 weeks post initiation. Poor responders then undergo drug-resistant TB (DR-TB) testing and treatment adjustment. Delayed identification of poor responders increases drug resistance, disease transmission, and patient side effects. There is a critical need to rapidly identify poor responders, halt ineffective therapies, curb drug-resistant TB spread, and improve outcomes.

- Once completed, the treatment endpoint is often defined by national/global programme guidelines. However, a one-size-fits-all approach might not necessarily "cure" every patient. There is a need to assess, in a personalized manner, whether a person is cured at the end of treatment, or the treatment needs to continue/changed to the second line of treatment.

- Finally, TB diagnosis relies largely on sputum samples, which becomes a bottleneck for detecting extrapulmonary TB and pulmonary TB in non-sputum producers. Sputum handling also presents serious biosafety issues.

Solution

HealSeq's innovation is a blood-based biomarker RT-PCR test, which detects RNA signatures from TB patients as early as two weeks after treatment initiation. The abundance of these RNAs can help physicians classify patients as good, intermediate, or poor treatment responders, soon after treatment initiation. Intermediate or poor responders can immediately undergo treatment modification or further confirmatory testing for DR-TB.

The test will also have applications as an "End-of-treatment test", helping determine whether the treatment has worked, and the patient has been cured. As the technique does not rely on sputum samples, the test is well-suited for the diagnosis of extrapulmonary TB and pulmonary TB in non-sputum producers.

The test holds the potential for:

- Improved treatment outcomes by identifying DR-TB much earlier and treatment being corrected faster.

- Achieving therapy individualization for patients who require longer or shorter therapy to cure TB.

- Being a first-of-its-kind reliable test for EPTB.

- Being the first-ever end-of-treatment test for TB.

- INR <1000 (~US$ 12) projected cost per test, which is 1/6th the cost of multiple tests needed during TB treatment. The test can be done using existing RT-PCR infrastructure in the country.

Support from India Health Fund

IHF has supported Healseq in the clinical validation of the test. The host-based biomarker test is now ready with a cost-effective RT-PCR kit that is showing 91% accuracy.

Healseq has also formalized an agreement with Molbio Diagnostics, through a partnership facilitated by IHF.

Molbio will support HealSeq in validating its RT-PCR test for TB detection and treatment efficacy monitoring, support its commercialization and wider public health integration and expand its applications to use cases beyond TB. IHF is also facilitating opportunities for HealSeq's test to be validated in other countries.

Impact and where it stands today

The company is now submitting its test licensing application to CDSCO. In progress is an easy-to-use mobile application to help clinicians easily interpret test results and provide actionable insights.

07 Swaasa: Non-invasive AI-powered detection of active TB in minutes using cough sounds

Problem

Active Case Finding (ACF) is vital for early TB detection in high-risk populations, but current methods—visual checks, symptom questionnaires, and exposure history—are subjective and inconsistent. As a result, 64% of symptomatic TB cases go undiagnosed. What's missing is a rapid, accurate, low-cost, and easy-to-use screening tool that frontline workers can use to triage patients for possible TB and refer for confirmatory testing, especially in low-resource settings.

Solution

Swaasa® is an AI-based mobile app developed by Salcit Technologies. Swaasa uses a smartphone's microphone to record a patient's cough and analyzes it using proprietary AI to detect unique acoustic signatures linked to pulmonary TB. Results are delivered within seconds without the need for lab, equipment or trained personnel. Swaasa is

non-invasive, hardware-free, and self-usable, making it ideal for home screening and large-scale screening by community health workers, especially in low-resource areas.

Support from India Health Fund

Funding by IHF and ACT For Health is aiding Salcit Technologies in the technical validation of Swaasa®'s AI algorithm. 6000 samples (3000 TB positives and 3000 TB negatives) have now been collected using Swaasa across clinical and community sites in AIIMS Delhi, AIIMS Bhubaneshwar, AIIMS Gorakhpur and JIPMER Pondicherry.

Where the project stands today and impact

Preliminary data analysis has shown that Swaasa demonstrates ~80% sensitivity and ~65% specificity, an acceptable rating for a screening and triaging tool for presumptive TB cases, particularly when used in combination with other assessments or diagnostic steps. Moreover, it shows high sensitivity for ages 6-14 years, which is encouraging given the challenges associated with paediatric TB diagnosis.

08   qXR: An AI-powered, automated chest X-ray screening tool to detect TB within minutes

Problem

In many low-resource settings, TB diagnosis still relies on analog chest X-rays, which are difficult to interpret without trained radiologists. This results in missed or delayed diagnoses, longer time to treatment initiation, increased risk of transmission of infection and an overreliance on costly confirmatory tests.

Solution

qXR, developed by Qure.ai, is a smartphone-based AI tool to screen patients for TB by analyzing their chest X-ray within minutes, with minimal training required for a technician. This innovation significantly bridges the gap left by the shortage of radiologists, reduces delays in diagnosis, and cuts down the need for confirmatory molecular tests, improving efficiency and accuracy.

Support from India Health Fund

IHF funded the algorithm development, development of the qXR app and capability to digitize analog chest X-Rays, a critical need in low-resource settings where analog X-Rays are the commonly available outputs. With IHF's support, qXR has scaled to screen >120,000 individuals (analog and digital X-rays) across over 128 sites, a majority of which include primary and secondary government facilities and charitable trust/mission-run hospitals. The pilots paved the way for quantifying the efficacy of the tool in last-mile settings, which included:

- a reduction in diagnosis turnaround time, with referral for confirmatory diagnosis becoming possible within two minutes.

- A comparative analysis of the treatment enrolment time before and after the software was deployed in a tertiary care centre in Rajasthan showed a 2.5-day reduction in treatment enrolment time, from 5.7 days to 3.2 days after introduction of qXR.

- Owing to its high sensitivity (more than 90%), the use of qXR has reduced the requirement of follow-on testing by 50%.

- qXR's deployment has also led to a 20% increase in the identification of incidental cases in Mumbai's seven peripheral hospitals.

- IHF's support also enabled the qXR platform to be adapted to detect COVID-19-related lung damage, demonstrating its versatility.

Impact and where it stands today

The outcomes enabled by IHF have helped qXR scale in India and beyond. qXR has now been independently evaluated by the WHO against a library of digital radiographs and associated clinical data, based on which it has been included as part of WHO's updated guidelines on TB screening. It is also being adapted for detection of silicosis (Pneumoconiosis), other lung health ailments including lung cancer, COPD and Interstitial Lung Disease, as well as early stages of heart failure.
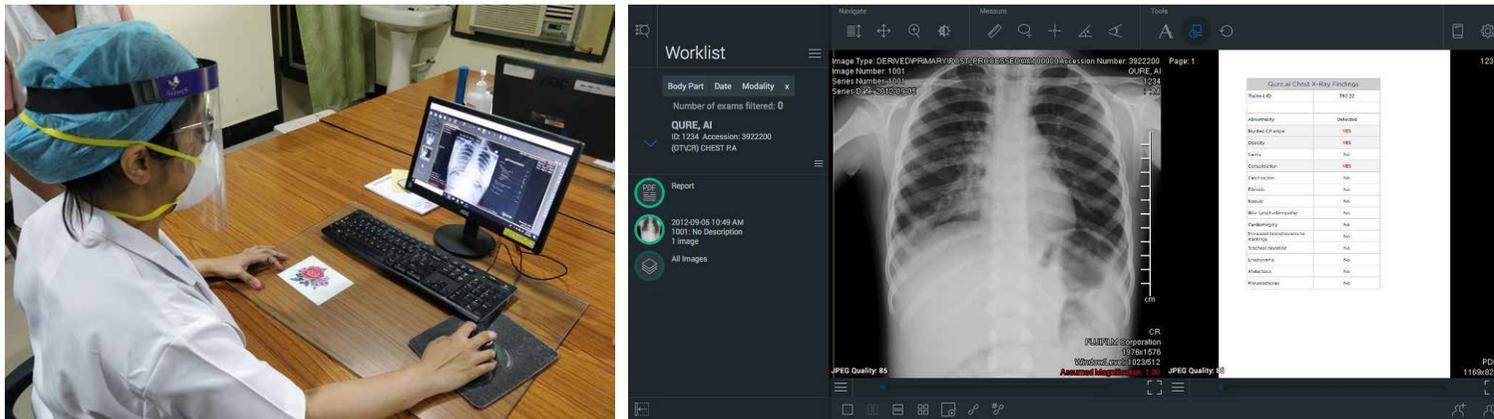
Treatment Adherence

09 TMEAD: A digital pillbox that helps TB patients adhere to their treatment

Problem

TB medications often come with difficult side effects, leading many patients to abandon treatment midway. This not only causes the disease to return—up to six times more likely—but also drives the rise of drug-resistant TB, one of the greatest public health

threats today. Traditionally, adherence to treatment depends on manual follow-ups by healthcare workers, a system that is difficult to scale and sustain.
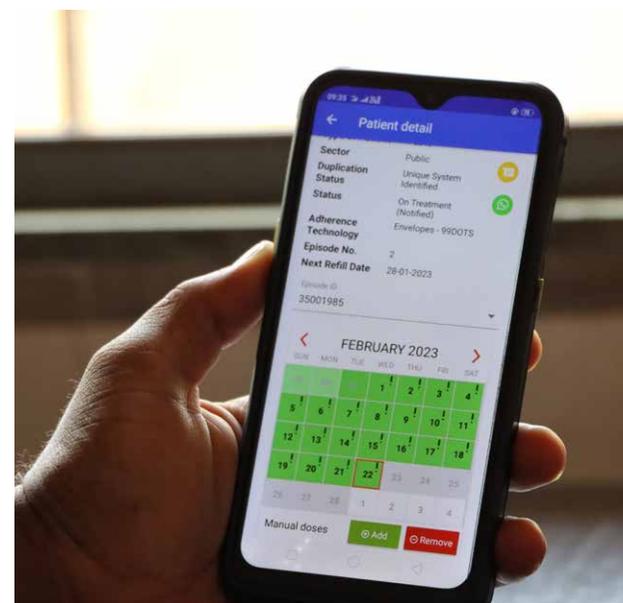
Solution

TMEAD (Tuberculosis Monitoring Encouragement Adherence Drive) is a digital pillbox designed to transform how TB patients stay on track with treatment. Pre-loaded with patient-specific medication sorted by dose, the device uses Internet of Things & cellular network technologies to monitor whether doses are taken on time and provides physical alarms and digital notifications as reminders to patients to take their medication. TMEAD also alerts health workers in real-time when doses are missed, ensuring quick intervention. This approach significantly improves treatment adherence, monitoring, and outcomes.

Support from India Health Fund

Through the IHF-supported pilot, over 800 TB patients in Maharashtra and Gujarat used TMEAD and an independent health technology assessment of TMEAD was performed by IIPHG, Gandhinagar. The study showed 99% adherence in the TMEAD group vs. 90% in the control group. The health technology assessment of TMEAD by Dept. of Health Research (DHR) revealed that treatment adherence is high with TMEAD compared to standard therapy

of care for drug-susceptible TB (DS-TB) patients and the intervention is cost-effective. The results have led to the device being recommended to the Central TB Division (CTD) for use in the National TB Elimination Programme.

Impact and where it stands today

Based on DHR's presentation to CTD, TMEAD will be recommended to be integrated in the Nikshay platform, which will allow reporting of patient treatment adherence on the platform and supplement TB case notification and monitoring efforts. Based on these positive outcomes, TMEAD is currently being recommended by CTD to the states for adoption.

Safe Sputum Transport (Supply Chain Optimization)

10 **TBSend Card: A novel sputum storage and transportation device for TB testing**

Problem

With limited accredited TB testing labs in India, sputum samples often travel long distances, before molecular testing can take place. This delay leads to contamination during transit in up to 10% of samples, increases costs and logistical complexities due to cold chain requirements to maintain sample quality, and hampers timely, accurate diagnosis. There's an urgent need for a low-cost, safe, and cold chain-free transport solution that preserves sample integrity for a long duration.

Solution

Wobble Base Bioresearch Private Limited has developed the TBSend Card—a cellulose matrix-based card coated with proprietary reagents that capture DNA from sputum.
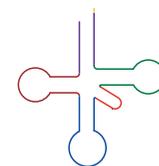
Wobble Base BioResearch

This solid-state card allows room-temperature storage and safe transport without compromising sample quality. DNA can then be released using a brief protocol and tested on any DNA testing platform for TB diagnosis. The design includes a biosafe pick-up handle, an airtight container with absorbent lining, and a denaturant that inactivates TB bacteria before storage. The sample remains stable for over six years and is compatible with standard DNA testing platforms. The card also has potential use for other fluid samples, like blood or plasma.

Support from India Health Fund

Through IHF's support, the TBSend Card has successfully passed independent biosafety testing at ICMR-National Institute for Research in Tuberculosis, Chennai and is now set for clinical validation at ICMR-NIRT.

Stakeholder engagement Initiatives in TB and Lung Health

7th International Symposium on "Seeking Ways to Eliminate TB in Asia" in South Korea organized by the Korea National TB Association [October 2024] where Asian players came together to address shared healthcare challenges with local resources and solutions. At the symposium, IHF delved into lessons from India and India Health Fund on the role of catalytic funding and collaborative initiatives to tackle TB and other infectious diseases.

India Innovation Summit hosted by Indian Council for Medical Research (ICMR) in Delhi [March 2025] where IHF joined the roundtable on "Commitment to Innovate towards Ending TB," and a panel that explored the challenges of scaling lab research into impactful real-world solutions.

Partnerships in TB and Lung Health

Driving TB Innovation Through Collaboration: IHF, ACT Grants, IPE Global, and IKP Knowledge Park

India Health Fund's engagement with domestic funders has brought awareness to the need to increase funding and action by Indian players to take a lead in addressing the burden of TB in India – which is the highest in the world.

IHF, in collaboration with ACT Grants, IPE Global and IKP Knowledge Park came together to announce the first-ever domestic funders consortium focused on supporting innovation in TB. The consortium launched a Request for Proposals (RfP) on World TB Day (24 March 2025), seeking innovative solutions which address unmet needs and emerging challenges in the continuum of care for TB, particularly for high-risk and underserved communities.

This first-of-its-kind domestic funder coalition for TB unites diverse types of funders, demonstrating the critical need for philanthropic patient capital to work alongside other funding models to unlock the full potential of health innovations.

This collective brings together a powerful mix of expertise and resources:

- IHF provides catalytic grant funding and a strategic focus on identifying and funding TB innovations, especially those that improve screening, diagnostics, and digital integration across the care continuum

- ACT Grants is contributing venture philanthropy expertise and catalytic grant funding to unlock high-potential innovations

- IPE Global is bringing blended finance and deep public health implementation expertise, strong government partnerships, and a strong focus on health systems strengthening and scale-up pathways

- IKP Knowledge Park is offering early-stage equity funding, scientific and technical incubation support, lab infrastructure, and mentorship for innovators.

Together, the collective aims to fast-track the validation and deployment of cutting-edge TB innovations, build replicable models for collaborative innovation support, strengthen India's TB primary care infrastructure, and contribute actionable insights to inform national TB strategy—ultimately improving outcomes for communities most at risk.
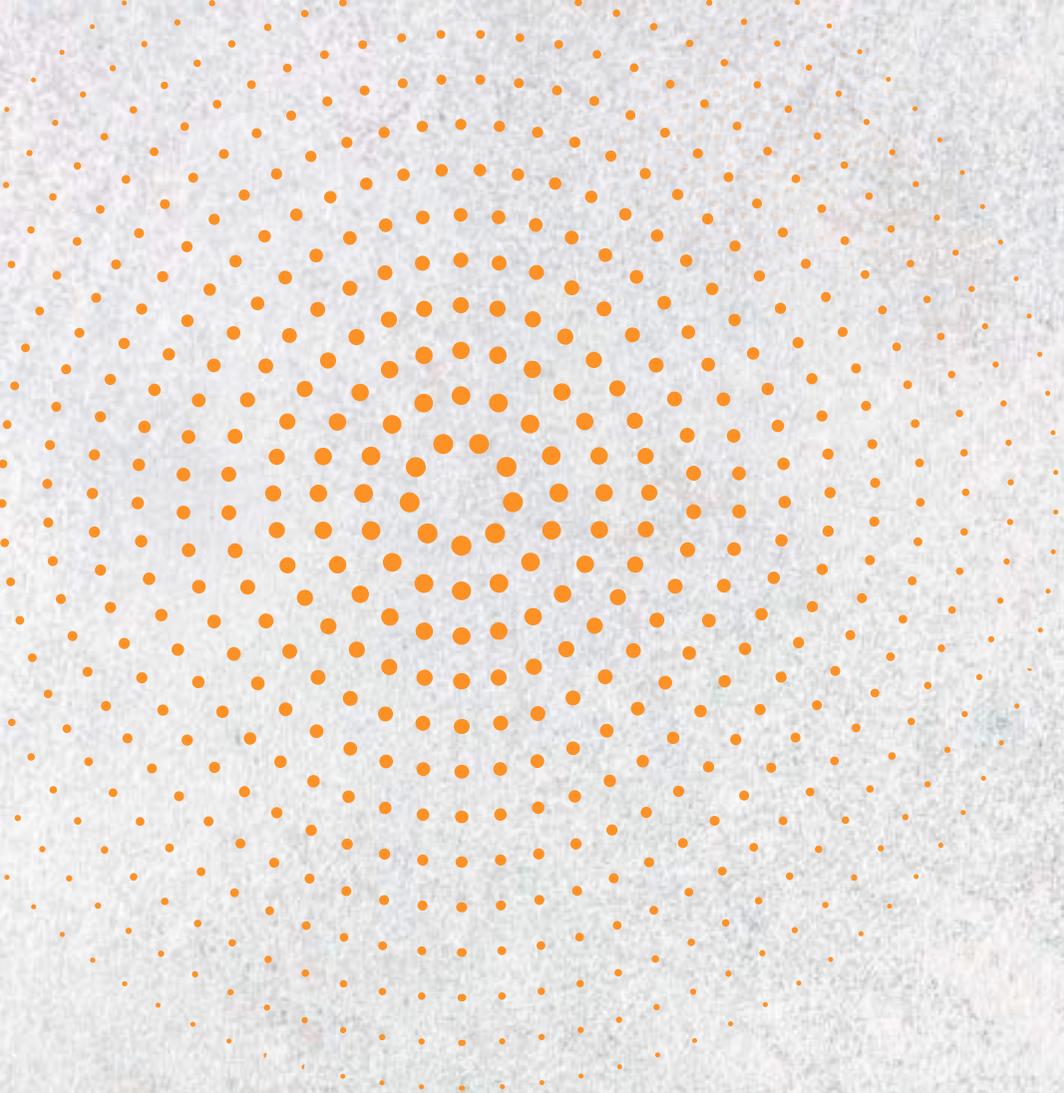
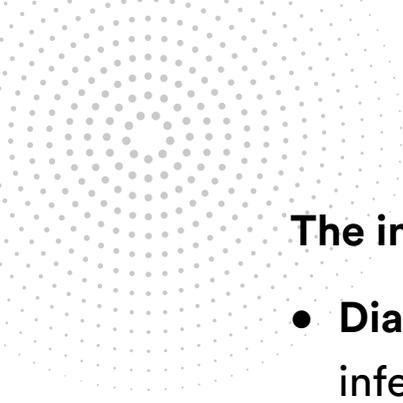# Antimicrobial Resistance (AMR)

Why do we work in AMR?

AMR is already one of the world's biggest killers, with 4.71 million associated deaths each year, with a sharp rise of 70% expected by 2050. In India, in 2019, AMR was associated with 1,042,500 deaths – the number expected to double by 2050[19]. The toll of AMR is further worsening due to climate-driven shifts in bacterial growth. One major challenge in tackling AMR is understanding its true burden, for which strong surveillance and effective diagnostics are prerequisites. Such tools not only hold the potential to strengthen primary health systems but also enhance decision-making capacities and preparedness at the local government level. However, the development of AMR surveillance and diagnostic tools remains underfunded. The reasons – high fixed costs for R&D, slow returns on upfront investment, and limited budgets for innovation, especially in resource-constrained low- and middle-income countries where the burden of AMR is the highest.

Despite these challenges, the case of investment in AMR is strong – for every $1 invested, an estimated return of $7.2-$13.1[20] is expected.

While IHF has been investing in point-of-care diagnostics for drug-resistant TB (DR-TB) *(see our projects with Healseq p.35 and TrueNat p.27)*, the growing challenge of AMR and the urgent need for solutions has led IHF to expand the scope of our AMR-focused investments to also include other disease areas – neonatal sepsis, urinary tract infections, acute respiratory tract infections, enteric infections and fungal infections. The key pathogens targeted in all these five disease areas are based on the WHO priority pathogen list as well as the pathogens of interest to the Indian Council of Medical Research. IHF now has an active pipeline of projects in AMR, which are currently being enabled with non-financial pre-funding support. Grant funding support will follow once the innovations reach the right stage of development.

19 https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02724-0/fulltext
20 Annex to the GLG Report: Towards specific commitments and action in the response to antimicrobial resistance

The innovation types that we are prioritizing are listed below:

- **Diagnostics:** Rapid, low-cost true point-of-care diagnostics for detecting resistant infections and antimicrobial susceptibility

- **Surveillance:** Digitally enabled surveillance systems translating into clinically relevant solutions

- **Decision support:** Clinical decision support systems for healthcare professionals and public health departments

Stakeholder engagement initiatives in AMR

Panel titled "Health Diplomacy in Fostering Regional Cooperation: From Access to Sustainable Solutions in Health" at the Regional World Health Summit in New Delhi [April 2025], organized by the Health Diplomacy Alliance. IHF shared insights on the potential for AMR innovation in the Asia-Pacific region and emphasized the critical role of health diplomacy in building an investment ecosystem to advance innovative diagnostics for infectious disease prevention and AMR.

Indo-Swiss AMR Innovation Dialogue, Switzerland [April-May 2025] organized by Swissnex in India, Consulate General of Switzerland where IHF joined a dialogue that brought together scientists, funders, policy makers and innovators to develop collaborations between Indian and Swiss organizations for long-term collaborations addressing the pressing challenge of AMR.
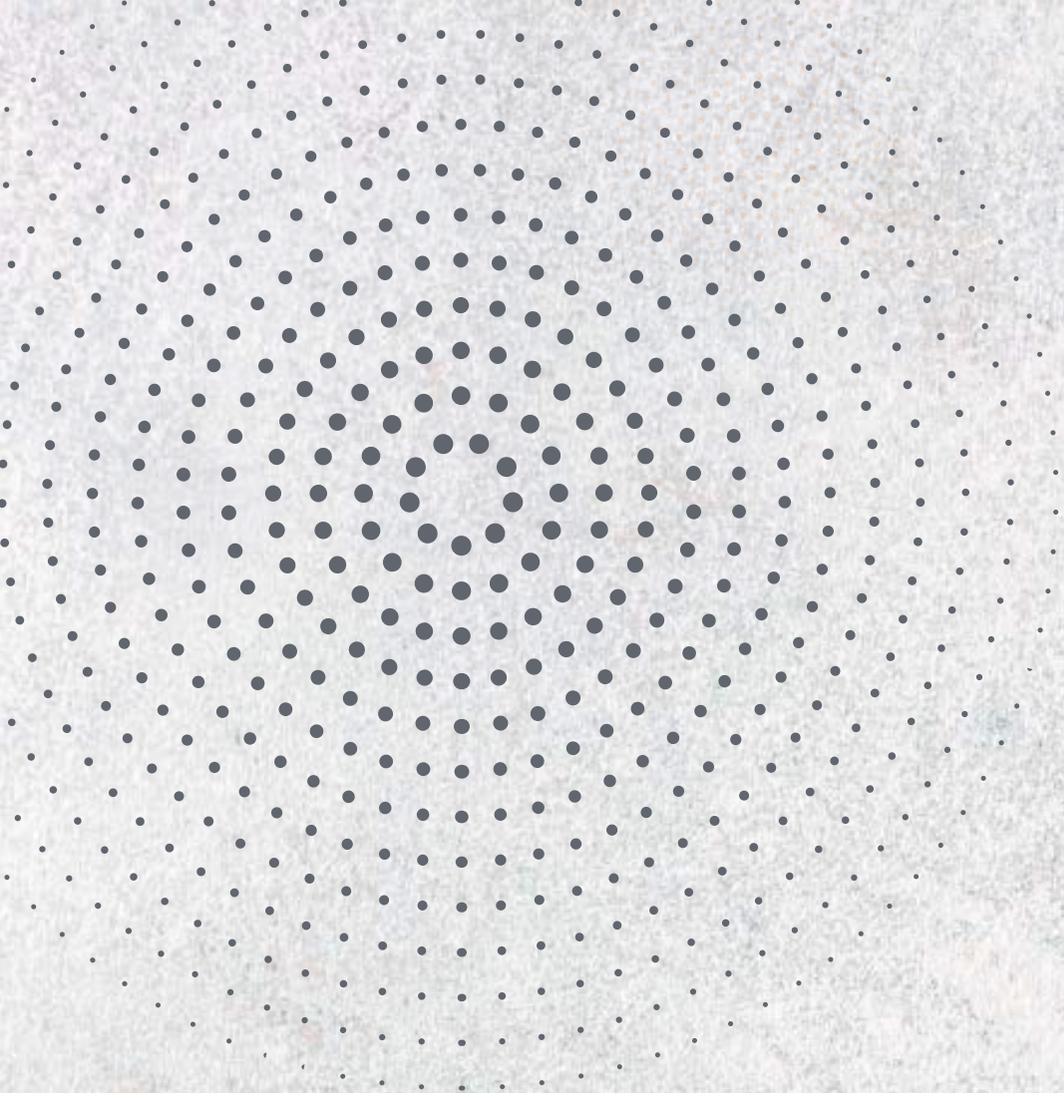
Partnering for impact

1 Closing the gap between innovation and implementation with Jhpiego

Addressing complex public health challenges—such as infectious diseases, tuberculosis (TB), digital health integration, and health system preparedness for emerging threats—requires both innovation and implementation expertise. While innovations have the potential to transform healthcare delivery, they often encounter barriers to adoption, scale-up, and integration into public systems.

Our strategic partnership with Jhpiego is designed to bridge the gap between innovation and implementation, ensuring that impactful solutions are not only developed but also embedded into public health systems at scale. This is achieved through robust evidence generation, policy engagement, and sustainable funding mechanisms.

This multi-country collaboration focuses on advancing shared goals across several key areas:

- Identifying, supporting, and scaling high-impact innovations that reduce public health expenditure, improve last-mile access and service delivery, and address systemic challenges through evidence generation, regulatory enablement, and need-gap analysis.

- Supporting the development and funding of initiatives in point-of-care diagnostics and ditgital health.

- Enabling implementation through program design, evidence generation, implementation support, capacity building of healthcare workers and providers, and operational research.

- Mobilizing resources through joint fundraising efforts with governments, multilateral agencies, and philanthropic partners.

- Facilitating ecosystem and network access for supported innovations by engaging with Indian and global stakeholders.

> *"Our partnership with India Health Fund reflects a shared commitment to ensuring that health innovations don't just remain promising ideas, but become practical solutions embedded in public systems. By combining Jhpiego's technical and implementation expertise with IHF's innovation ecosystem, we are creating a pathway for scalable, sustainable impact in public health."*
>
> **Dr. Amit Shah,**
> Country Director, India, Jhpiego

2 Advancing Climate-Responsive, Innovation-Driven Health Systems Across Asia with the Asian Development Bank

IHF's partnership with the Asian Development Bank (ADB) aims to leverage their complementary strengths to connect regional financing for health systems strengthening with local innovation. While IHF will bring forward catalytic funding to de-risk and validate science and technology-led product innovations, service delivery approaches and evidence-to-action toward solving complex public health challenges; ADB brings deep regional development expertise, policy advocacy, and financing capacity to scale solutions across Asia and the Pacific, aligned with its Strategy 2030. The partnership aims to bridge critical gaps between early-stage public health innovation to scale. Through the collaboration, the two entities will:

- Support climate-resilient and pandemic-prepared health systems at national and regional levels in developing member countries, including India.

- Accelerate the development, validation, and deployment of innovations in diagnostics, surveillance, treatment, and service delivery for climate-sensitive infectious and tropical diseases such as TB, malaria and dengue.

- Pilot and scale point-of-care and digital health solutions in urban and rural microsites for evidence generation, policy integration and knowledge dissemination.

- Advance action on AMR, women's health and the growing burden of non-communicable diseases, particularly among vulnerable populations.

- Engage the private sector to enhance its role as a provider of innovative products, services, and technologies by enabling co-funding, market access, and regulatory navigation.

- Promote regional knowledge exchange, the advancement of innovations, and advocacy in support of scalable public health solutions.

> " *At ADB, we recognize that infectious diseases, antimicrobial resistance, and addressing the adverse health impacts of climate change are emerging threats and concerns that demand urgent, coordinated action. Our partnership with IHF enables us to connect regional financing and health system strengthening with local innovation. Together, we aim to identify and scale transformative solutions to improve lives and build healthier, more resilient communities across Asia and the Pacific.*"
>
> **Ms. Ayako Inagaki,**
> Human and Social Development Sector Office, ADB Sectors Department 3, Asian Development Bank
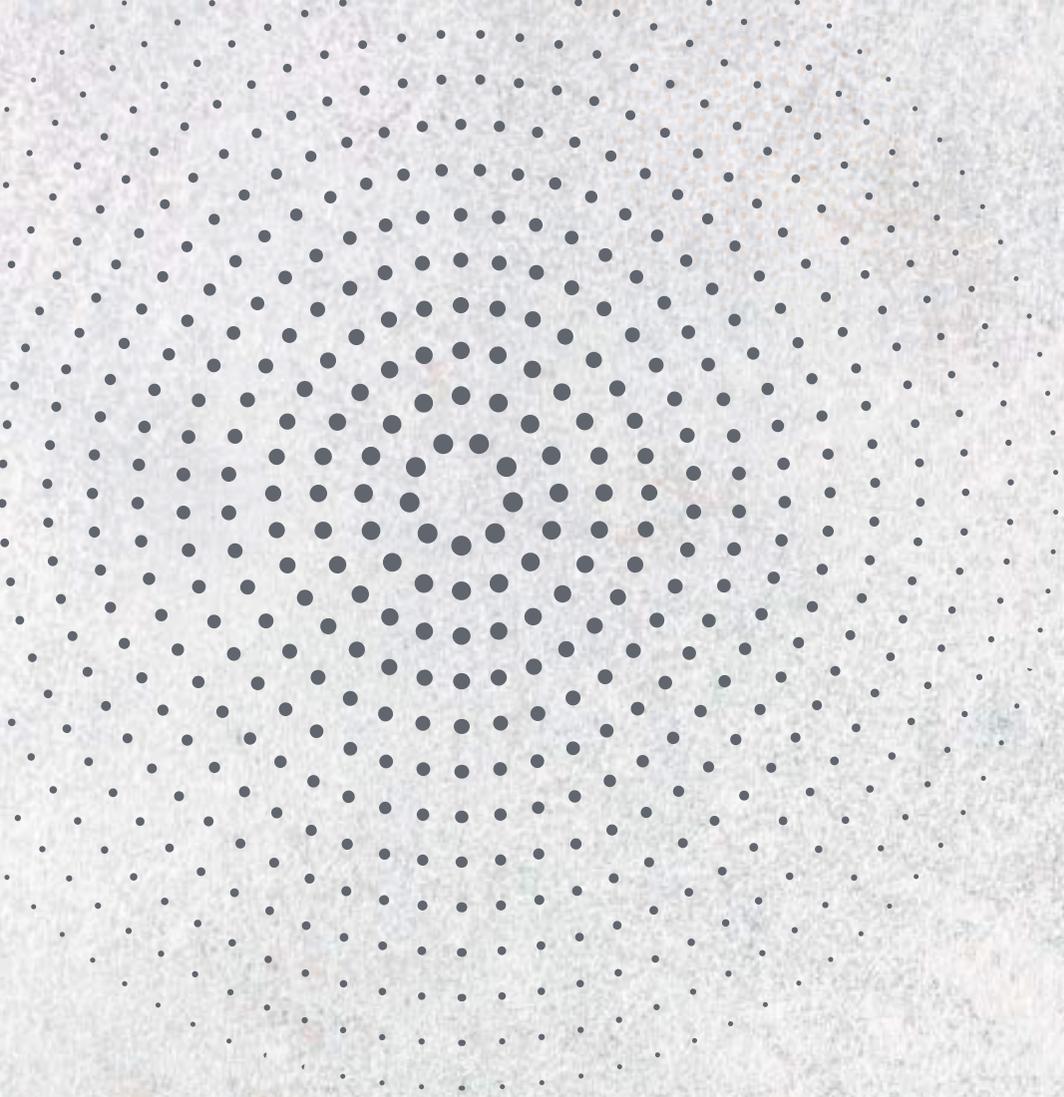
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